CABINET FOR HEALTH AND FAMILY SERVICES

DEPARTMENT FOR PUBLIC HEALTH

REGISTERED SANITARIAN

FIELD HANDBOOK

PREPARED BY

Kentucky Registered Sanitarian Examining Committee

Printed with State Funds
KRS 57.375

TABLE OF CONTENTS

INTRODUCTION

The Registered Sanitarian Examining Committee recognizes the need for a current *Registered Sanitarian's Field Handbook* for use by Registered Sanitarians (Registered Environmental Health Specialist) in the field. While this handbook may not contain all applicable information required by a Sanitarian, it contains reference material considered beneficial while working in the field.

We offer this Handbook in hopes it will satisfy the Kentucky Registered Sanitarian's needs to have valuable information at their fingertips while conducting field activities. It is our sincere objective to provide a tool which, when used with knowledge, training, and experience, will help protect, promote and enhance the health and well being of our Commonwealth's citizens.

Information gathered with assistance from the Division of Public Health Protection and Safety, Division of Laboratory Services, Division of Epidemiology, Division of Fire Prevention, Division of Air Quality, and Labor Cabinet.

Special thanks to the Division of Laboratory Services for their revision and inclusion of the *"Manual for Environmentalists and Milk Inspectors"* into this handbook.

ELEMENTS

Name	Symbol	Atomic No.
Actinium	Ac	89
Aluminum	Al	13
Americium	Am	95
Antimony, stibium	Sb	51
Argon	Ar	18
Arsenic	As	33
Astatine	At	85
Barium	Ba	56
Berkelium	Bk	97
Beryllium	Be	4
Bismuth	Bi	83
Boron	B	5
Bromine	Br	35
Cadmium	Cd	48
Calcium	Ca	20
Californium	Cf	98
Carbon	C	6
Cerium	Ce	58
Cesium	Cs	55
Chlorine	Cl	17
Chromium	Cr	24
Cobalt	Co	27
Columbium, see niobium		
Copper	Cu	29
Curium	Cm	96
Dysprosium	Dy	66
Einsteinium	Es	99
Erbium	Er	68
Europium	Eu	63
Fermium	Fm	100
Fluorine	F	9
Francium	Fr	87
Gadolinium	Gd	64
Gallium	Ga	31
Germanium	Ge	32
Gold, aurum	Au	79
Hafnium	Hf	72
Helium	He	2
Holmium	Ho	67
Hydrogen	H	1
Indium	In	49

ELEMENTS, continued

Name	Symbol	Atomic No.
Iodine	I	53
Iridium	Ir	77
Iron, ferrum	Fe	26
Krypton	Kr	36
Lanthanum	La	57
Lead, plumbum	Pb	82
Lithium	Li	3
Lutetium	Lu	71
Magnesium	Mg	12
Manganese	Mn	25
Mendelevium	Md	101
Mercury	Hg	80
Molybdenum	Mo	42
Neodymium	Nd	60
Neon	Ne	10
Neptunium	Np	93
Nickel	Ni	28
Niobium	Nb	41
Nitrogen	N	7
Nobelium	No	102
Osmium	Os	76
Oxygen	O	8
Palladium	Pd	46
Phosphorus	P	15
Platinum	Pt	78
Plutonium	Pu	94
Polonium	Po	84
Potassium	K	19
Praseodymium	Pr	59
Promethium	Pm	61
Protactinium	Pa	91
Radium	Ra	88
Radon	Rn	86
Rhenium	Re	75
Rhodium	Rh	45
Rubidium	Rb	37
Ruthenium	Ru	44
Samarium	Sm	62
Scandium	Sc	21
Selenium	Se	34
Silicon	Si	14
Silver, argentum	Ag	47

ELEMENTS, continued

Name	Symbol	Atomic No.
Sodium	Na	11
Strontium	Sr	38
Sulfur	S	16
Tantalum	Ta	73
Technetium	Tc	43
Tellurium	Te	52
Terbium	Tb	65
Thallium	Tl	81
Thorium	Th	90
Thulium	Tm	69
Tin, stannum	Sn	50
Titanium	Ti	22
Tungsten (Wolfram)	W	74
Uranium	U	92
Vanadium	V	23
Xenon	Xe	54
Ytterbium	Yb	70
Yttrium	Y	39
Zinc	Zn	30
Zirconium	Zr	40
Lawrencium	Lw	103

ABBREVIATIONS FOR UNITS OF MEASUREMENT

cfm = cubic feet per minute
cfs = cubic feet per second
cc = cubic centimeters
cm = centimeter(s)
ft. = foot or feet
sq.ft. = square feet
cu. t. = cubic feet
fps = feet per second
gal. = gallon(s)
gpd = gallons per day
gpm = gallons per minute
g = gram(s)
hr. = hour(s)
in. = inch(es)
sq. n. = square inch(es)
cu. n. = cubic inch(es)
lb. = pound(s)
km = kilometer(s)
m = meter(s)
mg = milligram(s)
mg/l = milligram(s) per liter
mil.gal.= million gallons
mgd = million gallons per day
min. = minute(s)
ml = milliliter(s)
MLSS = mixed liquor suspended solids
oz. = ounce(s)
ppm = parts per million = mg/l
sec. = second(s)
SS = suspended solids
VSS = volatile suspended solids
yd. = yard(s)

METRIC EQUIVALENTS
(Based on National Bureau of Standards)

LENGTH

Cm = 0.3937 in.	In. = 2.5400 cm
Meter = 3.2808 ft.	Ft. = 0.3048 m
Meter = 1.0936 yd.	Yd. = 0.9144 m
Km = 0.6214 mile	Mile = 1.6093 km

AREA

Sq. cm = 0.1550 sq. in.	Sq. in. = 6.4516 sq. cm
Sq. m = 10.7639 sq. ft.	Sq. ft. = 0.0929 sq. m
Sq. m = 1.1960 sq. yd.	Sq. yd. = 0.8361 sq. m
Hectare = 2.4710 acres	Acre = 0.4047 hectare
Sq. km = 0.3861 sq. mile	Sq. mile = 2.5900 sq. km

VOLUME

Cu. cm = 0.0610 sq. in.	Cu. in. = 16.3872 cu. cm
Cu. m = 35.3145 cu. ft.	Cu. ft. = 0.0283 cu. m
Cu. m = 1.3079 cu. yd.	Cu. yd. = 0.7646 cu. m

CAPACITY

Liter = 0.0353 cu. ft.	Cu. ft. = 28.3162 liters
Liter = 0.2642 gal. (U.S.)	Gal. = 3.7853 liters
Liter = 61.0250 cu. in.	Cu. in. = 0.0164 liter

Liter = 2.2046 lb. of pure water at 4º Celsius

WEIGHT

Gram = 15.4324 grains	Grain = 0.0648 g
Gram = 0.0353 oz.	Oz. = 28.3495 g
Kg = 2.2046 lb.	Lb. = 0.4536 kg
Kg = 0.0011 ton (sht)	Ton (sht) = 907.1848 kg
Ton (met.) = 1.1023 ton (sht)	Ton (sht) = 0.9072 ton (met.)
Ton (met.) = 0.9842 ton (lg)	Ton (lg) = 1.0160 ton (met.)

PRESSURE

1 kg per sq. cm = 14.223 lb. per sq. in.
1 lb. per sq. in. = 0.0703 kg per sq. cm
1 kg per sq. m =0.2048 lb. per sq. ft.
1 lb. per sq. ft.= 4.8824 kg per sq. m
1 kg per sq. cm = 0.9678 normal atmosphere

WEIGHTS AND MEASURES

LINEAR MEASURE

1 foot = 12 inches
1 yard = 3 feet
1 rod = 51/2 yards
1 furlong = 40 rods
1 stat. mile = 8 furlongs
1 stat. mile = 5280 feet
1 naut. mile = 6080 feet
1 league = 3 miles

CIRCULAR MEASURE

1 minute = 60 seconds
1 degree = 60 minutes
1 radian = 57.296 degrees
1 quadrant = 90 degrees
1 circle = 4 quadrants = 2π radians or 360 degrees

SQUARE MEASURE

144 sq. inches = 1 sq. foot
9 sq. feet = 1 sq. yard
301/4 sq. yards = 1 sq. rod
160 sq. rods = 1 acre
43,560 sq. feet = 1 acre
640 acres = 1 sq. mile

LIQUID MEASURE

1 pint = 4 gills
1 quart = 2 pints
1 gallon = 4 quarts
1 barrel = 311/2 gallons
1 hogshead = 2 barrels
1 [mp. gal. = 1.2 gal. (U.S.)

VOLUME

1 cu. ft. = 7.48 gal.
1 gal. = 231 cu. inches
1 gal/hr. = 2.135 oz/min.

AVOIRDUPOIS WEIGHT

1 dram = 27.3437 grains
1 ounce = 16 drams
1 pound = 16 ounces
1 quarter = 25 pounds
1 hundredweight = 4 quarters
1 short ton = 2000 pounds
1 long ton = 2240 pounds
1 pound = 7000 grains

APOTHECARIES' WEIGHT

1 scruple = 20 grains
1 dram = 3 scruples
1 ounce = 8 drams
1 pound = 12 ounces

CONSTANTS

π equals 3.1416
Water freezes at 32º F or 0º C
Water boils at 212º F or 100ºC
Body temperature is 98.6ºF or 37ºC

7000 grains = 1#
1 grain/gallon = 17.1 ppm
1 grain/gallon = 142.86#/mil.gal.

1 atmospheric pressure = 14.7#/sq.in

ppm is 1 part in a million parts by weight
ppm = 8.34#/million gallons

1 atm. Pressure = 34 ft. of water
1 foot of water = 0.433#/sq.in.

1#/sq.in. = 2.31 ft. of water

1 gallon = 231 cu. inches - 128 ounces
1 gallon of water weighs 8.34#
1 quart = 32 fluid ounces

1 mile = 5,280 feet
1 acre = 43,560 sq.ft.

1 cu. ft. = 7.48 gallons (7.5)

1 cu. ft. of water weighs 62.5# approx.
1 cu. ft. = 1,728 cu. inches

British imperial gallon = 1.2 U.S gal.
1 Brit. imperial gallon weighs 10#

1% strength of sol. = 10,000 ppm

METRIC SYSTEM

Prefixes	**Meaning**	**Units**
Milli	1/1000 or .001	Meter for length
Centi	1/100 or .01	Gram for mass
Deci	1/10 or .1	Liter for capacity
unit	1	
Deka	10	
Hecto	100	
Kilo	1000	

CONVERSION RATIOS

Multiply	**By**	**To Obtain**
Diam. Circle	3.1416	Circum. Circle
Diam. Circle	0.8862	Side of = sq.
Diam. Sphere cubed	0.5236	Vol. of sph.
Circular mils	0.7854	Square mils
U.S. gallons	0.8327	Imp. gal.(Brit.)
U.S. gallons	0.1337	Cubic feet
U.S. gallons	8.330	lb. of water (20ºC)
Cubic feet	62.427	lb. of water (4ºC)
Ft. of water (4º C)	0.4336	lb per sq. in.
In. of mercury (0º C)	0.4912	lb per sq. in.
Knots	1.1516	Miles per hour

To obtain the above, divide by starting with above.

CONVENIENT MULTIPLIERS

Inches x 0.0833 = feet
Inches x 0.02778 = yards
Inches x 0.00001578 = miles

Sq. in. x 0.00695 = sq. feet
Sq. in. x 0.0007716 = sq. yards
Cu. in. x 0.00058 = cu. feet
Cu. in. x 0.0000214 = cu. yards

Feet x 0.3334 = yards
Feet x 0.00019 = miles

Sq. feet x 144 = sq. inches
Sq. feet x 0.1112 = sq. yards

Yards x 36 = inches
Yards x 3 = feet
Yards x 0.0005681 = miles

Cu. feet x 1,728 = cu. inches
Cu. feet x 0.03704 = cu. yards
Sq. yards x 1,296 = sq. inches

Avoir. oz. x 0.0625 = pounds
Avoir. oz. x 0.00003125 = tons
Avoir. lbs. x 16 = ounces

Avoir. lbs. x 0.0005 = tons
Avoir. tons x 32,000 = ounces
Avoir. tons x 2,000 = pounds

Volume of Cone (or pyramid) = Area of Base x Altitude + 3
Surface Area of Sphere = 4π r cubed
Volume of a Sphere = 4/3π r cubed
Area of Rectangle = Length x Breadth
Volume of Rectangle = Length x Breadth x Height
Area of Triangle = Base x ½ Perpendicular Height

Diameter of Circle = Radius x 2
Circumference of Circle = Diameter x 3.1416
Area of Circle = Square of Diameter x .7854
Surface of Cylinder = 2π r H; if one end is added = 2π r H + π r squared

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Diameter of pipe or cylinder in inches squared x 0.041 equals gallons per foot run

Calorie is the amount of heat required to raise 1 gram of water through 1º C.
(This is the small calorie.)

Large calorie is amount of heat required to raise 1 kilogram of water through 1º C.
(Large calorie = 1000 small calorie.)

PURIFICATION OF WATER FOR EMERGENCY USE

HEAT

1. Strain water through a clean cloth into a clean container to remove any sediment or floating matter.
2. Boil the water vigorously for at least three (3) full minutes.
3. Allow water to cool. Keep water in clean covered container.

CHEMICAL

If boiling is not possible, strain the water as in step 1 above and purify with any of the chemicals as follows:

LIQUID CHLORINE LAUNDRY BLEACH

(Read label to find percentage available)

	Drops to be added per quart	
Available Chlorine	**Clean Water**	**Cloudy Water**
1	10	20
4 to 6 percent*	2	4
7 to 10 percent	1	2
If not known	10	20

* Common household laundry bleach

1. Mix thoroughly by stirring or shaking water in container.
2. Let stand for 30 minutes.
3. A slight chlorine odor should be detectable in the water; if not, repeat the dosage and let stand for an additional 15 minutes before using.

TINCTURE OF IODINE

(From medicine chest or first aid kit)

	Drops to be added per quart	
Tincture of Iodine	**Clean water**	**Cloudy water**
2 percent	5	10

1. Let stand for 30 minutes, after which time water is safe to use.

Formula for Determining Amount of Chlorine Required for Water Treatment

$$\text{Gallons of 5\% Available Chlorine-Required} = \frac{\text{Gals. Of water treated} \times \text{ppm dosage}}{50{,}000}$$

When using sources of chlorine other than 5% vary the gallons of source of chlorine in proportion to percent of available chlorine.

WATER

1 gal. = 8.33 lbs.
1 cu. ft. = 7.4805 gal. = 62.4 lbs.
1 acre in. = 27,154 gal.
1 acre ft. = 325,850 gal. = 43,560 cu. ft.
1 cu. ft. per sec. = 448.8 gal. per min. = 0.9917 acre in. per H.
Feet Head x .433 = lbs. per sq. in.

WATER CONVERSION FACTORS

U.S. gallons	x	8.33 = pounds
U.S. gallons	x	0.13368 = cu. ft.
U.S. gallons	x	231. = cu. in.
U.S. gallons	x	0.083 = Imperial gals.
U.S. gallons	x	3.78 = liters
Imperial gallons	x	10. = pounds
Imperial gallons	x	0.16 = cu. ft.
Imperial gallons	x	277.274 = cu. in.
Imperial gallons	x	1.2 = U.S. gallons
Imperial gallons	x	4.537 = liters
Cubic inches (of water) (39.1º)	x	0.036125 = pounds
Cubic inches (of water) (39.1º)	x	0.004329 = U.S. gallons
Cubic inches (of water) (39.1º)	x	0.003607 = Imperial gallons
Cubic inches (of water) (39.1º)	x	0.576384 = ounces
Cubic feet (of water) (39.1º)	x	62.425 = pounds
Cubic feet (of water) (39.1º)	x	7.48 = U.S. gallons
Cubic feet (of water) (39.1º)	x	6.232 = Imperial gallons
Cubic feet (of water) (39.1º)	x	0.028 = tons
Pounds of water	x	27.72 = cubic inches
Pounds of water	x	0.01602 = cubic feet
Pounds of water	x	0.12 = U.S. gallons
Pounds of water	x	0.10 = Imperial gallons

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CLASSIFICATION OF WATER HARDNESS

	ppm/Gal.	**Grains/Gal.**
Soft	0- 60	0- 3.5
Moderately Hard	60-120	3.5-7.0
Hard	120-180	7.0-10.5
Very Hard	Over 180	Over 10.5

PARTS PER MILLION

Parts per million is a convenient way to quote percentages in relatively low concentrations. Parts per million is percentages reduced to the millionth place. Listed are various comparisons:

%	P.P.M.	%	P.P.M.
100.0	1,000,000	.05	500
10.0	100,000	.04	400
1.0	10,000	.03	300
.9	9,000	.02	200
.8	8,000	.01	100
.7	7,000	.009	90
.6	6,000	.008	80
.5	5,000	.007	70
.4	4,000	.006	60
.3	3,000	.005	50
.2	2,000	.004	40
.1	1,000	.003	30
.09	900	.002	20
.08	800	.001	10
.07	700	.0001	1
.06	600	.00001	1/10

pH

pH is a measure of the intensity of acidity or alkalinity.

