TABLE 1
VEGETATIVE SPECIES OBSERVED AT THE COOLING WATER RECHARGE POND

Species and Layer	Location
Canopy	
Red oak (*Quercus rubra*)	Upland surrounding pond
Eastern white pine (*Pinus strobus*)	Upland surrounding pond
Red maple (*Acer rubrum*)	Upland surrounding pond
White oak (*Quercus alba*)	Upland surrounding pond
Sapling Layer	
Black birch (*Betula lenta*)	Upland surrounding pond
Eastern hemlock (*Tsuga canadensis*)	Upland surrounding pond
Red maple (*Acer rubum*)	Upland surrounding pond
Shrub Layer	
Black birch (*Betula lenta*)	Upland surrounding pond
Glossy buckthorn (*Rhamnus frangula*)	Upland surrounding pond
Maple-leaved viburnum (*Viburnum acerifolium*)	Upland surrounding pond
Willow (*Salix* sp.)	In pond/along shore
Red oak (*Quercus rubra*)	Upland surrounding pond
Eastern white pine (*Pinus strobus*)	Upland surrounding pond
Highbush blackberry (*Rubus allegheniensis*)	Upland surrounding pond
Early-low blueberry (*Vaccinium pallidum*)	Upland surrounding pond
White oak (*Quercus alba*)	Upland surrounding pond
Gray birch (*Betula populifolia*)	Upland surrounding pond
White ash (*Fraxinus americana*)	Upland surrounding pond
Witch hazel (*Hamamelis virginiana*)	Upland west of pond
Multiflora rose (*Rosa multiflora*)	Upland surrounding pond
Oriental bittersweet (*Celastrus orbiculatus*)	Upland surrounding pond
Groundcover	
Virginia creeper (*Parthenocissus quinquefolia*)	Upland surrounding pond
Canada mayflower (*Maianthemum canadense*)	Upland surrounding pond
Bindweed (*Polygonum* sp.)	Along pond shore
Maple-leaved viburnum (*Viburnum acerifolium*)	Upland surrounding pond
Curled dock (*Rumex crispus*)	South of pond/near shore
Horsetail (*Equisetum* sp.)	Upland south of pond
Hay-scented fern (*Dennstaedtia punctilobula*)	Upland surrounding pond
Eastern white pine (*Pinus strobus*)	Upland surrounding pond
Enchanter's nightshade (*Circaea quadrisulcata*)	Upland west of pond
Wild oats (*Uvularia sessilifolia*)	Upland west of pond
Goldenrod (*Solidago* sp.)	Upland surrounding pond
Smartweed (*Polygonum* sp.)	Along pond shore
Clubmoss (*Lycopodium* sp.)	Upland surrounding pond
White wood aster (*Aster divaricatus*)	Upland surrounding pond
Indian pipe (*Monotropa uniflora*)	Upland east of pond
Common mullein (*Verbascum thapsus*)	Upland surrounding pond
Pink lady's slipper (*Cypripedium acaule*)	Upland surrounding pond

TABLE 2
VEGETATIVE SPECIES OBSERVED IN THE NORTHEAST WETLAND

Species and Layer	Location
Canopy	
Red oak (*Quercus rubra*)	Near edge of wetland
Red maple (*Acer rubrum*)	Near edge of wetland
White birch (*Betula papyrifera*)	Near edge of wetland
Black birch (*Betula lenta*)	Near edge of wetland
Sapling Layer	
Red maple (*Acer rubum*)	Near edge of wetland
American elm (*Ulmus americana*)	Near edge of wetland
Eastern hemlock (*Tsuga canadensis*)	Near edge of wetland
Shrub Layer	
Highbush blueberry (*Vaccinium corymbosum*)	Along edges and scattered in wetland
Red maple (*Acer rubrum*)	Along edges and scattered in wetland
American elm (*Ulmus americana*)	Along edges and scattered in wetland
Glossy buckthorn (*Rhamnus frangula*)	Along edges and scattered in wetland
Steeplebush (*Spiraea tomentosa*)	Southwestern portion of wetland
White ash (*Fraxinus americana*)	Near edge of wetland
Vines	
Grape (*Vitis* sp.)	Northeastern and central portions of wetland
Groundcover	
False nettle (*Boehmeria cylindrica*)	Central and southwestern portions of wetland
Purple loosestrife (*Lythrum salicaria*)	Central and southwestern portions of wetland
Sedges (*Carex* sp.)	Wetland edges and within central and southwestern portions of wetland
Grasses (Gramineae)	Central and southwestern portions of wetland
Jewelweed (*Impatiens capensis*)	Wetland edges and within central and southwestern portions of wetland
Sensitive fern (*Onoclea sensibilis*)	Wetland edges and within central and southwestern portions of wetland
Marsh fern (*Thelypteris palustris*)	Central and southwestern portions of wetland
Cattail (*Typha latifolia*)	Northwestern portion of wetland

TABLE 3
VEGETATIVE SPECIES OBSERVED IN THE SPHAGNUM BOG AND VICINITY

Species and Layer	Location
Canopy	
Eastern Hemlock (*Tsuga canadensis*)	Edge of bog/surrounding upland
Red maple (*Acer rubrum*)	Edge of bog/scattered in bog
Eastern white pine (*Pinus strobus*)	Edge of bog/scattered in bog/surrounding upland
White oak (*Quercus alba*)	Surrounding upland
Red oak (*Quercus rubra*)	Surrounding upland
Black birch (*Betula lenta*)	Edge of bog
Gray birch (*Betula populifolia*)	Edge of bog
Sapling Layer	
Red maple (*Acer rubum*)	Edge of bog/scattered in bog
Black birch (*Betula lenta*)	Edge of bog/surrounding upland
Eastern white pine (*Pinus strobus*)	Edge of bog/scattered in bog/surrounding upland
Eastern hemlock (*Tsuga canadensis*)	Edge of bog/surrounding upland
Larch (*Larix laricina*)	Scattered in bog
Black oak (*Quercus velutina*)	Surrounding upland
White oak (*Quercus alba*)	Surrounding upland
American chestnut (*Castanea dentata*)	Surrounding upland (East of bog)
Shrub Layer	
Highbush blueberry (Vaccinium corymbosum)	Edge of bog/scattered in bog
Dangleberry (*Gaylussacia frondosa*)	Surrounding upland
Black birch (*Betula lenta*)	Edge of bog
Red maple (*Acer rubrum*)	Edge of bog/scattered in bog
Gray birch (*Betula populifolia)*	Edge of bog
Leatherleaf (*Chamaedaphne calyculata*)	Bog
Black chokeberry (*Photinia melanocarpa*)	Edge of bog/bog
Rhodora (*Rhododendron canadense*)	Bog
Glossy buckthorn (*Rhamnus frangula*)	Edge of bog/surrounding upland
Larch (*Larix laricina*)	Scattered in bog
American chestnut (*Castanea dentata*)	Surrounding upland
Steeplebush (*Spiraea tomentosa*)	Edge of bog/bog
White ash (*Fraxinus americana*)	Edge of bog
Maple-leaved viburnum (*Viburnum acerifolium*)	Surrounding upland
Witherod (*Viburnum nudum var cassinoides*)	Edge of bog
Groundcover	
Sphagnum (*Sphagnum* sp.)	Bog
Sedges (*Carex* sp.)	Edge of bog/bog
Marsh fern (*Thelypteris palustris*)	Bog
Cinnamon fern (*Osmunda cinnamomea*)	Edge of bog
Skunk cabbage (*Symplocarpus foetidus*)	Bog
Clubmosses (*Lycopodium* sp.)	Surrounding upland