Numerically pH is the logarithm of the reciprocal of the gram ionic hydrogen equivalents per liter.

$$pH = \log \frac{1}{[H+]} \text{ per liter}$$

pH Values		
Alkalinity	14.0	10,000,000
	13.0	1,000,000
	12.0	100,000
	11.0	10,000
	10.0	1,000
	9.0	100
	8.0	10
(Neutral)	7.0	1
	6.0	10
	5.0	100
	4.0	1,000
	3.0	10,000
	2.0	100,000
	1.0	1,000,000
Acidity	0.0	10,000,000

TEMPERATURE

The numbers in the left-hand column refer to temperature in degrees Centigrade and corresponding degrees in Fahrenheit are found in the right-hand column.

ºC.	ºF.	ºC.	ºF.	ºC.	ºF.	ºC.	ºF.
-30	-22.0	22	71.6	74	165.2	152	305.6
-29	-20.2	23	73.4	75	167.0	154	309.2
-28	-18.4	24	75.2	76	168.8	156	312.8
-27	-16.6	25	77.0	77	170.6	158	316.4
-26	-14.8	26	78.8	78	172.4	160	320.0
-25	-13.0	27	80.6	79	174.2	162	323.6
-24	-11.2	28	82.4	80	176.0	164	327.2
-23	- 9.4	29	84.2	81	177.8	166	330.8
-22	- 7.6	30	86.0	82	179.6	168	334.4
-21	- 5.8	31	87.8	83	181.4	170	338.0
-20	- 4.0	32	89.6	84	183.2	172	341.6
-19	- 2.2	33	91.4	85	185.0	174	345.2
-18	- 0.4	34	93.2	86	186.8	176	348.8
-17	1.4	35	95.0	87	188.6	178	352.4
-16	3.2	36	96.8	88	190.4	180	356.0
-15	5.0	37	98.6	89	192.2	182	359.6
-14	6.8	38	100.4	90	194.0	184	363.2
-13	8.6	39	102.2	91	195.8	186	366.8
-12	10.4	40	104.0	92	197.6	188	370.4
-11	12.2	41	105.8	93	199.4	190	374.0
-10	14.0	42	107.6	94	201.2	192	377.6
- 9	15.8	43	109.4	95	203.0	194	381.2
- 8	17.6	44	111.2	96	204.8	196	384.8
- 7	19.4	45	113.0	97	206.6	198	388.4
- 6	21.2	46	114.8	98	208.4	200	392.0
- 5	23.0	47	116.6	99	210.2	202	395.6
- 4	24.8	48	118.4	100	212.0	204	399.2
- 3	26.6	49	120.2	102	215.6	206	402.8
- 2	28.4	50	122.0	104	219.2	208	406.4
- 1	30.2	51	123.8	106	222.8	210	410.0
0	32.0	52	125.6	108	226.4	212	413.6
1	33.8	53	127.4	110	230.0	214	417.2
2	35.6	54	129.2	112	233.6	216	420.8
3	37.4	55	131.0	114	237.2	218	424.4
4	39.2	56	132.8	116	240.8	220	428.0

TEMPERATURE, continued

The numbers in the left-hand column refer to temperature in degrees Centigrade and corresponding degrees in Fahrenheit are found in the right-hand column.

ºC.	ºF.	ºC.	ºF.	ºC.	ºF.	ºC.	ºF.
5	41.0	57	134.6	118	244.4	222	431.6
6	42.8	58	136.4	120	248.0	224	435.2
7	44.6	59	138.2	122	251.6	226	438.8
8	46.4	60	140.0	124	255.2	228	442.4
9	48.2	61	141.8	126	258.8	230	446.0
10	50.0	62	143.6	128	262.4	232	449.6
11	51.8	63	145.4	130	266.0	234	453.2
12	53.6	64	147.2	132	269.6	236	456.8
13	55.4	65	149.0	134	273.2	238	460.4
14	57.2	66	150.8	136	276.8	240	464.0
15	59.0	67	152.6	138	280.4	242	467.6
16	60.8	68	154.4	140	284.0	244	471.2
17	62.6	69	156.2	142	287.6	246	474.8
18	64.4	70	158.0	144	291.2	248	478.4
19	66.2	71	159.8	146	294.8	250	432.0
20	68.0	72	161.6	148	298.4	252	485.6
21	69.8	73	163.4	150	302.0	254	489.2

From - Klenzade Dairy Sanitation Handbook

To convert Centigrade to Fahrenheit temperature, multiply the Centigrade reading by 9/5 and add 32.

To convert Fahrenheit to Centigrade temperature, subtract 32 from Fahrenheit reading and multiply by 5/9.

$$\frac{\text{Centigrade}}{100} = \frac{\text{Fahrenheit - 32}}{180}$$

NUMBER OF U.S. GALLONS IN ROUND TANK FOR ONE FOOT IN DEPTH

Diameter of Tank	Capacity U.S. Gallons	Cu. Ft. and Area Sq. Ft.	Diameter of Tank	Capacity U.S. Gallons	Cu. Ft. and Area Sq. Ft.
1' "	5.87	.785	5' 4"	167.12	22.34
1 1	6.89	.922	5 5	172.38	23.04
1 2	8.	1.069	5 6	177.72	23.76
1 3	9.18	1.227	5 7	183.15	24.48
1 4	10.44	1.396	5 8	188.66	25.22
1 5	11.79	1.576	5 9	194.25	25.97
1 6	13.22	1.767	5 10	199.92	26.73
1 7	14.73	1.969	5 11	205.67	27.49
1 8	16.32	2.182	6	211.51	28.27
1 9	17.99	2.405	6 3	229.50	30.68
1 10	19.75	2.640	6 6	248.23	33.18
1 11	21.58	2.885	6 9	267.69	35.78
2	23.50	3.142	7	287.88	38.48
2 1	25.50	3.409	7 3	308.81	41.28
2 2	27.58	3.687	7 6	330.48	44.18
2 3	29.74	3.976	7 9	352.88	47.17
2 4	31.99	4.276	8	376.01	50.27
2 5	34.31	4.587	8 3	399.88	53.46
2 6	36.72	4.909	8 6	424.48	56.75
2 7	39.21	5.241	8 9	449.82	60.13
2 8	41.78	5.585	9	475.89	63.62
2 9	44.43	5.940	9 3	502.70	67.20
2 10	47.16	6.305	9 6	530.24	70.88
2 11	49.98	6.681	9 9	558.51	74.66
3	52.88	7.069	10	587.52	78.54
3 1	55.86	7.467	10 3	617.26	82.52
3 2	58.92	7.876	10 6	647.74	86.59
3 3	62.06	8.296	10 9	678.95	90.76
3 4	65.28	8.727	11	710.90	95.03
3 5	68.58	9.168	11 3	743.58	99.40
3 6	71.97	9.621	11 6	776.99	103.87
3 7	75.44	10.085	11 9	811.14	108.43
3 8	78.99	10.559	12	846.03	113.10
3 9	82.62	11.045	12 3	881.65	117.86
3 10	86.33	11.541	12 6	918.	122.72
3 11	90.13	12.048	12 9	955.09	127.86
4	94.	12.566	13	992.91	132.72
4 1	97.96	13.095	13 3	1031.5	137.89
4 2	102.	13.635	13 6	1070.8	143.14
4 3	106.12	14.186	13 9	1110.8	148.49
4 4	110.32	14.748	14	1151.5	153.94
4 5	114.61	15.321	14 3	1193.	159.48
4 6	118.97	15.90	14 6	1235.3	165.13
4 7	123.42	16.50	14 9	1278.2	170.87
4 8	127.95	17.10	15	1321.9	176.71
4 9	132.56	17.72	15 3	1366.4	182.65
4 10	138.25	18.35	15 6	1411.5	188.69
4 11	142.02	18.99	15 9	1457.4	194.83
5	146.88	19.63	16	1504.1	201.06
5 1	151.82	20.29	16 3	1551.4	207.39
5 2	156.83	20.97	16 6	1599.5	213.82
5 3	161.93	21.65	16 9	1648.4	220.35

To find the capacity of tanks larger than given in the table, set table for tank one-half of the given size, and multiply its capacity by 4, or one of one-third its size and multiply by 9, etc.

VENTILATION SYSTEMS

1. Canopy hoods: Canopy hoods shall be designed to cover completely the cooking equipment. The edge of the hood shall extend a minimum horizontal distance of 6" beyond the edge of the cooking on all open sides.

   - Canopy wall mount hood:
     length of hood (FT.) x width of hood (FT.) x 100 CFM = Exhaust Requirement

   - Canopy Island hood:
     length of hood (FT.) x width of hood (FT.) x 150 CFM

   - Low wall or back shelf hood:
     lineal feet of cooking surface x 300 CFM = Exhaust Requirement

   - A cleaning schedule shall be submitted for every commercial kitchen exhaust system. The schedule shall indicate methods of cleaning and time interval between cleanings.

   - The code official shall require a full-scale test of the commercial kitchen exhaust system to determine conformance. The test shall simulate the most severe cooking conditions for the particular installation.

Further information may be obtained from the Department of Housing, Buildings and Construction, Division of Fire Prevention, 1047 US Highway 127S., Bay 1, Frankfort, KY 40601-4322 (502) 564-3626.

'A' WEIGHTED SOUND LEVELS OF SOME NOISES FOUND IN DIFFERENT ENVIRONMENTS

(NOTE: UNLESS OTHERWISE SPECIFIED, LISTED SOUND LEVELS ARE MEASURED AT TYPICAL OPERATOR-LISTENER DISTANCES FROM SOURCE.)

OVERALL LEVEL Db/A (SPL re 0.0002 MICROBAR)	**INDUSTRIAL**	**COMMUNITY (OR OUTDOOR)**	**HOME (OR INDOOR)**
– 130 + PAIN			
– 130 – LIMITED AMPLIFIED SPEECH UNCOMFORTABLY	OXYGEN TORCH		
– 120 – LOUD	SCRAPER-LOADER (117dB) COMPACTOR (116dB)	JET TAKEOFF @ 200 FT. (120 dB)	
– 110 – MAX. VOCAL EFFORT	RIVETING MACHINE (110 dB) TEXTILE LOOM (106 dB)	AUTO HORN @ 3 FT. (112 dB)	ROCK-N-ROLL BAND (108-111 dB)
– 100 – VERY LOUD	ELECTRIC FURNACE AREA (100dB) FARM TRACTOR (98 dB)	JET FLYOVER @ 1000 FT. (103 dB) POWER MOWER (96 dB)	
– 90 –	NEWSPAPER PRESS (97 dB) INSIDE SUBWAY CAR 25 MPH (95 dB)	COMPRESSOR @ 20 FT. (92 dB) ROCK DRILL @ 100 FT. (92 dB) MOTORCYCLES @ 25 FT. (90 dB)	
– 80 – MODERATELY LOUD	COCKPIT-PROP AIRCRAFT (88 dB) COTTON MILLING MACHINE (85 dB) COTTON SPINNING (83 dB) LATHE (81 dB) TABULATING (80 dB)	PROPELLER AIRCRAFT FLYOVER @ 100 FT. (88 dB) DIESEL TRUCK, 40 MPH @ 50 FT. (84 dB)	FOOD BLENDER (88dB) GARBAGE DISPOSAL (80 dB)
– 70 –		PASSENGER CAR 65 MPH @ 25 FT. (77 dB)	CLOTHES WASHER (78 dB) LIVING ROOM MUSIC (76 dB) DISHWASHER (75 dB) TV-AUDIO (70 dB) VACUUM (70 dB)
– 60 –		NEAR FREEWAY-AUTO TRAFFIC (64 dB) AIR CONDITIONING UNIT @ 20 FT. (60 dB)	CONVERSATION (60 dB)
– 50 – QUIET		LARGE TRANSFORMER @ 200 FT. (53 dB) LIGHT TRAFFIC @ 100 FT. (50 dB)	
– 40 –			
– 30 – VERY QUIET			
– 20 –			
– 10 – JUST AUDIBLE			
– 0 – THRESHOLD OF HEARING (1000-4000 Hz)			

NOISE

HEALTH EFFECTS

Noise - induced hearing loss is the most significant physical health problem caused by excessive noise exposure. In addition to losses in hearing sensitivity, noise may provoke physical (trigger ailments like stomach ulcers and allergies) and mental stress; hinder or complicated performance capability; and disrupt one's privacy, relaxation, and sleep.

BASIC SOLUTION

1. Separate by distance the source of noise from the listener.
2. Surround the noise source with sound-absorbing material.
3. Surround the people who would be disturbed by the noise with sound-absorbing material.
4. Install a sound suppression device between the people and the noise source.

DEFINITIONS

NOISE - Unwanted sound.

DECIBEL (dB) - The unit of measuring the loudness (intensity of a sound. Zero is the slightest sound that can be heard, with the perceived loudness doubling approximately every ten decibels.

PITCH - Tone level. Pitch is determined by how many times per second the sound waves vibrate.

AMBIENT NOISES - Noise that occurs in the absence of directly observable noise sources.

SONIC BOOM - The loud bang and change in air pressure of the shock wave which every plane flying faster than the speed of sound drags along behind it.

PERMISSIBLE NOISE EXPOSURES DURATION PER SOUND LEVEL dB/A

Day, Hours	Slow Response
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

LIGHTING

Foot Candle: The foot-candle is a measure of brightness - intensity of light. It is the brightness of the light that impinges upon a surface that is one foot away from the center of a candle.

Lumen: A lumen is the unit of luminous flux. A lumen is just a little less than one-twelfth of a candlepower.

Candlepower: Candlepower is the unit of intensity of a light source.

RECOMMENDED LIGHTING REQUIREMENTS	
Place	**Recommended Foot-Candles**
Walks, drives, on other outdoor areas, if used at night	0.5
Playgrounds, outdoor, if used at night	2.0
If used for night baseball, basketball, etc.	10.0
Storage spaces, passages	10.0
Boiler rooms, power plants	5.0
Stairways, landings, corridors, aisles, exits, washrooms, locker spaces, dressing rooms	20.0
Auditoriums, assembly rooms	10.0
If used for class or study purposes	30.0
Libraries (reading tables, catalogues)	30.0
Laboratories, general	30.0
Local illumination	50.0
Manual training rooms, workshops, general	30.0
Local illumination	100.0
Drafting rooms, sewing, typing, general	30.0
Local illumination	100.0

AIR QUALITY DEFINITIONS

acid deposition: acid or acid-forming materials that are deposited on biota, land or water surfaces, in either wet or dry form.

acid rain: rain with a pH of less than 5.6; results from atmospheric moisture mixing with sulfur and nitrogen oxides emitted from the burning of fossil fuels; may cause damage to buildings, car finishes, crops, forests, and aquatic life; one form of acid deposition.

air pollution: air-borne substances, either not found in the normal composition of air or at above normal levels, that can harm living organisms and/or other materials or resources.

air pollution index: a description of the concentration of specific types of air pollution present in the ambient air; known as the "PSI Index", pollutant standards index in the U.S.

air quality: a comparison of the composition of the air we breathe to an uncontaminated air resource or to air quality objectives.

Air Quality Index (AQI): a specific air pollution index used in Canada to characterize air quality.

ambient air: the outside air that surrounds us; the air that we breathe.

ambient air quality standards: federal or state limits on different air pollutants that serve as target values for local air quality improvement or protection programs.

atmosphere: the invisible gas layers that surround the earth.

biological contaminants: materials not normally found in air, water, or soil that originate from living or dead biological sources (e.g., dust mites, pollen).

biological magnification: the mechanism by which chemicals become more and more concentrated as they are transferred along the food chain.

carbon dioxide: a colorless, odorless, incombustible gas, CO_2, formed during respiration, combustion, and organic decomposition; considered the major greenhouse gas.

carbon monoxide: a colorless, odorless, toxic gas produced primarily by incomplete burning of fuel - fossil fuels, wood, or other carbon-containing materials.

chlorofluorocarbons (CFCs): a group of chemicals used for a wide variety of products such as aerosols and refrigerants; thought to cause loss of ozone from the upper atmosphere.