Table 4
Potential Reference Locatons: Sphagnum Bog

Nuclear Metals, Inc.
Concord, Massachusetts

		Potential Reference Areas							
Area	**Sphagnum Bog**	**Westford Bog**	**Hudson Bog**	**Gardner Hill Bog (smaller)**	**Gardner Hill Bog (larger)**	**Thoreau's Bog/Gowings Swamp**	**Walden Pond Bog**	**Adams/Wright Bog No. 1**	**Adams/Wright Bog No. 2**
Town	On-site	Westford	Hudson	Stow	Stow	Concord	Concord	Concord	Concord
Location Information	On-site	Near Westford Station; north of Springfield Terminal railroad tracks; on East Boston Camps property.	West of White Pond Road; immediately north of abandoned railroad tracks	In Gardner Hill Town Forest	In Gardner Hill Town Forest	East of Old Bedford Road; southwest of the Ripley School	South of Walden Pond; east of Mass. Bay railroad tracks	South of Walden Pond; west of Mass. Bay railroad tracks.	Southwest of Walden Pond; west of Mass. Bay railroad tracks; northwest of Bog No. 1.
Distance from Site	On-site	10.9 miles north of Site.	5 miles southwest of Site.	3.7 miles southwest of Site.	3.7 miles southwest of Site.	4.8 miles northeast of Site.	4.1 miles east-southeast of Site.	4.0 miles east-southeast of Site.	3.8 miles east-southeast of Site.
NWI Code	PSS3Ba	PSS3Ba	PSS3Ba	PSS3Ba			PSS3Ba	PSS3Ba	PSS3Ba
Soil Type	Freetown muck, ponded (No. 99)	Freetown muck (No. 46)	Freetown muck (No. 46)	Freetown muck, ponded (No. 99)	Freetown muck, ponded (No. 99)	Freetown muck (No. 46)	Freetown muck (No. 46)	Hinkley loamy sand (No. 35D)	Freetown muck (No. 46)
Hydrology	Water along perimeter of bog. No inlets/outlets.	Water along perimeter of bog. Inlets/outlets not observed.	Water along southeast perimeter of bog; no water along northwest perimeter. Inlets/outlets not observed.	Muddy along perimeter; no standing water; quaking bog. Inlets/outlets not observed.	Water along perimeter of bog. Inlets/outlets not observed.	Standing water along edge. Relatively large wetland area. Inlets/outlets not observed.	Part of larger wetland area. Southeastern portion is bog-like, northwest portion is shrub swamp, southeast portion is pond-like.	Water along perimeter. Inlets/outlets not observed.	No standing water. Relatively dry. Inlets/outlets not observed.
Approximate Size	3.5 acres	4 acres	8 acres	1.5 acres	5 acres	5 acres	3 acres	1 acre	3 acres

Table 4
Potential Reference Locatons: Sphagnum Bog

Nuclear Metals, Inc.
Concord, Massachusetts

		Potential Reference Areas							
Area	**Sphagnum Bog**	**Westford Bog**	**Hudson Bog**	**Gardner Hill Bog (smaller)**	**Gardner Hill Bog (larger)**	**Thoreau's Bog/Gowings Swamp**	**Walden Pond Bog**	**Adams/Wright Bog No. 1**	**Adams/Wright Bog No. 2**
Vegetative Structure	Tall shrubs along perimeter, within and just inward of moat; sphagnum mat and low shrubs in center with occasional scattered saplings and tall shrubs.	Tall shrubs along perimeter, sphagnum mat and low shrubs in center with occasional scattered saplings and tall shrubs.	Tall shrubs and saplings along perimeter, low vegetation in center	Tall shubs along edge, low vegetation (mainly sphagnum) in center with occasional scattered saplings and tall shrubs of red maple.	Shurbs of swamp azalea and highbush blueberry along perimeter. Center - sedges and sphagnum (graminoid fen)	Saplings and tall shrubs along edge; center has Sphagnum mat with many sedges, and many saplings and shrubs	Bog-like portion has tall shrubs along the perimeter, and low vegetation in the center with scattered shrubs/saplings	Shrub layer along edge (patchy), lower vegetation in center.	Tall shrubs along edge, dense leatherleaf in center within sphagnum mat.
Dominant Vegetation	Sphagnum, leatherleaf, highbush blueberry, red maple, rhodora, black chokeberry, white pine, larch. Edge: black birch, gray birch, hemlock, dangleberry	Sphagnum, leatherleaf, swamp azalea, sheep laurel, black chokeberry, white pine, red maple, highbush blueberry, scattered black spruce in center. Edge: white pine, oak, hemlock, red spruce, dangleberry, black huckleberry.	Sphagnum, leatherleaf, red maple, highbush blueberry, glossy buckthorn, gray birch, black chokeberry, white pine.	Sphagnum, swamp azalea, red maple, large cranberry, leatherleaf, sheep laurel, white pine, swamp loosestrife, highbush blueberry, mountain holly, gray birch, maleberry. Edge: white oak, red maple, white pine, dangleberry.	Sphagnum, sedges, swamp azalea, highbush blueberry, pitcher plants.	Sphagnum, sedges, highbush blueberry, red maple, white pine, black spruce, larch, leatherleaf. Edges: red maple, white pine, black and white oak.	Red maple, highbush blueberry, sphagnum, white pine Edge: black huckleberry, dangleberry, white pine and oak.	Sedges, sphagnum, highbush blueberry, red maple, leatherleaf. Edge: sheep laurel, black huckleberry, white oak, white pine.	Sphagnum, leatherleaf, highbush blueberry. Edge: white pine, white oak, black huckleberry.

Notes:
Shading indicates recommended reference location.
NWI = National Wetlands Inventory
PSS3Ba = Palustrine [P], Scrub-Shrub [SS], Broad-leaved Evergreen [3], Saturated [B], Acid [a]

Table 5
Potential Reference Locatons: Cooling Water Recharge Pond

Nuclear Metals, Inc.
Concord, Massachusetts

		Potential Reference Areas						
Area	**Cooling Water Recharge Pond**	**Maynard High School Pond**	**Durant Avenue Retention Pond**	**Silver Hill Road Pond**	**Great Hill Conservation Area Pond**	**Robert/Parker Road Pond**	**LongfellowFord Pond**	**Maynard Industrial Park Pond**
Town	On-site	Maynard	Maynard	Concord	Acton	Acton	Sudbury	Maynard
Location Information	On-site	Northeast of Maynard High School; south of 117.	East of Durant Avenue, west of George Road.	Immediately north of Silver Hill Road.	South of Great Hill; north of Fire Department on School Street, east of Main Street.	Immediately north of intersection of Robert and Parker Roads	Immediately east of Longfellow and north of Ford	North of Maynard Industrial Park parking lot
Distance from Site	On-site	2 miles southwest of Site.	2.4 miles west of Site	6.3 miles northeast of Site.	2.1 miles northwest of Site.	1.0 miles west of Site	1.9 miles south-southwest of Site	2 miles west of Site
NWI Code	PUBHx	PUBHx	PUBHx	PUBHx	PUBHx	PUBHx	PUBHx	PUBHx
Soil Type	Hinckley loamy sand, 25-35% slope (No. 35E)	Mapped as water; surrounding soil is mostly Merrimac fine loamy sand, 3-8% slope (No. 37B); southwestern corner of pond surrounded by Urban land (No. 260).	Mapped as water; on north, east, and southeast surrounded by soils mapped as Swansea muck (No. 45); to west are soils mapped as Sudbury fine sandy loam, 2 to 8% slopes (No. 38B).	Mapped as water; surrounded by Hinckley loamy sand, 3-8% slope (No. 35B)	Udorthents, wet substratum (Soil No. 555). Sandy soils observed along eastern edge of pond.	Mapped as water; surrounded by Ridgebury fine sandy loam, 2 to 8 percent slope, extremely stony (No. 32B)	Mapped as Canton-Charlton-Urban land Complex, 3 to 15 % slopes (No. 264) to south and east; Sudbury fine sandy loam, 2 to 8 percent slopes (No. 38B) to west; Swansea muck (No. 45) to southwest; and Scarboro loamy sand (No. 40) to north.	Mapped as Freetown muck (No. 46)
Topography	Moderately sloping to pond.	Moderately sloping to pond.	Relatively flat to gently sloping.	Gently to moderately sloping to pond.	Relatively flat to gently sloping to pond	Gently sloping to pond.	Gently sloping to pond.	Relatively flat to gently sloping to pond

Table 5
Potential Reference Locatons: Cooling Water Recharge Pond

Nuclear Metals, Inc.
Concord, Massachusetts

Area	Cooling Water Recharge Pond	Potential Reference Areas						
		Maynard High School Pond	Durant Avenue Retention Pond	Silver Hill Road Pond	Great Hill Conservation Area Pond	Robert/Parker Road Pond	LongfellowFord Pond	Maynard Industrial Park Pond
Hydrology	No inlets or outlets	Two pavement-drained outfalls (no flow).	Two storm drains. Approximately 1 gallon/minute flow from one; no flow from the other drain.	Inlets/outlets not observed.	Inlets/outlets not observed.	Culvert at southern end of pond (extends under Parker).	Apparent inlet along northern side of pond.	Pipe/culvert at east end of pond.
Dominant Vegetation	Minimal vegetation in pond. Edges: bindweed, smartweed. Surrounding upland: Black birch, red oak, red maple, white pine, Virginia creeper, maple-leaf viburnum, glossy buckthorn, multiflora rose, poison ivy, oriental bittersweet, Canada mayflower, red and white oak shrubs, white ash shrub, white pine seedings, pink lady slipper.	Minimal vegetation in pond. Red maple, black oak, white ash, white pine saplings, glossy buckthorn, poison ivy, black cherry shrubs, black oak shrubs, multiflora rose, oriental bittersweet	Minimal vegetation in pond - some yellow water lily. Red maple and white pine saplings, some yellow birch saplings. Shrubs of sweet pepperbush, highbush blueberry, red maple. Herbaceous layer of sedges, cinnamon fern, sensitive fern.	Grassy lawn by residence, meadow-like by Silver Hill Road, far northern portion is marsh-like. Red maple, white pine, black cherry, grasses, smooth sumac, glossy buckthorn, multiflora rose.	In pond (near edges): small amounts of water chesnut, willow shrubs, arrowhead; cattails along western and southern edges of pond. Surrounding pond: sedges, glossy buckthorn, alder, multiflora rose, clover, blue-eyed grass, deer-tongue grass, meadowsweet, black cherry shrubs.	Surrounded by manicured lawn on all sides. Some saplings of gray birch and shrubs of glossy buckthorn, willow, red maple.	Manicured lawn surrounding pond with some trees, saplings and shrubs along edge. Mostly saplings of red male with some quaking aspen.	Gray birch and pine saplings, many sedges and ferns along edges of pond.
Other	Bullfrogs in pond	Bullfrogs in pond	Canada geese in pond.	Residence abuts pond to the east.	Dogs, green frogs, and sunfish observed in pond.	Surrounded by residences. Water appears brown; floating green mats at southern end.	Surrounded by residences.	Possible former industrial discharge to pond. Bullfrog or green frog tadpoles observed.

Notes:
Shading indicates recommended reference location.
NWI = National Wetlands Inventory
PUBHx = Palustrine [P], Unconsolidated Bottom [UB], Permanently Flooded [H], Excavated [x]

Table 6
Potential Reference Locatons: Northeast Wetland

Nuclear Metals, Inc.
Concord, Massachusetts

		Potential Reference Areas							
Area	**Northeast Wetland**	**Conant Well Land**	**Durant Avenue Pool**	**Whittier Conservation Land**	**Assabet River Rail Trail**	**Sudbury State Forest**	**Hildreth Street**	**Old County Road**	**Nagog Hill**
Town	On-site	Acton	Maynard	Acton	Maynard	Stow	Westford	Hudson	Acton
Location Information	On-site	East of Route 27, north of water department driveway. (Two locations: Location 1 has ponded water and is located east of telephone pole No. 222, Location 2 has saturated soils and is south of Location 1 and immediately north of the water department driveway.)	East of Durant Avenue, west of George Road. South of Durant Avenue Retention Pond.	West of Route 27, immediately north of driveway to water department facility.	West of Assabet River Rail Trail (west of Winter Street), east of Assabet River.	Immediately east of Sudbury Road, South of Dawes Road	North and south of Hildreth Street. (north of house No. 43).	South of Old County Road, north of Main Street.	Nagog Hill Conservation Land east of Nagog Hill Road.
Approximate Distance from a Roadway	Adjacent to roadway	Adjacent to roadway	less than 0.1 mile	Adjacent to roadway	Adjacent to rail trail, approximately 0.1 miles from Winter Street	Adjacent to roadway	Adjacent to roadway	Adjacent to roadway	Southwest of Walden Pond; west of Mass. Bay railroad tracks; northwest of Bog No. 1.
Distance from Site	On-site	4.1 miles north of Site	2.4 miles west of Site	4.1 miles north of Site.	2.6 miles southwest of Site	4.3 miles southwest of Site	9.1 miles north-northwest of Site	4.8 miles southwest of Site	4.0 miles north/northwest of Site
NWI Code	PSS1E	NA	NA	NA	PEM1C	PSS1E	PEM1B	PSS1E	NA
Vernal Pool	Yes- northeast portion	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Yes