AIR QUALITY DEFINITIONS, CONTINUED

Clean Air Act: provides for regulations to control air pollution in the U.S. through state and federal actions and gives regulatory and enforcement powers to the federal government; passed by U.S. Congress in 1970, amended in 1977 and 1990.

climate: the combined effect of temperature, precipitation, other atmospheric factors, and their yearly patterns on a large area of the earth's surface.

contaminant: impurity or other inclusion in air, water, or land resources that affects the normal use of that resource. High levels of air contaminants lead to air pollution.

criteria pollutants: six major air pollutants designated by the U.S. Environmental Protection Agency as harmful to human health and general public welfare when above specified levels - carbon monoxide, sulfur dioxide, nitrogen oxides, photochemical oxidants (ozone); lead; and, particulate matter less than 10 microns in size.

dry deposition: deposit of dry, acid or acid-forming materials on the Earth's surface.

ecology: the study of the interactions between living organisms and their environment.

electrostatic precipitator: an air pollution control device that removes particulate matter from a stream of air, using electrical attraction.

emission standard: limit on the amount of air pollutant that can be released into the air from a particular source or source category/type.

Environment Canada: Canadian government department in charge of enforcement or air quality regulations.

Environmental Protection Agency (EPA): A United States agency responsible for managing federal efforts to control air and water pollution; solid waste disposal, radiation and pesticide hazards, and other environmental concerns.

fly ash: air-borne solid particles that result from the burning of coal and other solid fuel.

food chain: a representation of the interactions between all living parts of the ecosystem and their dependence on one another for food.

fossil fuel: any combustible carbon-based fuel that is the result of organic deposits of the distant geological past - natural gas, coal, oil.

AIR QUALITY DEFINITIONS, CONTINUED

fungi: plants that have no chlorophyll and are dependent on other organisms or on dead or decaying organic materials for food. Molds, mildew, and mushrooms are examples of fungi.

greenhouse effect: the warming of the atmosphere caused by the build-up of carbon dioxide and other greenhouse gases. Visible light from the sun comes through the gases, but the gases prevent the return of the energy, now in the form of heat, to the outer atmosphere.

hazardous waste: any waste or combination of wastes that creates a substantial present or potential hazard to human health or living organisms.

heavy metals: metallic elements (e.g., mercury, chromium, cadmium, and lead) that can damage living organisms at low concentrations and tend to accumulate in the food chain.

hydrocarbons: any of a large family of chemical compounds that contain only carbon and hydrogen; the most harmful hydrocarbons are produced by incomplete combustion of fossil fuels and evaporated solvents.

lead: a heavy metal that has been identified as a criteria pollutant because of its toxic effect in small quantities on living organisms.

Legionnaire's Disease: a disease caused by a bacterium spread in air conditioning and ventilation ducts. First recognized at a convention of the American Legion in Philadelphia in 1976. It is an indoor air quality problem. It does not occur in the ambient (outdoor) air.

lichen: plant-like structures composed of fungi and algae growing so closely together that they look like one organism. Lichen are very sensitive to damage by air pollution.

meteorology: the climatic (or weather) conditions of a land area; a science that deals with the atmosphere, especially weather and weather forecasting.

National Environmental Policy Act (NEPA): an act that requires environmental impact statements be submitted for any major construction project that uses U.S. federal money.

National Ambient Air Quality Standards (NAAQS): U.S. federal government standards for the acceptable amount of criteria pollutants allowed in the ambient air.

nitrogen oxides: a general term for nitrogen and oxygen compounds/gases that result from the burning of fossil fuels; a major component of acid rain.

AIR QUALITY DEFINITIONS, continued

organic compound: any compound or material containing carbon.

ozone: a colorless gas composed of three atoms of oxygen. High in the atmosphere, the ozone layer protects us from harmful ultraviolet radiation. At ground level, ozone is considered a pollutant because breathing it can irritate the lungs.

ozone hole: an area in the stratosphere over the Antarctic where the ozone concentration appears to be getting thinner. This is a concern because the ozone layer shields the earth from ultraviolet radiation.

ozone layer: layer of ozone gas in the stratosphere; absorbs harmful ultraviolet radiation.

particulate matter: tiny particles of solid matter and/or liquid droplets that are small enough to remain suspended in air.

pH: a measure of the concentration of hydrogen ions in a solutions; the pH scale ranges from 0 to 14, where7 is neutral and values of less than 7 are acidic and values greater than 7 are basic or alkaline; pH is an inverted logarithmic scale so that every unit decrease in pH means a 10-fold increase in hydrogen ion concentration. Thus a pH of 3 is 10 times as acidic as a pH of 4 and 100 times as acidic as a pH of 5.

photochemical oxidants: chemicals created when sunlight interacts with airborne chemicals. Ozone is a major photochemical oxidant.

pollutant: any substance that changes air, water, or other resources in such a way that use of that resource is impaired.

Pollutant Standards Index (PSI): standardized index used in the U.S. to report air pollution levels.

precipitation: water in the form of rain, snow, hail, or fog that originates in the air and falls on the earth's surface.

radon: a naturally occurring colorless, odorless, radioactive gas.

smog: a visible combination of water vapor and a variety of air pollutants including smoke, fly ash, and/or gaseous pollutants such as ozone.

stratosphere: the layer of the atmosphere overlying the troposphere to about 50 kilometers in altitude; the ozone layer is in the stratosphere.

sulfur dioxide: a toxic gas that results from the burning of fossil fuels that contain sulfur; sulfur dioxide is a major component of acid rain.

AIR QUALITY DEFINITIONS, CONTINUED

topography: the physical characteristics of a land area, such as hills and valleys.

toxic substance: any substance that causes death or damage to humans, animals, or plants; dependent on dose level since most substances are toxic if ingested in excess.

troposphere: the layer of atmosphere gases closest to the earth's surface extending to an altitude of 10-15 kilometers.

ultraviolet radiation: short wavelength radiation from the sun; increasing amounts of ultraviolet radiation increase the risk of cancer.

volatile organic compounds (VOCs): chemical compounds made up of carbon, oxygen, hydrogen, and other atoms that can form gases easily. They are found in nature as well as in glue, paint, solvents, gasoline, tobacco smoke, pesticides and clothes that have been dry cleaned. VOCs help in the formation of ground-level ozone which is a main component of smog.

weather: the conditions and characteristics of the atmosphere during short periods of time such as a day or a week.

ENVIRONMENTAL CONTROL OF PESTS

Primary control measures, involving restricted use pesticides, should be attempted only in severe infestations in conjunction with the following habitat modifications:

- Removal of shelter - Take away the pest's preferred living/breeding sites by clean-up/clear-out/fix-up/build-out of harborage areas or entry into structures.
- Removal of food/water/attractants- Take away the pest's means of survival.
- Removal of security - Take away the pest's sense of safe refuge.

Initial control measures of habitat modification may be all that is necessary to remove pests, but it must be understood that measures to control certain pests (flies; some roach, lice or flea infestations; rats; mosquitoes and roosting birds) may require coordinated effort by a neighborhood or community. Lone attempts by an individual home or business owner (or apartment dweller) to deal with these problems are doomed to failure as re-infestation is assured from surrounding areas. There are also instances, (bats roosting/nesting in structures) where the pest is a ***federally protected or endangered species***, and special control methods must be followed to avoid severe civil and criminal penalties.

Listed below are selected pests with recommendations for consumer control measures and other general information:

PEST INSECTS/ARACHNIDS

ROACHES

Clean up infested areas (usually kitchens, bathrooms, laundry areas, damp areas in basements); remove all contents of kitchen and bathroom cabinets; use consumer available insecticidal spray under, behind, and between cabinets, appliances and attached equipment, in cracks/crevices inside cabinets and around baseboards and plumbing lines. Tracking-type powders (containing Borax or Diatomaceous Earth) can also be used if occupants are sensitive to pesticide odors. To prevent re-infestation, inspect grocery sacks, produce and pet food containers and any other packaging brought into the home for hitchhiking roaches. In multi-family dwellings, treatment of only one apartment (or floor) is a waste of time. As roaches will migrate from treated to untreated areas and return when pesticide degrades, work with the landlord, a licensed pest control firm, and other tenants for total structure treatment to avoid repeated infestation.

FLIES AND MOSQUITOES

Habitat modification is most effective means for long-term control as both pests tend to be neighborhood or community-wide problems. Some limited success in control can be accomplished by screening doors and windows. Zone spraying with low toxicity contact insecticides around doorways, windows, outdoor living areas and on surfaces where flying insects are frequently seen resting, also can provide some short term benefits. Citronella candles and similar repellent/insecticidal consumer products or personal spray/roll-on repellents are other short-term aids. Be sure and advise consumers that insect repellents containing the ingredient ***Deet***, be used with care on small children and label instructions/warnings followed.

FLEAS AND MITES

Infestations are most often localized to a single property or structure. Most probable causes are poorly maintained pets, stray animals, wildlife dens under a home or outbuilding, heavy mouse or rat infestation, or birds/bats nesting within a structure. Remove the cause first, then vacuum (including any furniture) affected areas of the structure thoroughly, seal and dispose of vacuum dust bag to remove captured pests and eggs (for outdoor areas, proceed directly to insecticide treatment). Note that multiple treatments with insecticides will be necessary, as the recommended low toxicity pesticides (Sevin, pyrethrum based, etc.) degrade quickly, and may kill all hatched pests but don't affect eggs. Usually a 4-7 day re-spraying routine over a two-three week period will handle severe infestations, with fewer total applications needed for lighter problems.

SPIDERS

Habitat modification and consumer available contact pesticides, are usually sufficient to deal with the two species of spiders found in Kentucky that pose a health threat. Black Widow and Brown Recluse Spiders are generally not aggressive, but unfortunately tend to nest in areas where humans store items for later use (woodpiles, garages, closets, etc.). Bites occur when bare hands, feet or other body parts accidentally come in contact with a threatened spider; therefore, always wear gloves and proper clothing and shoes when entering such areas for working or cleaning purposes. Severe infestations of these spiders occur in rare instances, requiring professional fumigation treatment to properly eliminate the threat.

TICKS

Habitat modification (clearing brushy areas and pruning back overgrown landscaping) and low toxicity contact pesticide spraying of lawn and landscaping should provide adequate control. Wear long sleeved shirts, gloves, and pants (not shorts) tucked into boot tops when working in tick-infested areas, and apply repellents (see note on products containing ***Deet*** above) around wrist, ankle and neck openings of clothing.

PEST BIRDS, BATS & RODENTS

PIGEONS, SPARROWS, BLACKBIRDS (STARLINGS, GRACKLES, COWBIRDS)
Habitat modification, by removal of roosting/nesting areas and elimination of access into buildings, is the primary option available to consumers. Spraying of roosts, poison baits and other major control measures are best left to professional exterminators or state agriculture/wildlife agencies. Pruning trees or removing brushy undergrowth opens up roosting areas to view by predators and makes most bird species move to denser cover. Since pigeons and sparrows prefer urban areas for roosting/nesting sites, sealing entry points into upper floors or attics and making rooftops, ledges and other perching areas inaccessible work best. There are several consumer available deterrents for bird roosting or perching on building - some resemble miniature coils of razor or barbed wire, or products resembling clear caulking compound like ***Tanglefoot*** or ***Hotfoot***, can be applied to perch sites. The wire products prevent birds from landing, while the caulk-type materials either grab and hold on to feet and feathers, or literally cause a burning sensation on birds' feet. **Always be aware**, and warn consumers calling in with bird problems, that repeatedly used roost areas indoors or outdoors that have existed for three (3) or more years, have a high probability of ***histoplasma capsulatum*** growth and are a risk for contracting ***histoplasmosis***. Specific instructions on safety measures can be found in the **HISTO HANDBOOK**, available at local health departments.

BATS, RODENTS
Bat or rodent (rats, mice) infestations respond well to habitat modification by building them out of structures. Rats and mice also need a poison bait treatment program to prevent their spreading to other areas, but **DO NOT** harm or kill bats as they are ***protected species***. Contact the KY Department of Fish & Wildlife for assistance in bat removal from within buildings. Also be aware bat dropping accumulations can promote growth of ***Histoplasma*** and that some bats are actually carriers of ***Histo***. For that reason, the installation of "Bat Houses" in residential areas in backyards or onside or back walls of homes is **NOT RECOMMENDED**, regardless of public promotions by nature groups to provide bat roosting areas. Follow **HISTO HANDBOOK** guidelines for precautions in cleanup of attic areas or upper floors.

ANIMAL BITES AND RABIES

Each animal bite represents a potential rabies exposure although in the majority of cases the actual probability of exposure is very unlikely. Many factors have to be considered in determining whether or not an exposure has taken place and the relative danger involved.

SPECIES OF BITING ANIMAL
While theoretically any mammal can develop rabies, only a few species account for the vast majority of actual exposures. In Kentucky, these species are dogs, cats, horses, cattle and bats - to a much lesser extent, raccoons, groundhogs (woodchucks), and opossums.

OTHER SPECIES
Bites of rabbits, squirrels, chipmunks, rats, mice and small caged pets (guinea, gerbils, hamsters, etc.), seldom, if ever, call for rabies prophylaxis. Domestic farm animals (especially horses and cattle) have never been proven to be a source of infection for man, but must be considered as potential.

CIRCUMSTANCES RELATING TO BITES
An attack that is unprovoked is much more likely to represent a rabies exposure than are bites that are provoked (children teasing pets, handling of wild animals, etc.).

TYPE OF EXPOSURE
In nearly all instances, rabies is transmitted by the inoculation of virus through the skin and much less commonly by the contamination of skin cuts or abrasions with saliva. Air-borne transmission is not a problem in Kentucky.

CONFINEMENT OF BITING ANIMAL
Kentucky law requires that all animal bites be reported to the health jurisdiction in which the bite occurred and that dogs, cats, and ferrets be confined for a ten day period under proper observation. If symptoms suggestive of rabies develop during the ten-day observation period (or were present at the time of the bite), the animal should be sacrificed and the head immediately sent to the Division for Laboratory Services, Department for Public Health, 100 Sower Avenue, Frankfort, Kentucky, 40601. Early signs of rabies in wild or stray animals cannot be interpreted reliably. Therefore, any such animal that bites or scratches a person should be killed at once (without damage to the brain) and the brain examined for evidence of rabies. When any suspect dog, cat or ferret begins to show symptoms suggestive of rabies, they should also be sacrificed and submitted immediately to the laboratory.

If examination of the brain by the direct microscopic and fluorescent antibody technique are negative for rabies, the bitten person need not be treated.

CHOOSING THE CORRECT SPECIMEN FOR THE LABORATORY

1. Do not submit live animals to the laboratory; there are no facilities for confinement.
2. Send only the heads of the animals to be examined. In the case of bats and small rodents, the entire specimen may be sent.
3. To simplify handling of large animal heads, such as cows and horses, it is suggested that the brain alone be sent, and not the entire head. The brain should be removed by a veterinarian, carefully packed and shipped as quickly as possible.

PACKING

1. Rabies specimens should be packed with wet ice. Such containers are furnished by the Division for Laboratory Services. The enclosed instructions for packing should be carefully followed.
2. If it is necessary to hold animal heads over weekends or holidays before shipping to the laboratory, refrigerate but do not freeze. Rabies virus is not affected by freezing, but freezing does make the preparation of satisfactory smears difficult, destroys cells, and delays of several hours may be required before the head has thawed enough to permit opening the skull and dissecting the brain.

SHIPPING

1. The best current methods for shipping are personal delivery or overnight mail. If mailing for overnight delivery on a Friday, specify to the post office that it must be delivered on Saturday. There is a guard at the laboratory twenty-four hours, seven days a week, who can receive a specimen.
2. Many specimens are received with little or no information concerning the clinical symptoms or history of the suspected animal. This oversight sometimes causes a delay in reporting the results. Rabies identification forms are included in the laboratory shipping container. Please complete this form.

These forms should be put in an envelope and attached to the outside of the container to avoid contamination or destruction of the forms.

More than one specimen should not be submitted in the same container.

DESTRUCTION OF ORGANISMS OF PUBLIC HEALTH CONCERN

COOKING RAW ANIMAL FOODS

145 degrees or above for 15 seconds	Most potentially hazardous foods
155 degrees or above for 15 seconds	Pork, ratites, injected meats, comminuted fish and meats, some commercially raised game animals.
165 degrees or above for 15 seconds	Poultry, some wild game animals, stuffed (fish, meats, pasta, poultry, ratites) or stuffing containing fish, meat, poultry or ratites.

MICROWAVE COOKING RAW ANIMAL FOODS

1. Rotated or stirred throughout or midway during cooking to compensate for uneven distribution of heat;

2. Covered to retain surface moisture;

3. Heated to a temperature of at least 165 degrees in all parts of the food; and

4. Allowed to stand covered for 2 minutes after cooking to obtain temperature equilibrium.

REFER TO KENTUCKY'S FOOD CODE FOR ADDITIONAL OR CLARIFYING INFORMATION.

GUIDE FOR SANITIZING FOOD CONTACT SURFACES OF EQUIPMENT AND UTENSILS

DATA TAKEN FROM THE FDA 1997 FOOD CODE
(Applicable to sanitization using hot water or chemical manual or mechanical ware washing/swabbing)

Sanitizing Agent or Medium	**Concentration Level/Range Temperature**	**Exposure Time**
Chlorine Solution	50 – 100 ppm-not To exceed 200 ppm (See following chart)	See following chart
Iodine Solution	12.5 ppm (12.5-25 ppm) (Min. water temp. 75ºF)	30 seconds
Quaternary Ammonium	200 ppm (150 ppm-400 ppm) (Min. water temp. 75ºF)	30 seconds
Hot Water Manifold Spray Immersion	180ºF (except for stationary rack, single temperature machines 170ºF*)	30 seconds

Concentration of the sanitizing solution shall be accurately determined by using a test kit or other device.

* Surface temperature of equipment or utensils must reach 160ºF

NOTE: Chemicals used in a sanitizing solution for exposure times specified above shall be listed in 21 CFR 178.1010 Sanitizing Solutions, and shall be used in accordance with EPA - approved manufacturer's label use instructions.

CHLORINE SOLUTION CHART

(5.25% household bleach)

NOTE: Household bleach may be used for sanitizing eating and drinking utensils *only* if the manufacturer's label use instructions provide for such use. Scented bleach shall not be used for sanitizing eating and drinking utensils or food contact surfaces.

MIN. CONCENTRATION LEVEL (mg/l or ppm)	MIN. TEMPERATURE		MIN. EXPOSURE Time
	pH 10 or less	pH 10 or less	
25	120ºF	120ºF	10 seconds
50	100ºF	75ºF	10 seconds
100	55ºF	55ºF	10 seconds

FORMULA: One (1) oz. Household bleach (5.25%) per 8 gal. water = 50 ppm
One (1) oz. = 2 tbsp. or 6 tsp.

INCREMENTAL SOLUTION GUIDE

Water (55ºF Minimum)	Chlorine (5.25% household bleach)
1 gal.	2 tsp. (10ml) = 65 ppm
2 gal.	1 tbsp. (15ml) = 100 ppm
4 gal.	2 tbsp. (30ml)* = 100 ppm
8 gal.	¼ cup (60ml) = 100 ppm

* 30 ml = one (1) fl. oz.

TABLE OF FOODBORNE INFECTIONS – BACTERIAL ORIGIN

Name	Pathogen	Foods Usually Involved	Incubation Period
Bacillus Cereus Gastroenteritis (Infection/ Intoxication) Exo-enterotoxin Enterotoxin	*Bacillus Cereus*	Rice and rice dishes, custards, seasonings, dry food mixes, spices, puddings, cereal products, sauces, vegetable dishes, meat loaf.	½ – 5 hours, 8 – 16 hours
Botulism (Intoxication)	*Clostridium botulinum*	Improperly processed canned goods of low acid foods, garlic-in-oil products, grilled onions in butter sauce, leftover potatoes, stews, meat/ poultry loaves.	12 – 36 hours + 72 hours
Campylobacteriosis (Infection)	*Campylobacter jejuni*	Unpasteurized milk and dairy products, poultry, pork, beef and lamb.	3 – 5 days
Clostridium Perfringens Enteritis (Infection/ Intoxication)	*Clostridium perfringens*	Cooked meat, poultry, gravy, beans that have been cooked slowly.	8 – 24 hours
E. coli 0157:H7 Enteritis (Infection/ Intoxication)	*Escherichia coli*	Raw and undercooked ground beef and other red meats, imported cheeses, unpasteurized milk.	12 – 72 hours
Listeriosis	*Listeria mono-cytogenes*	Unpasteurized milk and cheese, vegetables, poultry and meats, seafood, and prepared, chilled, ready-to-eat foods.	1 day to 3 weeks
Salmonellosis	*Salmonella*	Poultry and poultry salads, meat, and meat products, milk, shell eggs, egg custards and sauces, and other protein foods.	6 – 72 hours
Shigellosis (Infection)	*Shigella*	Potatoes, tuna, shrimp, turkey and macaroni salad, lettuce, moist and mixed foods.	1 – 7 days
Staphlyoccus (Intoxication)	*Staphlyococcus aureus*	Ham and other meats, warmed-over foods, dairy products, custards, potato salad, creamed-filled pastries, and other protein foods.	1 – 8 hours

TABLE OF FOODBORNE INFECTIONS AND INTOXICATIONS

Disease	Etiological Agent	Source	Incubation (Latency) Period
Bacillus Cereus	Heat stable toxin of *Bacillus cereus*	Food held at room temperature, especially cooked rice	1 to 6 hours when vomiting is the predominant symptom; 6 to 24 hours where diarrhea is the predominant symptom
Botulism	*Clostridium botulinum*	Home processed protein foods; inadequately canned foods with pH over 3.5	12 to 36 hours
Campylobacter	*Camplybacter jejuni*	Undercooked chicken and pork, contaminated food, water or raw milk	1 to 10 days; usually 2 to 5 days
Cholera	*Vibrio cholerae*	Foods contaminated by water, raw vegetables, mixed and moist food, seafood	Few hours to 5 days; usually 2 to 3 days
Clostridium Perfringens	*Clostridium perfringens,* Types A and C	Cooked meat and poultry that has stayed at room temperature for several hours or cooled slowly. Gravy, stew and meat pies	6 to 24 hours; usually 10 to 12 hours
EHEC	*Escherichia coli 0157:H7*, Verotoxin producing *E. coli*	Inadequately cooked beef, raw milk, contaminated water, other contaminated food	3 to 8 days; usually 3 to 4 days
EIEC	Enterionvasive strains of *E. coli*	Contaminated food	As little as 10 to 18 hours
EPEC	Enteropathogenic strains of *E. coli`*	Contaminated infant formula and weaning foods	As little as 9 to 12 hours
ETEC	Enterotoxogenic strains of *E. coli*	Contaminated food and water	Sometimes 10 to 12 hours; usually 3 to 4 days
Hepatitis A	Hepatitis A virus	Contaminated water, shellfish, salads	15 to 50 days; average 28-30 days
Listeriosis	*Listeria monocytogenes*	Milk, ready to eat foods such as soft cheese and deli foods	3 to 70 days; usually 3 weeks

Staphyloccoccus Food Poisoning	Enterotoxins A, B, C, D, or E of *Staphylococcus aureus*	Cooked ham, salads of protein food. Custard pastries, hollandaise sauces, warmed-over foods	30 minutes to 8 hours
Salmonellosis	*Salmonella Enteritides, Typhimurium, Heidelbeg, Darby, Infantis,* etc.	Eggs, poultry, meat, fresh produce, other raw foods	6 to 72 hours; usually 12 to 36 hours
Shigellosis	*Shigella Sonnei, Flexneri, Dysenteriae,* and *Boydii*	Moist foods, dairy products, water contaminated with excreta, carriers	12 to 96 hours, usually less than 4 days
Streptococcus Infection	Group A beta hemolytic strep	Potato and egg salad	1 to 3 days
Tuberculosis (Extra Pulmonary Type)	*Mycobacterium bovis*	Unpasteurized milk and other dairy products	4 to 6 weeks; first 6 to 12 months after infection most hazardous period
Tularemia (Rabbit Fever)	*Francisella tularenis*	Wild rabbits and hares, woodchucks and similar wild animals; water	1 to 14 days; usually 3 - 14 days
Typhoid Fever	*Salmonella typhi*	High protein foods, raw salads, milk products. Foods that have been handled and then eaten without further treatment	3 days to 3 months; usually 1 to 3 weeks
Vibrio Parahaemolyticus	Pathogenic strains of *Vibrio parahaemolyticus*	Raw of inadequately cooked seafood, food contaminated by handling raw seafood, contaminated seawater	4 to 30 hours; usually 12 to 24 hours
Vibrio Vulnificus	*Vibrio vulnificus*	Raw and undercooked seafood; especially oysters	12 hours to 3 days
Yersiniosis	*Yersina enterocolitica* or *Yersina pseudotuberculosis*	Raw pork and pork products including cold cuts	Generally under 10 days; probably 3 to 7 days

FOODBORNE INFECTIONS CAUSED BY INTESTINAL PARASITES

Name	Etiological Agent	Foods Usually Involved	Incubation Time
Amebic Dysentery	*Entamoeba histolytical*	Water contaminated with sewage, moist food contaminated with human feces	Several days to 4 weeks
Cyclospora	*Cyclospora cayetanensis*	Raspberries, lettuce, other contaminated fruits and vegetables	
Diphyllobothriasis (Fish Tapeworm)	*Diphyllobothrium latum*	Insufficiently cooked fresh water fish	3 to 6 weeks
Giardiasis	Giardia lamblia	Contaminated food and water	3 to 25 days of longer; medium 7 to 10 days
Taeniasis (Meat Tapeworm)	*Taenia saginata* (beef), Taenia solium (pork)	Insufficiently cooked beef and pork products	8 to 12 weeks for *T. solium,* 10 to 14 weeks for *T. saginata*
Trichinosis	Larvae of *Trichinella spiralis*	Insufficiently cooked pork products	5 to 45 days

WATER CONTAMINANTS

Contaminants	MCLG (mg/L)	MCL (mg/L)	Potential Health Effects From Ingestion Of Water	Sources of Contaminant In Drinking Water
Alachlor	Zero	0.002	Cancer	Runoff from herbicide on corn, soybeans, other crops
Atrazine	0.003	0.003	Mammary Gland Tumors	Runoff from use as herbicide on corn and non-cropland
Carbofuran	0.04	0.04	Nervous, Reproductive System Effects	Soil fumigant on corn and cotton; restricted in some areas
Chlordane*	Zero	0.002	Cancer	Leaching from soil treatment for termites
Chlorobenzene	0.1	0.1	Nervous System and Liver Effects	Waste solvent from metal degreasing processes
Dalapon	0.2	0.2	Liver and Kidney Effects	Herbicide on orchards, beans, coffee, lawns, road/railways
Dinoseb	0.007	0.007	Thyroid, Reproductive Organ Damage	Runoff of herbicide from crop and non-crop applications
Dioxin	zero	0.00000003	Cancer	Chemical production by-product; impurity in herbicides
Diquat	0.02	0.02	Liver, Kidney, Eye Effects	Runoff of herbicide on land and aquatic weeds
2,4-D*	0.07	0.07	Liver and Kidney Damage	Runoff from herbicide on wheat, corn, rangelands, lawns
Endothall	0.1	0.1	Liver, Kidney, Gastrointestinal	Herbicide on crops, land/aquatic weeds; rapidly degraded
Endrin	0.002	0.002	Liver, Kidney, Heart Damage	Pesticide on insects, rodents, birds; restricted since 1980

WATER CONTAMINANTS, continued				
Glyphosate	0.7	0.7	Liver, Kidney Damage	Herbicide on grasses, weeds, brush
Heptachlor	Zero	0.0004	Cancer	Leaching of insecticide for termites, very few crops
Heptachlor Epoxide	Zero	0.0002	Cancer	Biodegradation of heptachlor
Lindane	0.0002	0.0002	Liver, Kidney, Nervous, Immune, Circulatory	Insecticide on cattle, lumber, gardens; restricted in 1983
Methoxychlor	0.04	0.04	Growth, Liver, Kidney, Nerve Effects	Insecticide for fruits, vegetables, alfalfa, livestock, pets
Oxamyl (Vydate)	0.2	0.2	Kidney Damage	Insecticide on apples, potatoes, tomatoes
PCBs	Zero	0.0005	Cancer	Coolant oils from electrical transformers; plasticizers
Picloram	0.5	0.5	Kidney, Liver Damage	Herbicide on broadleaf and woody plants
Simazine	0.004	0.004	Cancer	Herbicide on grass sod, some crops, aquatic algae
Toxaphene	Zero	0.003	Cancer	Insecticide on cattle, cotton, soybeans; canceled in 1983
2,4,5-TP	0.05	0.05	Liver and Kidney Damage	Herbicide on crops, right-of-way, golf courses; canceled in 1983

SWIMMING POOLS

OPERATIONAL WATER QUALITY STANDARDS

DISINFECTANT RESIDUALS FOR SWIMMING AND DIVING POOLS, WADING POOLS, WATER SLIDES, AND WAVE POOLS

1. Chlorine residual shall be maintained between one (1.0) p.p.m. and two and five-tenths (2.5) p.p.m. as free available chlorine.
2. Bromine residual shall be maintained between one (1.0) p.p.m. and two and five-tenths (2.5) p.p.m. as free available disinfectant.
3. Pools stabilized with cyanuric acid shall meet the following criteria:
   a. Be an outdoor facility;
   b. Maintain one and five-tenths (1.5) to two and five-tenths (2.5) p.p.m. free available chlorine residual; and
   c. Cyanuric acid concentration twenty-five (25) p.p.m. to fifty (50) p.p.m.
4. If the presence of chloramines is determined, superchlorination is required, and the chloramine level shall not exceed two-tenths (0.2) p.p.m.

DISINFECTANT RESIDUALS FOR SPAS

1. Chlorine residual shall be maintained between two (2.0) p.p.m. and three (3.0) p.p.m. as free available chlorine;
2. Bromine residual shall be maintained between two (2.0) p.p.m. and three (3.0) p.p.m. as free available disinfectant; and
3. If the level of chloramines exceeds two-tenths (0.2) p.p.m., superchlorination is required. During the superchlorination process and until such time as free chlorine levels return to three (3) p.p.m. or less, the facility shall be closed.

pH

The pH of the facility water shall be maintained in a range of seven and two-tenths (7.2) to seven and eight-tenths (7.8). For corrosive water supplies, the alkalinity level shall be suitably adjusted to allow maintenance of the pH level.

TURBIDITY

Facility water shall have sufficient clarity at all times to meet one (1) of the following:

1. A black disc, six (6) inches in diameter, is readily visible when placed on a white field at the deepest point of the pool;
2. The openings of the main outlet grate are clearly visible by an observer on the deck; and
3, For wading pools, the bottom of the pool shall be clearly visible.

TOTAL ALKALINITY

The alkalinity of the facility water shall not be less than fifty (50) nor more than 180 p.p.m., as determined by suitable test kits.

TEST AND RECORDS
The facility operator shall perform tests for each of the above water quality characteristics before opening and during all hours of operation based on the frequency schedule listed below, and record all test results on a daily operational log sheet:

1. Disinfectant residual and pH shall be checked at least three (3) times daily with a greater frequency of bather load or climatic conditions warrant.
2. Turbidity - daily, or more often as needed.
3. Alkalinity, cyanuric acid (if used) - weekly, or more often as needed.
4. Temperature:
    a. Spas - daily, or more often as needed; and
    b. All other indoor facilities - daily.

TURNOVER RATES

"Turnover time" means the time in hours or minutes, required for the circulation system to filter and recirculate a volume of water equal to the facility volume.

The recirculation pump and motor shall deliver the flow necessary to obtain the turnover required in the table below. A valve for flow control shall be provided in the recirculation pump discharge piping. The turnover rate shall be as shown in the following table:

Type of Facility	**Turnover Required**
Diving Pools	8 hours or less
Wading Pools, Spas	30 minutes or less
Water Slides, Handicap Pools	2 hours or less
All Other Pools	6 hours or less

Higher flow rates may be necessary in pools with skimmers so that each skimmer will have a minimum flow rate of thirty (30) gallons per minute.

FILTRATION RATES

HIGH RATE SAND FILTERS
The design filtration rate shall be a minimum of five (5) gallons per minute per square foot of filter area. The maximum design filtration rate shall be the lesser of fifteen (15) gallons per minute per square foot of filter area or seventy-five (75) percent of the NSF listed filtration rate. The backwash rate shall be fifteen (15) gallons per minute per square foot of filter area.