Table 6
Potential Reference Locatons: Northeast Wetland

Nuclear Metals, Inc.
Concord, Massachusetts

		Potential Reference Areas							
Area	**Northeast Wetland**	**Conant Well Land**	**Durant Avenue Pool**	**Whittier Conservation Land**	**Assabet River Rail Trail**	**Sudbury State Forest**	**Hildreth Street**	**Old County Road**	**Nagog Hill**
Soil Type	Swansea Muck (No. 45)	Swansea Muck (No. 45)	Swansea Muck (No. 45)	Soil No. 39A	Windsor loamy sand, 3 to 8% slopes (No. 67B)	Swansea Muck (No. 45)	Canton fine sandy loam, 3 to 8 % slopes (No. 113 B)	Northwestern portion - Freetown muck (No. 46), eastern portion- Carver loamy coarse sand (No. 75A)	Charlton-Hollis-Rock outcrop complex, 3 to 8 % slopes (No. 7B)
Topography	Moderate slope to wetland	Relatively flat to gently sloping to wetland	Relatively flat surrounding pool.	Mounded soils in vicinity, approximately 10 foot tall moderately sloping banks	Relatively flat to gently sloping to wetland	Gently sloping to wetland	Gently sloping to wetland	Gently sloping to wetland	Low topography surrounding pool.
Hydrology	Standing water in northeast portion on May 20, 2004 (max. depth approx. 18 inches); saturated soils elsewhere. Saturated soils but no standing water on June 15, 2004. No inlets/outlets.	Location 1: Standing water (less than 1 foot depth) on June 15, 2004, connected to larger marsh area and to drainage channel from road. Location 2: Saturated soils on June 15, 2004 (may have had standing water earlier in season). Inlets/outlets not observed.	Standing water in entire area on June 2, 2004. Standing water in approximately 1/3 of area on June 15, 2004. No inlets/outlets.	Standing water on June 15, 2004 surrounded by mounded soils/banks. Inlets/outlets not observed.	Mucky saturated soils in center, some puddled water along edges (June 9, 2004). Inlets/outlets not observed.	Standing water on June 2, 2004. Inlets/outlets not observed.	Saturated soils, some ponded water with water flow to south. Wetlands north and south of road connected via culvert (June 9, 2004).	Standing water in entire area; estimated water depths 3 feet or greater (May 24, 2004). Inlets/outlets not observed.	Entire area flooded with approximately 6 inches of water (May 27, 2004). No inlets/outlets

Table 6
Potential Reference Locatons: Northeast Wetland

Nuclear Metals, Inc.
Concord, Massachusetts

		Potential Reference Areas							
Area	**Northeast Wetland**	**Conant Well Land**	**Durant Avenue Pool**	**Whittier Conservation Land**	**Assabet River Rail Trail**	**Sudbury State Forest**	**Hildreth Street**	**Old County Road**	**Nagog Hill**
Vegetative structure	Ponded area: a few scattered shrubs, fallen branches and logs; remainder of wetland contains mostly herbacous vegetation with a few scattered shrubs.	Location 1: Few shrubs in pool. Shrubs, groundcover, and trees surrounding pool. Location 2: fallen branches and logs in wet area, few shrubs in center, shrubs, ferns, and trees along edges	Standing water with no visible vegetation; many shrubs along edges of pool.	Saplings and scattered shrubs in pool (surrounding area is wooded).	Central portion is entirely herbaceous, shrubs along edge	Mixture of herbaceous and shrubs.	Central portion is entirely herbaceous.	Scrub-Shrub Swamp	Few scattered shrubs. Many ferns surrounding pool.
Dominant Vegetation	Ponded area: glossy buckthorn and elm shrubs, grape, highbush blueberry, jewelweed, sensitive fern, red maple saplings; remaining portion: false nettle, purple loosestrife, marsh fern, sedges, grasses, highbush blueberry, red maple shrubs. Surrounding upland canopy of red oak, red maple, hemlock saplings, white and black birch.	Location 1: Red maple, white pine, oak and white ash saplings, glossy buckthorn, Canada mayflower, elm shrubs/seedlings, arrowwood, highbush blueberry, royal fern, poison ivy, Virginia creeper, jewelweed, cinnamon fern, skunk cabbage. Location 2: Red maple, glossy buckthorn, elm shrubs, royal fern, white pine shrubs, winterberry	Abundant sweet pepperbush. Canopy dominated by red maple. Also hemlock saplings, highbush blueberry, cinnamon fern.	Red maple, elm saplings, glossy buckthorn, white pine, red pine.	Central portion: marsh fern, sensitive fern, jewelweed, false nettle. Edges: arrowwood, sweet pepperbush, silky dogwood, highbush blueberry, Virginia creeper, skunk cabbage, red maples trees and saplings, oriental bittersweet, poison ivy.	Skunk cabbage, swamp azalea, canopy of red maple and white pine. Also sphagnum moss, leatherleaf and pitcher plants (bog vegetation)	Central portion: grasses, blue flag iris, skunk cabbage, sensitive fern, cinnamon fern, tall meadowrue. Edges: grape, virginia creeper, poison ivy, red maple, quaking aspen, glossy buckthorn, arrowwood, elm, oak.	Shrubs	Cinnamon fern-along edges; highbush blueberry, poison ivy, oriental bittersweet. Surrounding upland canopy of red maple, white pine, elm saplings.

Table 6
Potential Reference Locatons: Northeast Wetland

Nuclear Metals, Inc.
Concord, Massachusetts

		Potential Reference Areas							
Area	**Northeast Wetland**	**Conant Well Land**	**Durant Avenue Pool**	**Whittier Conservation Land**	**Assabet River Rail Trail**	**Sudbury State Forest**	**Hildreth Street**	**Old County Road**	**Nagog Hill**
Other	Relatively open canopy over most of wetland.	Mallard in pool at Location 1	Closed canopy; Shrub clippings at southeast corner of pool.	Past soil disturbance apparent.	Hydrology influenced by Assabet River	Relatively open canopy (viewed from road)	Private property.	Grass/shrub clippings dumped along northern edge of wetland.	Many stones in soil. Relatively closed canopy over pool. Metal bicycle rim and wire mesh along edge of pool.

Notes:
Shading indicates recommended reference location.
NWI = National Wetlands Inventory
PSS1E = Palustrine [P], Scrub-Shrub [SS], Broad-leaved Deciduous [1], Seasonally Flooded/Saturated [E]
PEM1B = Palustrine [P], Emergent [EM], Broad-leaved Deciduous [1], Saturated [B]
PEM1C = Palustrine [P], Emergent [EM], Broad-leaved Deciduous [1], Seasonally Flooded [C]

Table 7
Potential Reference Locatons: Upland Site Soils

Nuclear Metals, Inc.
Concord, Massachusetts

		Potential Reference Areas		
Area	**Upland Site Soils**	**Gardner Hill Town Forest**	**Area East of Taylor Road/West of Green Meadow School**	**Assabet Wells**
Town	On-site	Stow	Maynard	Acton
Distance from Site	On-site	3.7 miles southwest of Site	2.3 miles southwest of Site	0.5 miles northwest of Site
Soil Type	Hinckley loamy sand, slopes of 3-8% (B), 15-25% (D), and 25-35% (Nos. 35 B,D,E)	Hinckley loamy sand (Nos. 35D, B)	Hinckley loamy sand (No. 35B)	Hinckley loamy sand (No. 35D)
Dominant Vegetation	Canopy: red oak, white pine, black birch and hemlock saplings. Shrubs: black birch, blueberry, oak shrubs. Groundcover: Canada mayflower, sedges, starflower, bracken fern, pink lady's slipper, wild oats.	Canopy: red oak and white pine. Shrubs: white pine red maple, maple-leaf viburnum, highbush blackberry. Groundcover: Canada mayflower, hay-scented fern, wild sarsaparilla, bracken fern, pink lady's slipper, starflower, wild oats.	Canopy: red oak, some black oak, beech and white pine saplings. Shrubs: white pine. Heavy leaf litter, minimal groundcover: black huckleberry and white pine seedlings.	Canopy: white pine, oak, scattered gray birch. Shrubs/groundcover: blueberry, oak seedlings, white pine seedlings, sedges.

Notes:
Shading indicates recommended reference location.