DIATOMACEOUS EARTH FILTERS
The design filtration rate shall not exceed one and one-half (1 ½) gallons per minute per square foot of filter area on diatomaceous earth filters, except that the rate of filtration may be increased to two (2) gallons per minute per square foot of filter area if continuous feeding of diatomaceous earth is employed.

CARTRIDGE FILTERS
The design filtration rate shall not exceed 0.15 gallons per minute per square foot of filter surface area. A clean duplicate set of cartridges shall be maintained at the facility.

RAPID SAND OR GRAVITY SAND FILTERS
Rapid sand filters shall be designed for a filter rate not to exceed three (3) gallons per minute per square foot of bed area at time of maximum head loss with sufficient area to meet the design rate of flow required by the prescribed turnover. Open gravity type filters shall be designed for a filter rate not exceeding two (2) gallons per square foot per minute.

Filter equipment and treatment systems shall operate continuously twenty-four (24) hours per day except if the facility is closed for repairs or at the end of the swimming season.

LEAD POISONING INVESTIGATION

NURSE

- Child has blood test (finger or venous).
- Determines if confirmed elevated blood lead level of child.
- Contacts local or district environmentalist.

ENVIRONMENTALIST

- Contacts the Environmental Lead Program Staff.
- Completes the history information form and provides a copy to Department.
- Conducts an on-site visual residence.
- Provides copy of visual assessment form to department for review, appropriate plan of action, and assignment.
- Determines available times and dates for investigation and sampling.
- Accompany and assist Risk Assessor. Discuss initial findings, etc.
- Possible follow up with visual to residence to review interim controls and/or abatement actions.

DEPARTMENTAL CERTIFIED RISK ASSESSOR ACTIVITIES

- Conduct the environmental investigation and sampling.
  * (Paint, dust, soil, and water) at residence(s), or other child occupied facilities.
- Average travel time.
- Sample preparation and delivery to laboratory.
- Summarize initial findings.
- Review sample results when received from laboratory.
- Assessment of hazards and reduction concerns, i.e. interim control or abatement.
- Write-up investigation report with results of findings and recommendations.
- Provide report, and other information to the health department concerning appropriate corrective action, etc.
- Conduct follow-up sampling if needed.

TYPES OF SAMPLES

- X-ray fluorescence (XRF) or laboratory paint-chip analysis of all defective paint on the dwelling, furniture, play structures, or on nearby buildings frequented by the child.

- XRF or laboratory paint-chip analysis of all chewable, impact, and friction surfaces.

- Dust samples by a certified risk-assessor from areas frequented by the child, including play areas, porches, kitchens, bedrooms, and living and dining rooms. Dust samples may also be collected from automobiles, work shoes, and laundry rooms (to assess the leaded dust on work clothes brought into the dwelling) if occupational lead exposure is a possibility.

- Soil samples from play areas, areas near the foundation of the house, and areas from the yard. If the child spends significant time at a park or other public play area, samples should be collected from these areas, unless the area has already been sampled.

- First-drawn and flushed water samples from the tap most commonly used for drinking water, infant formula, or food preparation.

- Glazed dinnerware or ceramic cookware containing lead.

- Other items suspected of containing hazardous levels of lead.

RADIATION

- The induction of stochastic effects (cancers and genetic effects) is considered to be the principle effect that may occur following exposure to low dose of ionizing radiation.
- The nominal probability, coefficients for stochastic effects are:

EXPOSED POPULATIONS	TOTAL DETRIMENT 10^{-7} $mrem^{-1}$
Adult Workers Whole Population	5.6 7.3

Based on the hypothesis that genetic effects and some cancers may result from damage to a single cell, it is assumed that:

- For radiation-protection purposes, the risk of somatic effects is proportional to dose without threshold, throughout the range of dose and dose rates of importance in routine radiation protection.
- The probability of response (risk) is assumed, for radiation-protection purposes, to accumulate with dose.
- Given the above assumption, radiation exposure at any selected dose limit will, by definition, have an associated level of risk.
- For this reason it is necessary to meet the following requirements:
  - The need to justify any activity which involves radiation exposure on the basis that the expected benefits to society exceed the overall societal cost (justification); and
  - The need to ensure that the total societal detriment from such justifiable activities or practices is maintained ALARA, economic and social factors being taken into account; and
  - The need to apply individual dose limits to ensure that the procedures of justification and ALARA do not result in individuals or groups of individuals exceeding levels of acceptable risk (limitation).
- It is our primary objective in radiation-protection to limit doses and further maintain all doses “as low as reasonably achievable (ALARA).”

UNITS OF RADIOACTIVITY

- **Curie (Ci)** - A unit of activity equal to 3.7×10^{10} disintegrations/second.
- **Millicurie (mCi)** - unit of activity equal to 3.7×10^{7} disintegrations/second.
- **Microcurie (µCi)** - unit of activity equal to 3.7×10^{4} disintegrations/second.
- **Nanocurie (nCi)** - unit of activity equal to 3.7×10^{1} disintegrations/second.
- **Picocurie (pCi)** - unit of activity equal to 3.7×10^{-1} disintegrations/second.
- **Becquerel (Bq)** - SI unit of activity equal to one (1) disintegration/second.
- **Gray (Gy)** - unit of absorbed dose of radiation, one (1) gray=1 joule/kilogram; one (1) gray is equal to 100 rads.
- **rad** - unit of absorbed dose of radiation, one (1) rad=0.01 joules per kilogram. Being replaced by gray, one (1) rad equals 0.01 gray.
- **Rem** - unit of dose, one rem is equal to 0.01 Sieverts. The dose equivalent in "rem" is numerically equal to the absorbed dose in "rad" multiplied by the radiation weighing factor, the distribution factor and any other modifying factor. One (1) rem is equal to 1000 millirems.
- **Sievert (Sv)** - unit of dose, one Sievert is equal to 100 rems; equal to dose in grays times the radiation weighing factor times other modifying factors.
- **Roentgen ®** - a unit of radiation and equals 2.58×10^{-4} coulomb/kilogram of air. It is defined only for the effect on air and applies to gamma and x-rays.

BASIC DOSIMETRIC QUANTITIES

- Absorbed Dose (D) is the energy absorbed per unit mass and its units is the joule per kilogram which is given the special name gray (Gy).

    - Absorbed dose is defined in terms that allow it to be specified at a point, but it is used by the ICRP to mean the average dose over a tissue or organ.

- Equivalent Dose (H_t) - It is the absorbed dose averaged over a tissue or organ (rather than at a point) and weighted for the radiation quality that is of interest.

    - The ICRP use weighing factor for the purpose which is the Radiation Weighing Factor (w_r) and is selected for the type and energy for the radiation incident on the body or, in the case of sources within the body, emitted by the source.

    - $H_t = w_r \times D_{t,r}$

INTRODUCTION

There is an increased risk with any exposure to radiation. The radionuclide or radionuclides at the incident are essential in evaluating the impacts of ionizing radiation on health and safety and the approach needed for remediation of the incident. Therefore, it is essential that in any incident the radionuclide be assessed in order to determine the potential exposures. The nature of the incident itself will have a bearing on the exposure pathways include ingestion, inhalation, and external gamma exposure.

Exposure to radiation results in damage cells of the body, and represents a risk of injury or, if the exposure is high enough, even death. All radiation is a known carcinogen and any exposure has the potential to result in increased risk. Careful attention must be paid to protection of individuals from exposure to radiation.

It is the purpose of this document to provide proper procedures for contacting Radiation Control staff or Disaster and Emergency Services, which will then contact Radiation Control staff in the event of an incident.

PROCEDURES FOR ADDRESSING A RADIATION INCIDENT

1. From 8:00 a.m. through 4:30 p.m., Monday through Friday contact the Radiation Control staff at (502) 564-3700 in the event of a radiation incident.

2. Call for local medical assistance and/or emergency vehicle, if needed; however, entry into an incident area should only be conducted if the guidance in Step 3 has been implemented.

3. Areas shall not be entered without conducting surveys which include radiation survey, volatile organics (photoionization detector; PID), and gas monitoring (lower explosion limits, oxygen, carbon monoxide, etc.).

4. Always remain upwind of any incident.

5. Personnel shall not enter areas without the proper personal protective equipment.

In order to reduce personal exposure especially during a radiation incident, it is essential to utilize the principles of time, distance and shielding.

CHEMICAL STOCKPILE AGENTS

The Chemical Warfare Agents described as follows were obtained from, Management of Chemical Warfare Agent Casualties, a Handbook for Emergency Medical Services by: Fredrick R. Sidell, M.D., dated October 1995. For more information contact Division of Public Health Protection and Safety, Chemical Stockpile Emergency Preparedness Program Coordinator.

ESTIMATED TOXICITIES OF MILITARY AGENTS				
Agent	**ED_{50}***	**LD50**	**Ect50* (mg-min/m3)**	**Lct50 (mg-min/m3)**
GB	--	1700 mg	3	100
VX	1 mg	10 mg	<1	50
HD	10 mcg	7 gm	20	1500

DOSE

In pharmacology, science, or medicine, the term in LD_{50} indicates the Dose that is Lethal to 50% of the population. Similarly, the term ED_{50} can describe the Dose that is Effective in 50% of the population (for what is effective must be stated; for example, the ED_{50} to cause a runny nose is 5 mg). Just as the terms LD_{50} and ED_{50} are used to describe doses given i.v., i.m., or orally, the terms Lct_{50} and Ect_{50} are used to describe the Ct that is Lethal for 50% of the population and the Ct that will cause a certain Effect in 50% of the population.

DECONTAMINATION

A solution of hypochlorite (household bleach) is the most universal solution used. However, the concentration varies. Household bleach is about 5% hypochloride. Most civilian EMS units use 1% or 2% hypochloride for casualty decontamination, whereas the military uses 0.5% hypochloride for skin decontamination. The term "hypochlorite" as used throughout refers to that dilution most appropriate according to local protocols.

NERVE AGENTS

SUMMARY

SIGNS AND SYMPTOMS
After a small vapor exposure: Miosis, runny nose, shortness of breath.
After a large vapor exposure: Loss of consciousness, convulsions, apnea, flaccid paralysis.
After a small to moderate liquid exposure: Localized sweating, fasciculation, nausea, vomiting, diarrhea, feeling of weakness (may start hours later).
After large liquid exposure: Loss of consciousness, convulsions, apnea, flaccid paralysis.

DECONTAMINATION
Thoroughly flush with hypochlorite, water.

EMERGENCY MEDICAL CARE
Atropine (2-6mg); 2-PAMCI; diazepam (depending on severity); ventilation; suction of airways if secretions are copious.

MANAGEMENT
The most important thing to do in dealing a casualty from any type of chemical or toxic substance is to **protect yourself**. Wearing protective gear as recommended by local policy (this usually consists of a mask and gloves as a minimum, but may also call for protective clothing or an apron), or by insuring that the casualty has been thoroughly decontaminated before touching him. Steps in managing a nerve agent casualty are:

1. Decontamination;

2. Ventilation;

3. The antidote, atropine;

4. An oxime (the antidote, 2-PAMCI); and

5. Other measures as required.

RECOMMENDATIONS FOR INITIAL THERAPY

VAPOR EXPOSURE

MILD:	**Miosis alone**	No treatment (severe pain is treated later).
	Rhinorrhea	Depends on amount of rhinorrhea and amount of discomfort; 2 mg. of atropine if either is great.
	Shortness of Breath	Depends on severity; 2 mg. of atropine if mild or moderate; 4mg. if great.
	Combination	Treat according to most severe effect.
MODERATE:	**Shortness of Breath**	2 to 4 mg of atropine, depending on severity.
SEVERE:	**Unconscious, Convulsing, Postictal, Gasping for air; Effects in 2 or more Systems**	6 mg of atropine (i.m.), 2-PAMCI (1gm i.v., 1.8 gm I.m.); diazepam; ventilation.

LIQUID EXPOSURE ON SKIN

MILD:	**Localized sweating, Fasciculations**	2 mg atropine; 1 gm, i.m. (or 600 mg, i.m.) of pralidoxime
MODERATE:	**Gastrointestinal effects**	2 mg atropine; pralidoxime
SEVERE:	**Same as for vapor exposure**	

VESICANTS - SUMMARY

SIGNS AND SYMPTOMS
After an asymptomatic latent period of hours, onset of erythema and blisters, conjunctivitis, upper respiratory signs. All may worsen over the following hours. Mustard does not cause pain on contact; Lewisite and phosgene oxime cause pain on exposure to liquid or vapor.

DECONTAMINATION
Hypochlorite or large amounts of water to flush agent away. Must be within seconds to be maximally effective.

EMERGENCY MEDICAL CARE
Immediate decontamination. None otherwise (no early effects). Suspected casualty should be observed for at least 8 hours. Later, symptomatic management of lesions.

Mustard is considered a persistent agent, but is a hazard from both liquid and vapor contact. Biological effects from mustard do not appear until many hours after contact with liquid or vapor mustard. Because there are no immediate effects, the exposed person usually takes no action to decontaminate himself. Organs most commonly affected are the skin, the eyes, and the airways, primarily because these are the organs that mustard contacts. Mustard is absorbed through these organs and later may cause damage to bone marrow, the gastrointestinal tract, and the central nervous system. Although mustard has been considered a major warfare agent for almost 80 years, the exact manner by which it causes tissue damage has not been defined. There is no antidote for mustard. Because there are no immediate effects, there is no immediate care needed except for decontamination. Later, hospital care consists of symptomatic management of the injuries. The management is similar to that for patients with thermal burns, except that the fluid requirements for a mustard casualty are not as great.

TIME COURSE OF EFFECTS
Tissue biochemical damage occurs within seconds or minutes after mustard exposure, but clinical effects do not occur until hours later. The only effective way to prevent or reduce damage from mustard is decontamination within seconds of exposure.

ON-SITE SEWAGE

LEACHING CHAMBER SIZING

Trenches: linear footage of convention 2 foot wide trench * 55% = length

Beds: Rock bed sizing * 85% = length

LAGOON SYSTEM SIZING

Lagoon: 5 sq ft. Surface area * total daily waste flow = total square feet of surface area.

Overflow Field: 10% * total daily wasteflow = length

MOUND SYSTEM SIZING

Use EPA Publication 625/1-8-012

GREY WATER SYSTEM SIZING (Washing Machine Only)

50 sq. ft. trench bottom area per bedroom.

DOSING TANK SIZING

Residential: 2 * daily waste flow
Commercial/public: 1.5 * daily waste flow

APPLICATION RATES FOR GRAVITY DISTRIBUTION LATERAL FIELDS BASED ON TWO (2) FOOT CONVENTIONAL TRENCH WIDTH

Soil Group	Soil Texture	Application Rate Gal/Sq. Ft./Day	Linear Ft. Per Gallon
I Sands	Sand Loamy Sand	1.2 .9	.42 .56
II Coarse Loams	Sandy Loam Loam	.7	.72
III Fine Loams (With Provisionally Suitable Structure)	Sandy Clay Loam Silt Loam Clay Loam Silty Clay Loam	.5	1.0
Fine Loams (With Provisionally Suitable Structure)	Sandy Clay Loam Silt Loam Clay Loam Silty Clay Loam	.37	1.35
IV Clays (Kaolinitic or Silty Clay 1:1 with Provisionally Suitable Structure)	Sandy Clay Clay	.27	1.85

MINIMUM CAPACITY OF PRE-TREATMENT UNITS

Number of Bedrooms	Gallon Capacity (Without Garbage Disposal)	Gallon Capacity (With Garbage Disposal)
2 or Less	750	1,000
3	1,000	1,250
4	1,250	1,500
5	1,500	1,750
Each Additional	250	250

ROCK LATERAL BED LENGTH REQUIREMENTS FOR GRAVITY DISTRIBUTION SYSTEMS BASED ON BED WIDTH

Bed Width	Multiply Total Linear Footage Of Two (2) Foot Wide Trench Required By:
3’	70%
4’	55%
5’	45%
6’	40%
7’	35%
8’	32%
9’	30%
10’	28%
11’	27%
12’	26%

DIVISION OF LABORATORY SERVICES
RECOMMENDED PROCEDURES

PREFACE

The Division of Laboratory Services has prepared this section for the purpose of presenting to the environmentalist and Milk Safety Branch inspector recommended procedures to be followed when collecting samples which are to be submitted to the laboratory. It includes information about the routine laboratory examinations offered. Methods to be used in the collection and shipment of samples of milk, water, food and related specimens are also included. All procedures herein described should be carefully followed in every instance before submitting specimens to the laboratory. This manual is subject to revision and from time to time additional material will be forwarded for this purpose.

It is hoped that this section will be a frequently consulted reference. Further questions regarding policy or services offered should be directed to the Director, Division of Laboratory Services, 100 Sower Boulevard, Suite 204, Frankfort, Kentucky 40601. Telephone (502) 564-4446.

CONTENTS

INTRODUCTION

The primary goal of the Division of Laboratory Services is to ensure the availability of reliable laboratory facilities for the protection of health in the Commonwealth and to promote their proper utilization. Services include the following (1) the examination of clinical and environmental specimens as required to support health programs; (2) reference testing not readily available elsewhere for hospitals and practicing physicians; (3) laboratory improvement support to local health department laboratories, including refresher training, proficiency testing analytes, on-site consultation and laboratory evaluation; dairy laboratory proficiency testing; and consultative service relative to the proper collection, handling and shipping of specimens, and accurate interpretation of test results. The Division of Laboratory Services is also engaged in the development and evaluation of new laboratory methodologies.

This section describes only those examinations available from the Division of Laboratory Services pertaining to milk, food, water, and related specimens. Health department personnel should refer to the "Quick Reference of Laboratory Tests" for information regarding submission of clinical diagnostic specimens and diagnostic tests available from the Division of Laboratory Services.

GENERAL INFORMATION

Milk, water and food samples for examination must be collected and submitted by a person authorized by the local health department. Specimens which have been improperly collected or shipped will be rejected. The value of a laboratory examination depends as much on the quality of the sample as upon the technique of the examination. A poorly collected or improperly prepared specimen cannot be expected to yield reliable information. Health officers, environmentalists, and Milk Safety inspectors are, therefore, urgently requested to see that every specimen which is to be sent to the laboratory is collected according to the procedures outlined in this manual.

The Division of Laboratory Services will provide sampling kits as requested by local health departments, environmentalists, and milk inspectors. Requests may be made through the local health network, or by using the Laboratory Supply Request Form (LAB 119). Environmentalists and milk inspectors are encouraged to check policies on confidentiality before releasing any information on test or investigation results.

BACTERIOLOGICAL AND CHEMICAL EXAMINATION OF MILK AND DAIRY PRODUCTS

SUBMISSION OF SAMPLES

Milk Safety Branch inspection personnel will be assigned a milk shipment schedule by the laboratory prior to January of each year. This shipping schedule will be based on milk control areas. These schedules will be worked out by area directly with the inspectors in a given area, a representative of the Milk Safety Branch, and the Division of Laboratory Services.

Samples arriving on any other than the scheduled date will be rejected by the laboratory and not examined. If it becomes necessary to ship on other than the schedule date, the inspector should notify the laboratory at least ten days prior to the scheduled date and request approval from the laboratory for another or alternate shipping date.

Samples should be shipped so that they will arrive in the laboratory not later than noon on the day scheduled.

COLLECTION OF SAMPLES

Samples of raw milk for pasteurization, Grade A pasteurized milk and milk products shall be collected as outlined in the most recent Pasteurized Milk Ordinance (PMO) and regulations of the Milk Safety Branch.

The collection and transportation of milk samples shall conform to the procedures given in "Standard Methods for the Examination of Dairy Products" and the Certifying Agency.

Samples upon which enforcement actions will be based, may be taken from supplies which are still in the possession of the producer, plant, hauler, or distributor. For this reason, samples shall be taken prior to the final delivery of the milk or milk products. In order to yield significant results, milk samples must be collected so as to represent the condition of the milk when reaching the receiving station, milk plant or consumer, as well as its condition after delivery to the plant but prior to pasteurization. Samples, therefore, must be collected either from the plant or delivery vehicle. Raw milk for pasteurization must be collected at the plant, receiving station, milk truck, farm and in plant storage tanks.

Raw samples for pasteurization in cans, tanks, vats, etc., should be collected aseptically in order to prevent any detectable change in the bacterial population of the product. The milk should be thoroughly mixed with a sterile agitator, if the tank is not equipped with one, before sampling to assure a representative sample. A sterile sampling dipper or tube should be used for taking the sample. Sampling equipment may be sterilized between samples by dipping into water at 180 degrees F for one minute or 100 ppm hypochlorite solution for 30 seconds. Rinse dipper twice in milk before taking sample.

Raw milk samples are to be collected in sterile 4 oz. whirl pak bags or 2 oz. plastic vials. Use waterproof marking pens to identify samples. The bags or vials should be filled 3/4 full. Do not expel air from bags. To close bags, whirl at least three complete revolutions and turn tape wires inward on opposite face on fold.

All raw samples submitted must be placed in waterproof containers or sealed plastic bags. They are then packed in crushed ice for shipping.

All pasteurized milk samples should be placed in sealed leakproof plastic bags to prevent contamination. Frozen desserts need to be packed with dry ice so they will not thaw.

Tests desired for all milk samples should be circled and then written at the bottom of the form. Persons receiving copies should also be listed at the bottom of the form (Lab 502).

To sample pasteurized milk containers select one set of containers and closures at random.

The submission-report form Lab 502 is completed using a soft lead pencil, black ink or typewriter only. Protect form from moisture and forward with samples. The following information should be included on this form:

Collection Date and Time	Name of Dairy
Shipping Date and Time	Type of Product
Shipped Via _____	Sample Number
Collector and Title	Temperature When Collected
Area	Tests Desired

The inspector should number the samples in consecutive order on this form starting with number one on each shipment being forwarded to the laboratory. If raw and finished samples are shipped together, each group should be numbered separately, each series starting with number one. Raw and finished samples must be listed on separate forms.

A copy of this form will be returned with the results of the laboratory findings. It will be the responsibility of the Milk Safety Branch to transmit this information to the person(s) concerned.

Samples should be carefully packed in order to avoid damage or contamination in transit. An extra milk sample must be included in each shipment so the laboratory can determine the temperature of the samples on arrival. If no temperature control sample is provided, the first sample listed will be used. The temperature control sample must be obtained at the first sampling point and be at least half the size of the largest test container. Only results of samples collected by an individual approved by the Milk Safety Branch may be used for official regulatory purposes.

MILK QUALITY TESTS

The chief properties which identify dairy products to be of acceptable sanitary quality are (1) freedom from pathogenic bacteria and toxic substances; (2) freedom from foreign material, and (3) low bacteria count.

Laboratory testing of representative samples is an essential part of every quality control program.

The bacteriological and chemical quality control tests which have been selected as being of special value for controlling the sanitary quality of milk and the method of reporting results are listed below.

1.	Standard Plate Count	Number of bacteria per ml
2.	Coliform Bacteria Count	Number of Coliform bacteria per ml
3.	Pasteurized Milk Containers	Residual bacteria count and residual coliform count per ml or per capacity of container
4.	Phosphatase Test	Fluid samples - mU/L Solid, semi-solids - mU/K
5.	Inhibitive-Adulterants	Units of B-lactam inhibitor present
6.	Cryoscopic Examination	Percent of excessive water
7.	Somatic Cell Count	Somatic cells per ml

STANDARD PLATE COUNT

This test is a method of measuring the existing bacterial population of a given sample of milk or milk product. The lower the bacterial population, the better the sanitary quality of the product.

COLIFORM BACTERIA COUNT

The test for the coliform group of bacteria is not intended to detect fecal pollution specifically or to identify *E. coli* in dairy products, but rather to measure the general care used to minimize bacterial contamination of dairy products. The presence of coliform bacteria indicates improper pasteurization or careless handling of the product after pasteurization.

Since it is time consuming and impractical to examine milk samples for all species of bacteria that might be present, the coliform group is used as an indicator for this purpose. An ideal bacterial indicator of unsanitary conditions is defined as any organism which is always present in human or animal wastes; always found in nature when enteric pathogenic bacteria are present; and by its absence reduces the probability of the presence of any enteric pathogenic bacteria.

PASTEURIZED MILK CONTAINERS
Total and coliform bacteria counts are made once each three-month period to determine if milk service containers are properly sanitized prior to filling.

PHOSPHATASE TEST
This procedure is designed to detect the presence of the enzyme phosphatase which is present in raw milk. Proper pasteurization inactivates this enzyme. The units of phosphatase present will be indicated. A reading of less than 350 units indicates proper pasteurization.

INHIBITIVE ADULTERANT
Antibiotics are the most common inhibitors found in dairy products. Their presence could disrupt the normal flora of bacteria and reduce the bacteria population of milk of poor quality to the point it could erroneously be graded as a good product. Their presence could also produce allergic responses in hypersensitive individuals.

SOMATIC CELL COUNT
Cows in very early or very late lactation, or cows with a low-grade or latent udder infection, are likely to produce milk which contains an excessive number of somatic cells. The screening and confirmatory tests which are used estimate the number of somatic cells (including leukocytes) in milk.

CRYOSCOPIC EXAMINATION
The amount of excessive water in milk can be estimated by determining the freezing point. Any amount of water in excess of the legal standard for this state is considered adulteration.

OTHER EXAMINATION
There are a number of additional tests that can be performed on special request of the appropriate program within the Division of Food and Sanitation. These tests are: flavors and odors, sedimentation, rancidity, radioactivity, and bacterial examinations for Staphylococci, Streptococci, enteric pathogens, Shigella, Salmonella, psychrophils, thermophilis and thermodurics.

WATER BACTERIOLOGY

BACTERIOLOGICAL ANALYSIS OF DRINKING WATER

The routine bacteriological examination of water samples is performed to determine their sanitary quality and suitability for general use. The results of these tests are to be used as indicators of the degree of contamination of the water samples.

Standardized tests for specific pathogenic bacteria and protozoans (e.g. *Giardia lamblia* and *Entamoeba histolytica*) are not routinely available.

Specimen mailing containers for submitting samples of water for bacteriological examinations are provided to local health departments by the Division of Laboratory Services on request.

All samples of water for bacteriological analysis should be collected by a Registered Environmentalist/Sanitarian.

WATER SAMPLE COLLECTION

The following procedures are to be used by local health departments:

1. Water must be collected in sterile vials provided by Laboratory Services. Plastic vials intended for the collection of water samples contain a dechlorinating agent, sodium thiosulfate. The purpose of sodium thiosulfate is to neutralize residual chlorine the moment the sample is taken. The thiosulfate prevents continuation of the bactericidal action of the chlorine during the time the sample is in transit to the laboratory. The bacteriological examination will then indicate more closely the true quality of the water at the time the sample was collected.

2. When sampling from a tap, the following steps should be taken:
   a. Select a tap or hose bibb which has been in use and does not leak. Do not sample from a drinking fountain or gate valve. Remove all attachments from sample tap prior to sampling.

   b. Flush tap for 2-5 minutes before collecting sample. Do not flush tap if source of contamination is suspected to be within the lines of the sampling site.

   c. Identify sample source on sample form and plastic vial.

   d. Fill plastic vial to 100 ml fill line.

   e. Re-cap the plastic vial securely.

   f. Check plastic vial for leaks by shaking and inverting plastic vial several times. Place vial in plastic bag.

   g. Place plastic vial and completed water sample form in the Styrofoam mailer.

   h. Remove backing from mailing label and seal Styrofoam mailer along the short axis.

   j. Pool and health club spa samples require three sample plastic vials each. These can be sent along with the complete form in an appropriate size box to lessen the cost of postage. Beach samples require only one vial.

   k. Samples must arrive in the laboratory within 30 hours of collection. Samples requiring chain of custody precautions are to be iced and taken to the nearest certified laboratory within 6 hours of collection.

3. A complete and accurate laboratory form must accompany each sample submitted for examination. Indicate if sample is other than drinking water (pool, beach, etc.)

4. Samples are to be mailed no later than Wednesday morning of any week. Samples shall arrive in the laboratory no later than 30 hours of collection. Samples that arrive between 30 hours and 48 hours of collection will be processed and results reported with a qualifier.

5. If it is necessary to collect a sample from an open body of water such as a pool or spring, the plastic vial should be attached to a water scoop then filled by plunging under the surface and sweeping forward, using care not to disturb the bed of such source.

6. If a sample is to be taken from a dug well or a cistern by bucket, rinse bucket several times from the source of supply. Then draw fresh water and pour directly into sample plastic vial.

7. If a water sample is submitted from a public or semipublic source, Natural Resources report from DEP 4008 must accompany the Division of Laboratory Services analysis request. The sample collector must fill in all non-shaded areas of the form and sign it at the bottom. Copies of this form may be obtained from the Division of Laboratory Services.

   A public water supply serves 25 or more people per day for 60 or more days per year. A semi-public water supply serves three or more families.

INTERPRETATION OF WATER SAMPLE REPORTS

The tests which are routinely performed are designed to show the presence or absence of the coliform group of bacteria. The coliform group is used as an indicator organism because it is widely distributed in the environment, found in much larger numbers than pathogenic forms and survives longer in water than most other bacteria. The presence of total coliforms in a water sample does not necessarily indicate fecal pollution but does indicate the possibility of transmission. The presence of *Escherichia coli* in a sample does indicate fecal pollution.

Drinking water samples are analyzed using the Colilert Quanti-Tray method. This method tests for both total coliforms and *Escherichia coli*. The results are reported as Most Probable Number. A Sample with no total coliform organisms will be reported as "0.00 Total Coliforms/100 ml". Positive results will be reported as number of organisms per 100 ml.

Samples received from dairies will be tested for total coliforms and *Escherichia coli* using the Colilert Presence/Absence method. Results will be reported as "Coliforms Present (or Absent)" and "*E. coli* Present (or Absent)".

The test for coliforms and fecal coliforms will be run on recreational water samples. Results will be reported as Most Probable Number (MPN) per 100 ml for coliforms and count per 100 ml for fecal coliforms.

Samples that are unsatisfactory for testing will be reported as unsatisfactory and the reason the sample was considered unsatisfactory will be given. Samples will be rejected for the following reasons:

1. Sample container broken or leaked.

2. No collection date.

3. Insufficient quality of sample (less than 100 ml).

4. The sample was received later than 30 hours after collection.

   NOTE: Samples which are not from public or semi-public water supply sources that arrive between 30 and 48 hours after collection will be tested. Results will be reported with a qualifier.

5. Unauthorized collector or no collector indicated.

Results of tests are sent electronically over the Local Health Network (LHN). Tests are run the day the sample is received. Cultures are incubated for 24 hours and the results are entered into the computer. The reports are printed during the night and are transmitted over the LHN the following morning. Recreational waters require 48-hour incubation for heterotrophic plate count. The results will be available after 48 hours and printed the following day.

PROCEDURES FOR THE COLLECTION OF FOOD SAMPLES FOR MICROBIOLOGICAL EXAMINATION

Too often, samples of food suspected of causing foodborne disease are submitted to the laboratory in non-sterile containers, wrapped in unsuitable covering and Not Refrigerated. Consequently, they are received in a decomposed state. Some are received also with no identification other than the sender's name and with no information other than "Someone became ill."

Foodborne disease outbreaks are subject to court proceedings, and frequently health department personnel are called upon to testify. Obviously, such testimony is of no value when the record of the sample is incomplete, and the laboratory results are of no significance if a sample is received in an unsatisfactory condition. Always bear in mind that unless a food sample is collected properly, the laboratory examination cannot be expected to yield reliable information and is of little or no value. If at all possible it is critical to collect a clinical specimen from the patient who has consumed the suspected food or verify if clinical specimens were identified at the hospital the patient contacted.

This section of the manual is devoted to the recommended methods for the collection of samples of food which are to be submitted to the laboratory for microbiological examinations.

COLLECTION OF SAMPLES

In collecting food samples for the isolation and identification of microorganisms that are pathogenic, normal to food products, an index of sanitation or cause spoilage and deterioration, the environmentalist should use every possible means to prevent contamination. When the sample arrives in the laboratory, the true condition of the product, as prepared and offered to the public must not be altered as a result of unsatisfactory collection methods.

If products are in bulk, or in containers of a size making it impractical to transport to the laboratory, transfer a representative sample to sterile containers under aseptic conditions. Since it is impractical to sterilize certain sampling devices in the field, it is best to sterilize such devices in the laboratory and transport them in sterile carrying cases. Where drills, triers, agitators, etc., are used in the field, it is often necessary to sterilize between samplings. Where this is necessary, special sterilizing equipment should be provided as facilities in stores, warehouses and food plants are seldom adequate for that purpose. The environmentalists should be familiar with any available resources in the area where proper sterilization of equipment could be obtained. A local hospital would in all probability render such services in an emergency.