APPENDIX B

EXCEL SPREADSHEETS OF ALL ANALYTES WITH AT LEAST ONE DETECTION BY SAMPLE GROUP LOCATION AND METHOD

Assabet River Surface Water - Upstream

param_name	SWRI17001000 11/2/2004 3:00:00 PM	SWRI17002000 11/2/2004 3:10:00 PM	SWRI17003000 11/2/2004 3:30:00 PM	SWRI17004000 11/3/2004 3:25:00 PM	SWRI17005000 11/3/2004 2:55:00 PM	SWRI17006000 11/3/2004 2:15:00 PM	SWRI17007000 11/3/2004 1:45:00 PM	SWRI17008000 11/3/2004 12:15:00 PM	SWRI17009000 11/3/2004 11:05:00 AM	SWRI17010000 11/3/2004 10:45:00 AM
VOCs (mg/L)										
Methyl ethyl ketone	0.02 U	0.0065 U	0.016 U	0.038	0.017	0.066	0.035	0.0064	0.031 J	0.013 U
Methyl Tertbutyl Ether	0.0003 J	0.00032 J	0.00033 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Metals, Total (ug/L)										
Aluminum	103 U	4790	916	153 U	108 U	12.5 U	58.7 U	68.4 U	57.7 U	48.5 U
Barium	18.6	89.1	33.3	18.3	18.6	16.2	16.4	17.5	18.6	17.1
Beryllium	0.025 U	0.28	0.038	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Cadmium	0.013 U	0.95	0.2	0.013 U	0.013 U	0.013 U	0.013 U	0.013 U	0.013 U	0.013 U
Calcium	18800	20000	19000	17400	18900	18600	17600	18400	18600	18500
Chromium	0.5 U	52.2	10.9	0.47 UJ	0.41 UJ	0.14 UJ	0.14 UJ	0.14 UJ	0.14 UJ	0.14 UJ
Cobalt	0.44	8	2.1	0.59	0.5	0.35 U	0.41	0.43	0.46	0.38
Copper	4.4 UJ	143 J	33.8 UJ	6.2 UJ	6 UJ	2.5 UJ	4.8 UJ	6.4 UJ	4 UJ	4.4 UJ
Iron	680	8690	2430	782	707	210 U	567	614	607	545
Lead	2 UJ	84.5 J	20.5 J	2.8	2.1	0.22 U	1.3 U	1.5	1.5	1.1 UJ
Magnesium	4600	5930	4620	4460	4460	4530	4260	4400	4400	4640
Manganese	70.1	483	184	77.4	65.6	48.7	61.1	64.3	69.8	64.3
Mercury	0.037 U	0.2	0.058	0.037 U	0.037 U	0.037 U	0.037 U	0.037 U	0.037 U	0.037 U
Molybdenum	1.7	2.5	1.8	1.6	1.7	1.7	1.5	1.6	1.7	1.7
Nickel	3.1	17.5	5.8	3.3 U	3.4 U	3.2 U	3.1 U	3.1 U	3.6 U	2.9
Potassium	6640	7030	6600	6330 J	7070 J	6870 J	6450 J	6700 J	6800 J	6600
Silver	0.02 U	1.7	0.34	0.049 U	0.04 U	0.004 U	0.018 U	0.023 U	0.034 U	0.004 UJ
Sodium	49600	50800	52700	59500	65100	61700	60100	57500	64700	49000
Thallium	0.1 U	0.12 U	0.02 U	0.083 U	0.037 U	0.028 U	0.023 U	0.015 U	0.33	0.013 UJ
Thorium	0.061 U	0.7	0.2 U	0.073 U	0.077 U	0.019 U	0.031 U	0.025 U	0.098 U	0.027 U
Titanium	7 U	184	36.5	7.9	7 U	7 U	7 U	7 U	7 U	7 U
Tungsten	0.72 U	5	2.4 U	0.23 U	0.27 U	0.24 U	0.17 U	0.2 U	0.33 U	0.74 U
Uranium	0.015 U	0.52	0.13 U	0.047 UJ	0.02 UJ	0.003 UJ	0.017 UJ	0.015 UJ	0.026 UJ	0.007 U
Vanadium	0.63 U	9.6	1.8	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U
Zinc	8.8 U	137	34.8	15.6 UJ	10 UJ	5.8 UJ	7.3 UJ	8.4 UJ	8.6 UJ	8.2 U
Metals, Dissolved (ug/L)										
Aluminum	7.8 U	4.3 U	5.7 U	5.7 U	12.7 U	85.4	11.1 U	15 U	10.5 U	9.8 U
Arsenic	1.7	1.5	0.96 U	0.96 U	1.6	0.96 U	0.96 U	1.2	1.8	1.1
Barium	17.3	16.5	17.2	17.7	18.1	18.7	17.6	17.1	18	16.9
Calcium	18500	18200	18500	19500	19500	19200	19800	19000	19300	18000
Cobalt	0.35 U	0.35 U	0.35 U	0.35 U	0.36	0.44	0.36	0.36	0.47	0.36
Iron	210	188	197	212	374	627	232	381	296	345
Lead	0.17 U	0.19 U	0.29 U	0.21 UJ	0.23 UJ	2.2 J	0.3 UJ	0.45 UJ	0.34 UJ	0.42 U
Magnesium	3940	3820	3960	4480	4310	4430	4640	4440	4760	4080
Manganese	53.9	50.8	54.8	56.6	55	60.9	59	58.1	93.7	64
Mercury	0.037 U	0.037 U	0.037 U	0.037 U	0.037 U	0.037 U	0.037 U	0.037 U	0.067	0.037 U
Molybdenum	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.7	1.6
Nickel	3	3	3.3	3.2	3.2	3.2	3.1	3.1	3.2	3
Potassium	6560	6160	6640	7440	6920	6900	6920	6850	6780	6380
Sodium	58400	61100	60700	62800	65200	63800	67300	61600	62500	56700
Thallium	0.086 U	0.035 U	0.026 U	0.081 U	0.013 U	0.013 U	0.013 U	0.013 U	0.35	0.021 U
Uranium	0.003 UJ	0.003 UJ	0.003 UJ	0.005 J	0.006 J	0.027 J	0.009 J	0.003 J	0.013 J	0.003 UJ
Vanadium	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U	0.95	0.63 U	0.91	0.63 U

Prepared by_____
Checked by_____
1/5/2006

Assabet River Surface Water - Site

param_name	SWRI18008000 11/3/2004 9:40:00 AM	SWRI18009000 11/3/2004 9:15:00 AM	SWRI18010000 11/3/2004 8:45:00 AM	SWRI18011000 11/2/2004 1:30:00 PM	SWRI18012000 11/2/2004 12:50:00 PM	SWRI18013000 11/2/2004 12:20:00 PM	SWRI18014000 11/2/2004 11:30:00 AM	SWRI18015000 11/2/2004 10:40:00 AM	SWRI18016000 11/2/2004 10:01:00 AM	SWRI18017000 11/2/2004 9:23:00 AM
VOCs (mg/L)										
Methyl ethyl ketone	0.001 U	0.018 U	0.012 U	0.0035	0.0011 U	0.0011	0.00033 J	0.001 U	0.001 U	0.0028
Methyl Tertbutyl Ether	0.0005 U	0.0005 U	0.0005 U	0.00027 J	0.00027 J	0.0003 J	0.00026 J	0.00028 J	0.00029 J	0.00028 J
Trichloroethene	0.0005 U	0.00026 J	0.0005 U	0.00026 J	0.0003 J	0.00032 J	0.0005 U	0.00026 J	0.0005 U	0.0005 U
Metals, Total (ug/L)										
Aluminum	47.3	57.9	58	55.2	66.6	52.2	57.6	55.9	38.5	52.6
Arsenic	3.2 U	3.5 U	2.8 U	1.1	1.1	0.98	0.96 U	3.5 U	0.96 U	0.96 U
Barium	17.2	16.8	17.1	16.5	16	17.3	17.5	16.1	16.6	17.1
Cadmium	0.013 U	0.013 U	0.013 U	0.017	0.013 U	0.013 U	0.013 U	0.013 U	0.013 U	0.013 U
Calcium	18200	17800	18100	19000 J	18600 J	19700 J	19500 J	17800	18900 J	19600 J
Cobalt	0.36	0.37	0.38	0.39	0.37	0.41	0.38	0.35	0.35	0.38
Copper	5.6 J	5.9 J	9.3 J	6.7	4.2	3.6	4.9	3.3 J	3.6	3.7
Iron	557	566	586	552	568	584	576	520	505	549
Lead	1.1 UJ	1.2 UJ	3.3 J	1.8	1.5	1.3	1.8	1.2 UJ	1.2	1.2
Magnesium	4600	4460	4700	4270	4220	4770	4310	4440	4410	4440
Manganese	61	58.5	60.4	57.2	58	61.7	57	50.5	53.7	57.7
Molybdenum	1.6	1.6	1.6	1.8	1.8	1.9	1.9	1.9	1.8	1.9
Nickel	2.8	2.9	2.9	5	3	3.3	3.3	2.8	3.1	3.2
Potassium	6920	6490	6700	7040	7320	6940	6850	6510	6650	8190
Sodium	52500	51100	49500	57600	57100	58800	60200	53600	57400	57900
Thallium	0.013 UJ	0.013 UJ	0.013 UJ	0.032 U	0.013 U	0.017 U	0.013 U	0.45	0.013 U	0.013 U
Uranium	0.004	0.006	0.007	0.097	0.039	0.038	0.039	0.015	0.033	0.038
Vanadium	0.63 U	0.63 U	0.63 U	4 U	4.1 U	5.5 U	3.7 U	0.9	2.4 U	4.5 U
Zinc	10.1	10.9	8	17.1	9.1	8.4	7.9	7.7	8.6	7.5
Zirconium	0.084 U	0.32 U	0.054 U	0.24 U	0.091 U	0.37 U	0.33 U	0.14 U	0.96	0.075 U
Metals, Dissolved (ug/L)										
Aluminum	4.7	7	6	6.4	17.3	16.8	21.6	4.9	12	10.1
Arsenic	1.3	0.96 U	1.5	1.5	1.5	0.96 U	0.96	1.6	0.96 U	1.2
Barium	17	17.7	17.2	16.2	16.4	17	16.9	16.4	17	17.6
Calcium	18200	18200	18100	18700	19100	19900	19200	18600	19100	19600
Copper	2.4	2.4	2.2	2.3	2.3	2.6	2.5	2.2	2.3	2.2
Iron	223	227	208	297	293	288	327	219	221	230
Lead	0.38	0.25	0.23	0.39	0.41	0.46	0.49	0.21	0.33	0.3
Magnesium	3950	3970	3950	4120	4290	4040	4060	4110	4000	4000
Manganese	59.4	56.3	54.8	46.5	47.6	48.4	46.1	47.8	48.2	48.4
Mercury	0.037 U	0.037 U	0.037 U	0.037 U	0.037 U	0.21	0.037 U	0.037 U	0.037 U	0.037 U
Molybdenum	1.6	1.6	1.6	1.8	1.8	2	1.9	2.1	1.9	2
Nickel	3	3.1	3.1	2.9	3	3.2	3	4.7	3.2	3.1
Potassium	6430	6920	6400	6630	6900	7310	7290	6840	6880	7260
Selenium	2.8 U	2.9 U	2.4 U	2.7 J	1.5 UJ	1.5 UJ	1.9 J	3.3 U	1.5 J	2 J
Sodium	57300	58800	59300	57300	57000	61500	56300	58100	56900	64400
Thallium	0.015 U	0.013 U	0.013 U	0.04 U	0.029 U	0.02 U	0.013 U	0.39	0.013 U	0.013 U
Uranium	0.003 UJ	0.003 UJ	0.003 UJ	0.026	0.036	0.036	0.034	0.003 UJ	0.03	0.032
Zinc	7.7 U	6.9 U	6.6 U	8.3 U	12.7	14	11.8	6 U	10.4	9 U
Zirconium	0.099 U	0.095 U	0.072 U	0.29 UJ	0.25 UJ	0.18 UJ	0.12 UJ	1.1 U	0.59 UJ	1.1 J

Prepared by_____
Checked by_____
1/5/2006

Assabet Surface Water - Downstream

param_name	SWRI18018000 11/1/2004 2:25:00 PM	SWRI18019000 11/1/2004 3:17:00 PM	SWRI18020000 11/1/2004 3:53:00 PM	SWRI18021000 11/1/2004 4:25:00 PM	SWRI18022000 11/1/2004 4:44:00 PM
VOCs (mg/L)					
Methyl ethyl ketone	0.0028	0.0059	0.0052	0.0023	0.011
Methyl Tertbutyl Ether	0.00027 J	0.00025 J	0.00027 J	0.0005 U	0.0005 U
Metals, Total (ug/L)					
Aluminum	66.6	42.3	53	89.1	180
Arsenic	0.97	1.5	0.96 U	1	2.3
Barium	16.8	17.1	17.1	17.9	20.7
Cadmium	0.013 U	0.013 U	0.013 U	0.017	0.022
Calcium	20200 J	20800 J	20800 J	20200 J	21000 J
Cobalt	0.46	0.42	0.41	0.54	0.81
Copper	3.8	3.3	3.4	4.6	7.1
Iron	529	510	482	658	975
Lead	1.4	1.3	1.2	2.1	4.8
Magnesium	4940	5080	5160	4780	5140
Manganese	72.5	72	62.6	99.1	151
Molybdenum	1.9	2	2	2	1.8
Nickel	3.7	3.9	3.8	3.8	4.2
Potassium	7560	7450	7530	7430	7980
Selenium	1.5 U	1.5 U	1.5 U	1.7	1.5 U
Sodium	65900	64000	65600	60800	66500
Titanium	7 U	7 U	7 U	7 U	8.2
Uranium	0.042	0.037	0.038	0.045	0.067
Zinc	8.1	7.3	9.3	9.2	12.3
Metals, Dissolved (ug/L)					
Aluminum	15.1	13	14.6	12.6	15
Arsenic	1	0.96 U	2.2	1.9	0.98
Barium	17.8	17.2	17.4	17.2	17.8
Calcium	21400	20200	20300	19900	20400
Cobalt	0.38	0.41	0.38	0.47	0.49
Copper	2.6	2.4	2.9	2.3	2.5
Iron	299	171	262	233	392
Lead	0.42	0.23	0.39	0.27	0.44
Magnesium	4580	4540	4660	4500	4470
Manganese	66.6	64.1	55.5	91.5	106
Molybdenum	2.1	2	2	2	2
Nickel	3.8	3.7	3.7	3.8	3.9
Potassium	8340	7970	8200	7570	7630
Selenium	1.5 UJ	2.6 J	2.3 J	2.3 J	2.4 J
Sodium	67300	69500	70300	73100	71800
Uranium	0.035	0.028	0.03	0.027	0.03
Zinc	11	7.9 U	10.8	9.5 U	8.2 U
Zirconium	0.3 UJ	1.4 J	0.51 UJ	0.28 UJ	0.15 UJ