If a food product is composed of several parts or components, such as a cream pie with meringue topping, turkey and dressing, etc., it is often desirable to sample the components separately in such a way as to eliminate as much chance of cross-contamination as possible. In the case of a cream pie, take a sample of the topping without disturbing the filling and then with a sterile implement cut away the surface of the filling with a minimum chance of contamination from the surface of the topping. This type of collection would be important if the components were processed separately and in such a manner as to give large numbers of microorganisms in specific portions and not in others.

Aseptic precautions should be taken at all times, and particularly in opening containers to obtain samples. Clean, dry, leakproof, wide mouth, sterilized containers of a size suitable to hold samples of the particular products should be used. Use sterile screw-cap bottles or vials or screw-type fruit jars or other similar leakproof containers.

TRANSPORTING SAMPLES

Transport samples to the laboratory as rapidly as possible. Be sure to maintain the original conditions under which the material was held. However, if the sample was collected at a high temperature, refrigerate it at 41^{o} F or below for transporting. If product is canned or in a dry condition, no particular precautions are necessary, but if product is under refrigeration or is frozen, samples should be transported rapidly in a protective case so they will arrive at the laboratory in an unchanged condition. Frozen samples should be kept solidly frozen at all times. Thawed samples of frozen products must be kept under refrigeration until they reach the laboratory, DO NOT REFREEZE.

Frozen samples should be collected in pre-chilled containers and placed in the freezer for sufficient time to become thoroughly frozen. Ship under conditions that will allow the sample to arrive in the laboratory in the frozen state. Refrigerated samples should be transported in wet ice (crushed). It may be necessary to use the regular milk shipper if a sufficient number of samples are to be collected. Otherwise, well-insulated chilled containers can be used. Unless otherwise specified, refrigerated samples should not be analyzed more than 36 hours after collection. The environmentalist should be familiar with local shipping schedules.

Freezing of refrigerated samples should be avoided since destruction of certain microorganisms may occur. Samples to be tested for *Clostridium perfringes* should not be frozen.

The laboratory should be advised in advance as to the types and number of samples, dates they are to be collected, when they will arrive and how they will be transported to the laboratory. This information can generally be given to the laboratory before samples are to be collected for informational, survey or quality control purposes.

In the case of outbreaks of foodborne illness, it may not be possible to give all of this information in advance to the laboratory. However every effort should be made to advise the laboratory at once by telephone that samples are to be collected for the investigation of a food poisoning outbreak.

Proper official submission forms (Lab 504) should accompany each food sample submitted to the laboratory. Note the information requested and be sure the form is completed and forwarded along with the sample.

The environmentalist should remember that food samples should be considered “official” samples before they are to be examined by the laboratory. There may be some exceptions as specified in the “Complain Investigation Samples” section. All inquiries regarding the collection of food samples should first be discussed with the Division of Public Health Protection and Safety. Failure to adhere to this policy may cause the environmentalist undue waste of time and effort in collecting samples which are not of the “official” category and may not be accepted by the laboratory.

COMPLAINT INVESTIGATION SAMPLES

Frequently consumer complaints are received concerning reported illness or injury resulting from the consumption of food or, concerning the discovery of some foreign visible contaminant in a food product. Prompt investigation should be initiated by the environmentalist first by completing a Record of Complaint and Investigation Report (CHPS-272) or an equivalent form. Also, a visit should be made to the establishment where the product was purchased and if possible a like-coded representative control sample should be collected. An examination of a number of product containers or packages in the establishment may reveal apparent adulteration, thus justifying selective sampling.

NOTE: The control sample, in addition to being like-coded, should usually consist of more than one unit or package of product collected at random from available units of product. Complete one (1) Laboratory Sample Collection and Data Analysis Report (Lab 504) for the complainant's sample and at least one (1) sample report for the official unopened sample(s) collected from the establishment. It should be determined by the environmentalist whether any other similar complaints have been received by the establishment**.**

When the complaint involves a product whose integrity is questionable due to having been opened or the seal on the closure has been tampered with, the sample will not be considered official. Such a sample should only be collected (as an unofficial sample) for laboratory examination if the suspected contaminant is visible to the naked eye. A control sample shall also be collected to accompany the suspect sample. If the reported contaminant is only suspect and not visible in a product which has been opened or tampered with, the product should not be collected unless accompanied by a specific request for analysis written by the patient's physician.

The laboratory should be advised about the number and types of samples collected and when they will be transported to the laboratory. Following laboratory examination, the complaint documentation, including laboratory results, may be forwarded to the appropriate agency for necessary follow-up action concerning the packer or manufacturer of the product in question.

REPORTING RESULTS OF THE LABORATORY EXAMINATION

The laboratory may report results as number of bacteria or other microorganisms or number of colonies of microorganisms, per gram or per milliliter as well as the presence or absence of a predominating organism.

SANITATION INDEXES

The cleanliness of food is considered essential by the consumer. He places a trust in the food producer, processor and handler that the food presented to him has been produced under sanitary conditions and is as free of contamination as possible. There has been considerable controversy over the types of organisms that are most indicative or can best be used in describing the sanitary quality of a food product. Three have been given the most consideration: *Escherichia coli*, coliforms and enterococci. The laboratory detection of microorganisms of these groups is only an indication of a situation which existed at some point along the path that the food has traveled. It is only when adequate history of the product is known that the laboratory information may be used to pinpoint the source and cause of the trouble. The presence of large numbers of these types of organisms is not necessarily indicative of an immediate health hazard. It may however indicate lack of good sanitary practices and it raises a warning flag that the conditions which brought about the contamination could easily give rise to spoilage, loss of quality, or create a health hazard. It must be remembered that certain members of the coliform group are found in certain fermented types of food and may even play a part in the process. Their presence in many fresh fruits and vegetables usually cannot be interpreted as indicative of poor sanitation.

DETECTION OF FOODBORNE MICROORGANISMS

The environmentalist may be required only upon occasion to investigate a foodborne illness outbreak. When this does occur he/she should be familiar with the correct procedures for collecting food samples to be sent to the laboratory. Food collection kits are available from the Division of Laboratory Services. Specific materials and instructions are included in each of these kits. The environmentalist should have at least one of these collection kits available for investigation of a foodborne outbreak. The laboratory should be alerted at once as to the types and numbers of samples, date they were or will be collected, when they will arrive in the laboratory and how they will be transported to the laboratory, as well as other pertinent information needed to prepare for the examination of these specimens.

Clinical specimens (stool, vomitus, throat swabs, etc.) are often very useful in foodborne disease investigations. Physicians and nurses, rather than environmentalists, are usually responsible for the collection of such specimens.

FOODBORNE DISEASE INVESTIGATIONS

The following instructions have been designed for use by local health departments in the investigation of foodborne disease outbreaks. By way of definition, a foodborne disease is any disease in which the agent reaches the host through a vehicle which is ingested. Such vehicles include all foods, milk, water and other beverages. A thorough investigation is suggested when an outbreak of any disease is associated with consumption of a common source vehicle.

I. When a suspected foodborne disease outbreak comes to the attention of the local health department, an immediate report should be made to the office of the State Epidemiologist.

   A. The report should be made by the local health officer or a designee from his staff who is acquainted with all the preliminary facts.

   B. Such reports should be made by phone to the Epidemiologist.

   C. Preliminary information on the incident may be supplemented by rapid inquiries to such persons as local practicing physicians, hospitals, school authorities, food handling establishments, leaders of the group in which the outbreak occurred, the reported victims themselves, etc.

   D. On the basis of this preliminary report, the Epidemiologist should be in a position to make one or more of the following suggestions:

      1. Collect further specific information on the incident prior to proceeding with a complete epidemiologic follow-up on the report.

      2. Proceed with the investigative technique outlined in this set of empirical instructions.

      3. Alter, omit or make additions to the specific steps outlined in these instructions.

      4. Immediately rule out the possibility that the outbreak is a common source foodborne illness.

II. If there is enough preliminary evidence to implicate a specific meal as the common source event, all left-over foods from the suspected meal should be immediately quarantined, sampled and properly stored for possible future shipment to the laboratory for corroboration of epidemiologic data.

   A. It is suggested that the local environmentalist perform this function.

B. Such foods should be officially quarantined by using the "Quarantined" tag (Form DFS-223) and "Notice of Quarantine," (Form DFS-223).

C. Official samples for laboratory analysis are to be collected utilizing the equipment contained in the food collection kit and the technique described in the instructions.

D. Proper storage methods for quarantined foods are essential.

III. If possible every available person who consumed all or any portion of the suspected meal as well as those individuals who prepared and/or served the foods should be visited and interviewed. (If the total number of persons exposed is too large, a smaller number may be interviewed.)

A. The public health nurse may be the most logical member of the local health department staff selected to perform this phase of the investigation.

B. A list of names and addresses of those persons who consumed the suspected meal as well as the food handlers should be prepared. Additional names may be added to the list by information gathered from the persons interviewed.

C. An individual "Foodborne Disease Questionnaire," (Form EPID 212) should be filled out on each person. Care should be taken in obtaining the questionnaire information to avoid introduction of bias into the derived data. Ask direct objective questions. Do not suggest answers in the phrasing of your questions.

D. It is well to remember that this might be the only opportune time to collect clinical specimens (e.g., vomitus and stools) from patients still showing symptoms. Special instructions for collection of such specimens are included in the kits.

E. If any of the victims received medical treatment, it is advisable to obtain information relative to symptoms, laboratory findings, diagnosis (tentative or confirmed) and treatment from the attending physician and/or hospital personnel. Such information can be recorded on the back of the "Foodborne Disease Questionnaire" (Form EPID 212).

IV. A complete inspection of the establishment or establishments where the suspected foods were prepared and/or served should be performed.

A. The local environmentalist should carry out this phase of the investigation.

B. Record the source (retailer, wholesale, distributor, code numbers, etc.) method of preparation (cooking times, temperatures, etc.) and method of storage (both before and after preparation) of all foods served at the suspected meal.

C. If not previously done, quarantine sample and properly store all left over foods from the suspected meal.

D. If a private water supply is involved, collect a sample for bacteriological analysis.

E. Inquire as to the health of food service employees in the establishment.

1. Check into the absenteeism records of the employees and note any recent illnesses.

a. Consultation with the attending physician may be indicated.

2. Particularly note infections on the hands or other exposed body surfaces of employees.

F. Do a complete sanitary inspection of the establishment utilizing "Inspection Report for Food Establishment" (DFS 208).

1. Always look for toxic metals (cadmium, zinc, antimony and copper) in the equipment as well as pesticides, cleaning agents or other chemicals which may have contaminated the foods.

2. Check for insects, rodents or other animals which have had access to the foods involved in the outbreak.

V. The collected information should now be summarized, tabulated and analyzed.

A. Case History Questionnaire information should first be summarized on Form EPID 212 "Foodborne Disease Questionnaire." Clerical personnel can be well utilized at this point.

B. Arrange the individual food history data in a table such as the attack table which is enclosed in each Food Collection Kit. The purpose of such a table is to compare attack rates for persons who ate, as opposed to those who did not eat, each item served at the suspected meal.

1. The greater the disparity in attack rates between those who ate versus those who did not eat a particular food item, the greater the probability that the item in question was the vehicle for the agent which caused the illness.

2. Assistance in the statistical analysis of such data is available from the State Epidemiologist.

VI. After the epidemiological data has statistically implicated one or more of the previously quarantined left-over foods from the suspected meal, samples should be submitted with "Sample Collection Data and Analysis Report", (LAB-504), to the Division of Laboratory Services, Kentucky State Department of Public Health, for analysis.

A. These samples should be officially collected, packaged, (use official tape DFS-224) sealed and submitted. Tests requested must be written on form. Testing is based on results of investigation

B. The Division of Laboratory Services should be consulted by phone in order that the time of arrival can be properly scheduled.

C. Previously quarantined and sampled food items shown to be epidemiologically unrelated to the outbreak should not be submitted for laboratory studies and can now be released from quarantine.

D. Remember, in foodborne disease investigations, the function of the laboratory is to supplement and substantiate the epidemiological findings of a careful investigation. (Laboratory results are used to corroborate the epidemiologic observations, not supplant them.)

VII. Logical conclusions should now be drawn as to the identity of the food item which served as the vehicle of the disease agent, the manner in which the food became contaminated, the specific agent which caused the disease, how the outbreak could have been prevented, etc.

A. A form for summarizing the results of the investigation, CDC 52.13, "Investigation of a Foodborne Outbreak" is included in the Food Collection Kit.

B. A completed report should be submitted to the State Epidemiologist.

COLLECTION AND SHIPMENT OF FOOD AND CLINICAL SAMPLES

LIQUIDS AND SEMI-SOLID FOOD SAMPLES

COLLECTION
At least 100 grams or approximately four ounces. If possible, leave in original container or transfer to sterile four ounce sampling bottle or large whirl-pak bag.

SHIPMENT
Identify sample. Seal with official seal. Seal cap with plastic adhesive or masking tape. Pack in leakproof container and place this shipment case in wet ice in plastic bag or use freezer packs. Do not freeze.

DRY FOOD SAMPLES

COLLECTION
100-200 grams or four to six ounces. Submit original unbroken package, if possible. If this cannot be done, a portion may be aseptically transferred to sterile plastic bag. Bags should be carefully sealed.

SHIPMENT
Identify sample. Seal with official seal. Some samples may not require refrigeration in transit. When in doubt, refrigerate.

MEAT SAMPLES

COLLECTION
At least 100 grams, or approximately four ounces. Use sterile knife to cut portion and place in sterile plastic bag. Use sterile tongue depressor for ground meat. Bags should be carefully sealed. Store in refrigerator.

SHIPMENT
Identify sample, seal with official seal and ship in wet ice. Do not freeze.

FROZEN FOOD SAMPLES

COLLECTION
100-200 grams. Submit unbroken package, if possible. If thawed, transfer portion to sterile plastic bag. Store in refrigerator if thawed, otherwise, in freezer.

SHIPMENT
Frozen samples should be packed in dry ice and shipped in the frozen state. Thawed sample containers should be shipped refrigerated. Do not refreeze thawed specimens.

SAMPLES FOR CHEMICAL ANALYSIS
Samples for pesticide analysis must not be sampled and/or shipped in plastic containers. In general, however, the sampling and shipping methods for bacteriological analysis are acceptable for chemical analysis.

VOMITUS AND STOOL

COLLECTION
At least 1/2 ounce. Collect in clean container such as small saucepan or sterile plastic bag. If *B. cereus*, *Campylobacter* or *Vibrio* are suspected, transfer Cary-Blair media and mail refrigerated. For organisms other than the above, transfer to an enteric pathogen kit containing buffered glycerol saline. Complete Submission Report Form (LAB-219). Ship as soon as possible.

SHIPMENT
Quickest means possible.

DIARRHEA STOOL SPECIMEN

COLLECTION
At least 1/2 ounce. Collect in clean container such as a small saucepan or sterile plastic bag and transfer to glass vial in enteric pathogens container. Make sure the preservative is in the vial before using. Complete Submission Report Form (LAB-219). Ship as soon as possible.

SHIPMENT
Quickest means possible.

ANIMAL BITES AND RABIES EXPOSURES

Many factors must be considered in determining the relative danger involved in an animal bite.

SPECIES
Only warm-blooded animals (mammals) are susceptible to rabies infections. Theoretically, any mammal can develop rabies, however, only few species account for the majority of infections. In Kentucky, these species are skunks, bats, horses, cattle, dogs, and cats. Bites of rabbits, squirrels, chipmunks, rats, mice and small caged pets (guinea pigs, gerbils, hamsters, etc.), rarely require prophylaxis.

CIRCUMSTANCES
An unprovoked attack is much more likely to represent a rabies exposure than are bites resulting from children teasing pets, attempting to handle wild animals, etc**.**

EXPOSURE TYPE
In nearly all instances, rabies is transmitted by bite (inoculation of virus through the skin). Infection by contamination of skin cuts or abrasions with saliva is much less common.

REPORTING BITES
Kentucky law requires that all animal bites be reported to the health jurisdiction in which they occur. Complete the "Animal Quarantine Notice" form, #Epid-200.

CONFINEMENT
When an animal is suspected of being rabid and there has been human exposure, the animal should be confined under observation for 10 days. If symptoms consistent with rabies are present at the time of the exposure, or develop during quarantine, or if the animal dies during this time, it should be tested for rabies.