Assabet Sediment - Upstream

param_name	SDRI17001000 11/2/2004 3:00:00 PM	SDRI17002000 11/2/2004 3:10:00 PM	SDRI17003000 11/2/2004 3:30:00 PM	SDRI17004000 11/3/2004 3:25:00 PM	SDRI17005000 11/3/2004 2:53:00 PM	SDRI17006000 11/3/2004 2:15:00 PM	SDRI17007000 11/3/2004 1:45:00 PM	SDRI17008000 11/3/2004 12:15:00 PM	SDRI17009000 11/3/2004 11:05:00 AM	SDRI17010000 11/3/2004 10:45:00 AM
VOCs (ug/kg)										
1,1,1-Trichloroethane	0.902 UJ	0.916 U	0.894 U	1.43 U	1.2 U	0.929 U	0.935 U	28.8 J	1.38 U	6.5
1,1-Dichloroethane	0.902 UJ	0.916 U	0.894 U	1.43 U	1.2 U	0.929 U	0.935 U	1.33 UJ	1.38 U	2.1
1,1-Dichloroethene	0.902 UJ	0.916 U	0.894 U	1.4 U	1.2 U	0.929 U	0.935 U	23.4 J	3.3 U	5.2 U
Carbon disulfide	4.51 UJ	4.58 U	4.47 U	7.17 U	5.98 U	4.64 UJ	4.67 UJ	6.63 UJ	6.91 U	3.2 J
Cis-1,2-Dichloroethene	0.902 UJ	0.916 U	0.894 U	1.43 U	1.2 U	0.929 U	0.935 U	1.33 UJ	1.38 U	0.89 J
Tetrachloroethene	0.902 UJ	0.916 U	0.894 U	1.43 U	1.2 U	0.929 U	0.935 U	3.8 J	1.38 U	5.2
Trichloroethene	0.902 UJ	0.916 U	0.894 U	1.43 U	1.2 U	0.929 U	1.7	46.4 J	0.9 J	18.7
Trichlorofluoromethane	0.902 UJ	0.916 U	0.894 U	1.43 U	1.2 U	3.6	0.935 U	1.33 UJ	1.38 U	1.31 U
Metals (mg/kg)										
Aluminum	12000 J	16700 J	5040	15100	2650	7440	6100	5310	4890	3390
Arsenic	13.9 J	6.4 J	4.8	90.4	4.2	109	9.5	3.1	3.6	2.7
Barium	54.7 J	69.5 J	26.4	82.3	17.4	45.5	36.5	26.9	34.4	19
Beryllium	50.8	0.34	0.23	0.83	0.097	0.37	0.25	0.25	0.22	0.15
Cadmium	0.13	0.17	0.22	0.64	0.12	0.18	0.24	2.5	0.47	0.4
Calcium	4890	1700	789 J	1520 J	655 J	685 J	805 J	2990 J	1060 J	6380 J
Chromium	29.5	37.1	19.2	27.5	11.3	17.3	20.2	16.2	40.6	18.1
Cobalt	3.5 J	7.1 J	4.4	30.6	2.4	24.4	6.3	8	4.1	2.2
Copper	36.5 J	37.6 J	27.2 J	9.3 J	9.1 J	15.3 J	17.3 J	24.1 J	27.1 J	46.7 J
Iron	11700	27300	13300	64200	5620	31300	18400	9840	8550	5860
Lead	16.5 J	14.7 J	88.1	8.2	11.9	16.1	35.1	23.2	44	49.9
Magnesium	3650 J	7610 J	2820	3020	932	2750	2910	3110	1940	952
Manganese	231	307	296	3010	168	182	409	126	93	69
Mercury	0.0066	0.083	0.054 J	0.11 J	0.041 J	0.02 J	0.021 J	0.046 J	0.085 J	0.13 J
Molybdenum	4.2 J	0.79 J	0.49	6.1	0.71	3.8	0.79	0.59	0.35	0.4
Nickel	13.7 J	18.8 J	13.5 J	28.4 J	4.3 J	19.8 J	13.2 J	29.8 J	9.7 J	7.3 J
Potassium	3580 J	4960 J	848 J	315 J	377 J	1470 J	1330 J	514 J	987 J	524 J
Silver	0.056	0.078	0.19	0.15	0.11	0.15	0.096	0.033	0.26	0.34
Sodium	892 J	226 J	91	102	53.4	160	86	75.6	77.1	252
Thallium	0.35	0.43	0.071	0.24	0.046	0.2	0.081	0.069	0.11	0.054
Thorium	7.8 J	4.9 J	13.8	6.3	3.2	4.5	3.7	2.3	5.1	2.4
Titanium	530 J	648 J	222	591	196	414	363	293	337	186
Tungsten	0.27 J	0.78 J	0.9 U	0.4	0.92	0.4	0.79	0.96	0.73	1.3
Uranium	1.9	1.3	1.2	6.1	0.85	2.2	1.3	1.3	1.2	0.62
Vanadium	16.1 J	53.9 J	12.8 J	39.6 J	7.3 J	18.4 J	15.1 J	10.8 J	13.9 J	7.5 J
Zinc	40.3 J	46.3 J	50.7	42.2	17.8	37.8	42.7	55.6	54.2	30.3
Zirconium	1.9	2.7	1.9 J	3.4 J	0.75 J	2.6 J	2.5 J	3.4 J	1.9 J	0.9 UJ