Exceptions to this recommendation are wild animals and unhealthy strays. Early behavioral signs of rabies in wild animals cannot be interpreted reliably. In these cases, the animal should be immediately sacrificed, without damage to the brain, and tested for rabies.

ANIMALS EXPOSED
The following recommendations apply in cases of pets or domestic animals exposed to a known rabid animal:

1. An exposed animal with a valid vaccination certificate should be revaccinated immediately and quarantined for 45 days. If the animal develops symptoms or dies, rabies testing should be performed.

2. An exposed animal that has <u>not</u> been vaccinated, should be destroyed immediately. If the owner refuses to destroy the animal it can be quarantined for 6 months and rabies vaccine given 1 month prior to release. If the animal becomes ill or dies during that time it should be examined for rabies.

TEST SPECIMENS

No animal should be killed by clubbing or shooting in the head. If the animal's brain is damaged or shot away there will be no satisfactory material to examine. If the animal is decomposed and the tissues of the brain are not identifiable the specimen is unsatisfactory. Animals destroyed by poison can be examined microscopically but are not suitable for virus isolation procedures.

- All mammals are accepted for rabies examination. Live animals are not acceptable. In these situations refer the client to a veterinarian, who can euthanize the animal.
- Send only heads of the animals to be tested. For very small animals such as bats or mice, it is preferable to submit the whole body, as the brain is less likely to dry out.
- To simplify handling of very large animal heads, such as cows and horses, it is suggested that the brain be sent, and not the entire head. The brain should be removed by a veterinarian, carefully packed and shipped as quickly as possible.
- If more than one small animal is being shipped, the same container may be used only if each animal is separately wrapped and clearly marked. Separate submission forms must be completed for each animal.
- If shipment cannot be arranged immediately, the animal head can be kept refrigerated for a short time. If the delay will be several days, the head can be frozen and shipped frozen. Once the head has thawed testing will proceed as usual.

SUBMISSION OF ANIMAL HEADS FOR RABIES EXAMINATION

The shipping container for submitting animal heads to the Division of Laboratory Services is furnished to the Local Health Center and will be available there. It contains:

1 - 3 ½ gallon plastic bucket with a 12" lid. The bucket is enclosed in a specially designed waxed packing carton for shipping.
1 - Large plastic bag (10" x 10" x 30" long) in which to place crushed ice.
1 - Small plastic bag (12" x 18" long) in which to place the animal head.
2 - Plastic ties, 8" long, used to seal the plastic bags.
1 - Roll of gummed tape to seal the carton before shipping.
1 - Envelope containing: Rabies Submission Form #254, instruction sheet, and one (1) pre-addressed shipping label.

[This containment system, when used as instructed, meets U.S. Postal regulations.]

PACKING

1. The head of the animal must be removed from the body and placed in the smaller plastic bag. Twist and knot the top of the bag and secure below the knot with one of the plastic ties.
   (Do not put ice or cold packs in the same bag with the head.)

2. Line the plastic bucket with a few sheets of newspaper to absorb condensation and then put in the larger plastic bag.

3. Place sealed bag containing the head into the larger bag in the bucket. Fill this large bag with wet ice, knot, and secure below the knot with the second plastic tie.
   (Cold packs do not hold-up well in the summer heat.)

4. Snap the lid securely in place on the bucket.

5. Carefully complete submission form #254. Answer <u>all</u> questions.
   Put the form back into the brown envelope and place on top of the sealed bucket. Close and seal carton. If the package is to be hand delivered, the carton can be closed, folded so that the bucket handle protrudes for easier carrying.
   (Some commercial couriers prefer the handle inside the carton.)

SHIPPING

Ship to arrive as quickly as possible. We recommend that you request overnight delivery. Specimens can be received 24 hours a day, 7 days a week by lab staff and/or by building security staff. Specify to the U.S. Post Office or the commercial courier that you need next day delivery not next working day. Specimens can also be hand-delivered to the Centralized Laboratory Facility (CLF) building. The shipping label is pre-addressed:

Division of Laboratory Services
Department of Public Health
100 Sower Blvd.
Frankfort KY 40601

Complete the return address information and affix the label to the side of the carton. Arrange for pre-paid transport. The Laboratory cannot accept collect shipments.
[Contact the laboratory for further information: 502 / 564-4446 ext 4487.]

Breathitt Veterinary Center of Murray State University is authorized to perform microscopic rabies testing for the western counties of the state. If it is more convenient to ship specimens there, call for further instructions to: 502-886-3959

TEST RESULTS

The brain will be examined by direct (preliminary) and fluorescent (confirmatory) microscopic techniques. Each of these test results will be phoned to the County Health Center submitting the specimen. If these microscopic tests are negative for rabies, the person bitten need not be treated. Computer generated reports will follow.

CHEMICAL ANALYSES OF FOOD, WATER, MILK, DRUGS, OCCUPATIONAL HEALTH, MEDICAL EXAMINER AND CONSUMER PRODUCT SAMPLES

SUBMISSION OF SAMPLES

Samples for chemical analysis should be submitted to the Instrumentation Section, Division of Laboratory Services, Department for Public Health by U.S. Mail at 275 East Main St., Frankfort, KY 40621 or by other carriers at 100 Sower Boulevard, North Loading Dock, Frankfort, Kentucky 40601.

If there are questions concerning any aspect of sampling, you are encouraged to call. Food samples must be cleared through the Food Safety Branch at 564-7181. Environmental lead samples must be cleared through Environmental Management Branch at 564-4537.

Routine samples for food analysis should be addressed:
ATTENTION: FOOD ANALYST, INSTRUMENTATION SECTION

Routine Pesticide samples should be addressed:
ATTENTION: PESTICIDE ANALYST, INSTRUMENTATION SECTION
Samples for pesticide analysis must not come into contact with plastic containers or wrappers.

All samples which are likely at some later date to involve legal proceedings should bear an adequate legal seal, be properly identified, have a verifiable chain of custody, and have the proper forms completed.

The division does not directly handle material where criminal intent is suspected.

Sampling for the Occupational Health and Safety and the Medical Examiner's programs should be done by those agencies.

Unofficial samples and samples other than water from private sources should be referred to commercial laboratories. These include samples which have not been collected by authorized personnel and are not part of an investigation, or where sample results are not needed for official purposes. In the event that a request for chemical analyses needs clarification, the Division of Environmental Health and Community Safety or the Division of Laboratory Services should be consulted before submitting samples.

COLLECTION OF SAMPLES FROM PRIVATE WATER SUPPLIES

Most tests for chemical analysis of water require specific, specially prepared containers and preservation methods. Maintenance of a supply of these containers in local health departments is not recommended because of the infrequent demand for any given analysis, the instability of most preservatives, and the large inventory required to cover all potential needs. The laboratory should be called to discuss specific analytical needs before sampling.

Bacterial contamination should be considered along with any chemical contamination. Use Form Lab 504 or Lab 700B for submission of samples.

Samples submitted for chemical analysis should be sent in similar to samples submitted for foodborne illness investigation.

ANALYTE SELECTION	
SUSPECTED CONTAMINATION	**TEST**
Fertilizer, Agricultural Run-off	**Nitrate and Nitrite (plus Coliform & Fecal Coliform)**
Pesticide/Herbicide	**Specific Pesticide or Herbicide or screen for Pesticide only.**
PCB's	**PCB's**
Brine or Road Salt	**Chloride, Sodium**
Lead, Copper, or Iron Leaching from Pipes	**Lead, Copper or Iron, pH**
Dump, Landfill or Industrial Waste	**Nitrate, Nitrite, Chloride, Leachate, the specific contaminant or class of contaminants such as Heavy Metals, Volatile Organics, etc.**
Gasoline or Fuel Oil	**Petroleum Products (specific type)**
Septic Tank, Sewer or Cesspool	**(Total Coliform, Fecal Coliform, Nitrate, Chloride**

POTABILITY PROBLEMS	
BAD ODOR OR TASTE	**TEST**
Salty	**Chloride, Sodium**
Musty	**Total Coliform, Nitrate, Nitrite, Iron (If iron is present, pH and Manganese)**
Soapy, Perfumey	**Detergents**
Sour, Metallic	**Chloride, Hardness, Fluoride, pH, Iron, Manganese, Morbidity**
Gasoline, Oil	**Petroleum Products (specific type)**
Rotten Eggs	**(Iron Bacteria, Algae) Sulfate**
Staining of Sink, Tub, Laundry	**Iron, Manganese**
Scaling or Chalky Residue on Hot Water Pipe	**Hardness**

STATE AGENCIES

KENTUCKY DEPARTMENT OF AGRICULTURE
Capitol Plaza Tower, 7th Floor, 500 Mero St., Frankfort, KY 40601

OFFICE OF THE COMMISSIONER
(502) 564-5126 FAX (502) 564-5016
www.kyagr.com

OFFICE OF STATE VETERINARIAN
(502) 564-3956

OFFICE FOR CONSUMER & PUBLIC SERVICES
(502) 573-0282

DIVISION OF REGULATION & INSPECTION
(502) 573-0282

DIVISION OF FOOD DISTRIBUTION
(502) 573-0282

OFFICE FOR AGRICULTURAL MARKETING & PRODUCT PROMOTION
(502) 564-4696

DIVISION OF MARKETING & PROMOTION
(502) 564-4983

DIVISION OF SHOW & FAIR PROMOTION
(502) 564-4983

DIVISION FOR ENVIRONMENTAL SERVICES
(502) 564-4696

DIVISION OF PESTICIDE REGULATIONS
(502) 564-7274

DIVISION OF PESTS & WEEDS
(502) 573-0802

DEPARTMENT OF CORRECTIONS
www.cor.state.ky.us
275 E. Main St., Frankfort, KY 40601

OFFICE OF THE COMMISSIONER
(502) 564-4726 FAX (502) 564-5037

STATE AGENCIES

CABINET FOR HEALTH AND FAMILY SERVICES
275 E. Main St., Frankfort, KY 40621

OFFICE OF THE SECRETARY
(502) 564-7042 FAX (502) 564-7091
www.chs.ky.gov

OFFICE OF GENERAL COUNSEL
(502) 564-7900 FAX (502) 564-7573

OFFICE OF INSPECTOR GENERAL
(502) 564-2888 FAX (502) 564-6546

DIVISION OF SPECIAL INVESTIGATIONS
(502) 564-2815 FAX (502) 564-7876

KENTUCKY DEPARTMENT FOR PUBLIC HEALTH
(502) 564-3970 FAX (502) 564-9377

DIVISION OF ADULT AND CHILD HEALTH
(502) 564-4830 FAX (502) 564-8389

DIVISION OF EPIDEMIOLOGY & HEALTH PLANNING
(502) 564-3418 FAX (502) 564-0542

HIV/AIDS BRANCH
(502) 564-6539

DIVISION OF LABORATORY SERVICES
(502) 564-4446 FAX (502) 564-7019

DIVISION OF LOCAL HEALTH DEPARTMENT OPERATIONS
(502) 564-4990 FAX (502) 564-2556

DIVISION OF RESOURCE MANAGEMENT
(502) 564-6663 FAX (502) 564-0919

OFFICE OF VITAL STATISTICS
(502) 564-4212 FAX (502) 227-0032

STATE AGENCIES

CABINET FOR HEALTH AND FAMILY SERVICES, continued

DIVISION OF PUBLIC HEALTH PROTECTION & SAFETY
(502) 564-7398 FAX (502) 564-6533

ENVIRONMENTAL MANAGEMENT BRANCH
(502) 564-4856

FOOD SAFETY BRANCH
(502) 564-7181

MILK SAFETY BRANCH
(502) 564-3340

ENVIRONMENTAL LEAD PROGRAM
(502) 564-4537

RADIATION HEALTH & TOXIC AGENTS BRANCH
(502) 564-3700

JUSTICE CABINET

http://justice.ky.gov/
Bush Building, 2nd Floor, 403 Wapping St., Frankfort, KY 40601

OFFICE OF THE SECRETARY
(502) 564-7554 FAX (502) 564-4840

DEPARTMENT OF PARKS
(502) 564-2172 FAX (502) 564-6100
http://parks.ky.gov

STATE AGENCIES

MILITARY AFFAIRS
www.military.state.ky.us
Boone National Guard Center, Frankfort, KY 4061

ADJUTANT GENERAL
(502) 607-1558 FAX (502) 564-7504

EMERGENCY MANAGEMENT
http://kyem.dma.state.ky.us
(502) 607-1682 FAX (502) 564-7504

NATURAL RESOURCES & ENVIRONMENTAL PROTECTION CABINET
www.nr.state.ky.us
Capitol Plaza Tower, Frankfort, KY 4061

OFFICE OF THE SECRETARY
(502) 564-3350 FAX (502) 564-3354

DEPARTMENT FOR ENVIRONMENTAL PROTECTION
http://www.dep.ky.gov/default.htm
(502) 564-2150 FAX (502) 564-4245

DIVISION OF WASTE MANAGEMENT
(502) 564-6716 FAX (502) 564-4049

DIVISION OF WATER
(502) 564-3410 FAX (502) 564-0111

BOARD OF PHARMACY
www.state.ky.us/boards/pharmacy
23 Millcreek Park, Frankfort, KY 40601-9230

EXECUTIVE DIRECTOR
(502) 573-1570 FAX (502) 573-1582

STATE AGENCIES

PUBLIC PROTECTION & REGULATION CABINET
www.ppr.state.ky.us
90 Airport Road, Frankfort, KY 40601

OFFICE OF THE SECRETARY
(502) 564-7760 FAX (502) 564-3969

DEPARTMENT OF HOUSING, BUILDINGS & CONSTRUCTION
101 Sea Hero Rd., Suite 100, Frankfort, KY 40601

OFFICE OF THE COMMISSIONER
(502) 573-0365 FAX (502) 573-1057

DIVISION OF FIRE PREVENTION/STATE FIRE MARSHAL'S OFFICE
(502) 573-0382 FAX (502) 573-1004

DIVISION OF BUILDING CODES ENFORCEMENT
(502) 573-0373 FAX (502) 573-1059

DIVISION OF PLUMBING
(502) 573-0397 FAX (502) 573-1058

TOURISM DEVELOPMENT CABINET
www.kytourism.com
Capitol Plaza Tower, 24th Floor, 500 Mero St., Frankfort, KY 40601

OFFICE OF THE SECRETARY
(502) 564-4270 FAX (502) 564-1512

DEPARTMENT OF PARKS
(502) 564-2172 FAX (502) 564-6100
http://parks.ky.gov

FOOD SERVICES DIRECTOR
(502) 564-2172

KENTUCKY STATE POLICE POSTS

www.kentuckystatepolice.org

Post 1- Mayfield	**270/856-3721**
2- Madisonville	**270/676-3313**
3- Bowling Green	**270/782-2010**
4- Elizabethtown	**270/766-5078**
5- Campbellsburg	**502/222-0151**
6- Dry Ridge	**859/428-1212**
7- Richmond	**859/623-2404**
8- Morehead	**606/784-4127**
9- Pikeville	**606/433-7711**
Post 10- Harlan	**606/573-3131**
11- London	**606/878-6622**
12- Frankfort	**502/227-2221**
13- Hazard	**606/435-6069**
14- Ashland	**606/928-6421**
15- Columbia	**270/384-4796**
16- Henderson	**270/826-3312**

KENTUCKY REGIONAL POISON CENTER

www.krpc.com

Calls should be made to: KENTUCKY REGIONAL POISON CENTER
KOSAIR CHILDREN'S HOSPITAL
PO Box 3070
LOUISVILLE, KY 40232-5070
1-800-222-1222

FEDERAL AGENCIES

Food and Drug Administration District Office
www.fda.gov
6751 Steger Drive
Cincinnati, OH 45237-3097
(513) 679-2700

US Government Food, Food Safety Inspection Service, Meat and Poultry Operations
www.fsis.usda.gov
155 E. Columbus Street
Pickerington, OH 43147
1-614-833-1405

Environmental Protection Agency -- Region 4
www.epa.gov
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-3104
1-800-241-1754

U.S. Consumer Product Safety Commission
www.cpsc.gov
4330 East-West Highway
Bethesda, MD 20814
(800) 638-2772

Centers for Disease Control and Prevention
www.cdc.gov/ncidod/dbmd/foodborne/index.htm
Foodborne and Diarrheal Diseases Branch
Atlanta, GA 30333
(404) 639-2206