Prepared by_____
Checked by_____
1/5/2006

Assabet Sediment - Site

param_name	SDRI18008000 11/3/2004 9:40:00 AM	SDRI18009000 11/3/2004 9:15:00 AM	SDRI18010000 11/3/2004 8:45:00 AM	SDRI18011000 11/2/2004 1:30:00 PM	SDRI18012000 11/2/2004 12:50:00 PM	SDRI18013000 11/2/2004 12:20:00 PM	SDRI18014000 11/2/2004 11:55:00 AM	SDRI18015000 11/2/2004 11:00:00 AM	SDRI18016000 11/2/2004 10:15:00 AM	SDRI18017000 11/2/2004 9:31:00 AM
VOCs (ug/kg)										
1,1,1-Trichloroethane	1.6	1.4	1.6	8.4	1.06 U	1.09 U	0.928 U	0.799 U	1 U	0.923 U
1,1-Dichloroethane	0.47 J	1.12 U	1.26 U	0.855 U	1.06 U	1.09 U	0.928 U	0.799 U	1 U	0.923 U
1,1-Dichloroethene	0.812 U	1.12 U	1.3 U	2	1.06 U	1.09 U	0.928 U	0.799 U	1 U	0.923 U
Tetrachloroethene	0.57 J	0.52 J	0.55 J	5.6	9.3	9.5	0.928 U	0.44 J	1 U	0.923 U
Trichloroethene	3.7	3.2	2.6	20.7	2.3	2.5	0.928 U	0.799 U	1 U	0.923 U
Metals (mg/kg)										
Aluminum	10000	4930	5830	9010 J	5300 J	3310 J	8660 J	4780 J	4840 J	7160 J
Arsenic	6.3	3.2	4	11 J	7.4 J	22 J	10.9 J	2.6 J	2.5 J	4.4 J
Barium	27.7	23.6	31.8	37.1 J	18.2 J	20 J	45.4 J	21.3 J	12.6 J	26.5 J
Beryllium	0.31	0.2	0.22	0.33	0.23	0.24	0.42	0.19	0.15	0.3
Cadmium	0.11	0.096	0.12	0.18 J	0.11	0.22	0.47	0.073 J	0.054	0.1
Calcium	868 J	834 J	1090 J	1290 J	1140	3420	1560	995 J	550	822
Chromium	26	23.7	56.9	58.5 J	21.4	15.7	25.9	31.8 J	13.4	36
Cobalt	5.5	4.4	5.9	8.5	4.4 J	5.1 J	12.3 J	3	2.2 J	4.2 J
Copper	12.7 J	17.6 J	18.1 J	22.5 J	10.2 J	10.5 J	8.7 J	6.8 J	4.7 J	11 J
Iron	13100	9530	10900	14300 J	8930	11500	16300	7200 J	7700	9770
Lead	13.1	43.2	34.3	251 J	14.9 J	12 J	11.5 J	19.2 J	5 J	12.2 J
Magnesium	3780	2030	2500	3630 J	1690 J	1340 J	2530 J	2380 J	2390 J	3700 J
Manganese	129	191	200	400	145	287	340	106	90.8	194
Mercury	0.037 J	0.09 J	0.067 J	0.66 J	0.1	0.081	0.024	0.031 J	0.0071	0.037
Molybdenum	0.34	0.67	0.47	0.71	2.7 J	4.5 J	1.9 J	0.15	0.18 J	0.49 J
Nickel	17.1 J	9.8 J	11.1 J	19.2	13.2 J	10.8 J	20.7 J	9.1	8.3 J	14.2 J
Potassium	1290 J	953 J	1000 J	1150 J	256 J	364 J	555 J	1020 J	534 J	1130 J
Selenium	0.76 U	0.88 U	0.81 U	0.95	1.3 U	0.47 U	1.2 U	0.355 U	0.65 U	0.8 U
Silver	0.045	0.15	0.3	0.13 J	0.12	0.078	0.062	0.037 J	0.022	0.099
Sodium	68.6	105	120	137	107 J	90.7 J	131 J	99.2	92.2 J	151 J
Thallium	0.12	0.078	0.087	0.12	0.072	0.055	0.16	0.11	0.055	0.071
Thorium	4.1	3.1	2.6	3.1	6.1 J	2.2 J	4.2 J	3.6	3.8 J	3 J
Titanium	489	320	367	545 J	289 J	215 J	421 J	330 J	188 J	393 J
Tungsten	0.2 U	1	1.2	0.92 J	0.48 J	0.93 J	0.51 J	0.24 J	0.31 J	0.44 J
Uranium	1.1	0.76	0.66	1.1	2.1	1.7	2.5	0.81	0.83	1.4
Vanadium	19.3 J	12 J	15.1 J	22.5 J	12.5 J	13.6 J	17.9 J	11.5 J	10.1 J	15.7 J
Zinc	38.5	40	51.4	52.7 J	24 J	34.4 J	43.4 J	22.7 J	14.3 J	22 J
Zirconium	1.6 J	1.4 J	1.6 J	1.4 J	0.87	0.96	2.1	2.4 J	1.5	1.9

Prepared by_____
Checked by_____
1/5/2006

Assabet Sediment - Downstream

param_name	SDRI18018000 11/1/2004 2:43:00 PM	SDRI18019000 11/1/2004 3:17:00 PM	SDRI18020000 11/1/2004 4:07:00 PM	SDRI18021000 11/1/2004 4:07:00 PM	SDRI18022000 11/1/2004 4:44:00 PM
VOCs (ug/kg)					
1,1-Dichloroethene	0.8 J	0.976 U	1.49 U	1.63 UJ	2.17 U
Acetone	5.9 J	20.2	52.4 J	214 J	145
Carbon disulfide	4.1 J	4.88 UJ	7.43 U	7.8 J	10.8 UJ
Methyl ethyl ketone	6.55 U	4.88 U	11.3 J	45.8 J	28.6
Toluene	1.31 U	0.976 U	1.49 U	0.77 J	2.17 U
Metals (mg/kg)					
Aluminum	3130 J	7210 J	7380 J	7390 J	3760 J
Antimony	0.082 UJ	0.17 J	0.21 J	0.22 J	0.0509 UJ
Arsenic	2.9 J	121 J	10.4 J	8.5 J	3 J
Barium	19.1 J	35 J	73.9 J	52.2 J	26.2 J
Beryllium	0.14	0.6	0.33	0.35	0.21
Cadmium	0.11 J	0.15 J	1.1 J	0.59 J	0.23 J
Calcium	1640 J	534 J	1260 J	1760 J	1150 J
Chromium	21.6 J	17.1 J	469 J	147 J	24.2 J
Cobalt	3.6	16.4	10	14.2	3.9
Copper	12 J	5.4 J	72.2 J	73.8 J	10.9 J
Iron	5890 J	114000 J	9510 J	12200 J	4690 J
Lead	19 J	5.2 J	327 J	93.2 J	29.2 J
Magnesium	1160 J	2050 J	1970 J	2640 J	1060 J
Manganese	83.4	564	230	242	191
Mercury	0.11 J	0.019 J	0.35 J	0.39 J	0.086 J
Molybdenum	0.56	8.4	1.3	2	0.77
Nickel	6.1	12.4	14.6	26.7	6.4
Potassium	428 J	1040 J	689 J	733 J	380 J
Selenium	0.88	0.59	1.1	1.5	1.4
Silver	0.11 J	0.057 J	0.51 J	0.57 J	0.099 J
Sodium	156	73	128	251	191
Thallium	0.05	0.18	0.15	0.17	0.078
Thorium	1.8	3.5	4.5	3.5	1.4
Titanium	190 J	328 J	322 J	438 J	207 J
Tungsten	0.59 J	0.88 J	1 J	1.9 J	0.62 J
Uranium	0.48	1.2	1.3	1.1	0.91
Vanadium	7.6 J	17.6 J	50 J	25.5 J	8.1 J
Zinc	27.8 J	54.2 J	260 J	110 J	26.4 J
Zirconium	1 J	1.2 J	4 J	0.99 J	0.72 J

Prepared by_____
Checked by_____
1/5/2006

Maynard Pond Surface Water

param_name	SWRI17026000 11/4/2004 1:20:00 PM	SWRI17027000 11/4/2004 1:45:00 PM	SWRI17028000 11/4/2004 1:55:00 PM	SWRI17029000 11/4/2004 2:05:00 PM	SWRI17030000 11/4/2004 2:15:00 PM
Metals (ug/L), Total					
Barium	3.8	3.8	3.7	3.6	4
Calcium	902	925	922	915	922
Lead	3.8	3.9	3.8	3.7	4.7
Magnesium	214	216	202	186	212
Mercury	0.037 U	0.04	0.037 U	0.037 U	0.037 U
Potassium	1360 J	1420 J	1360 J	1360 J	1320 J
Sodium	2890	2900	2720	2640	2680
Zinc	26 J	27.9 J	26.4 J	26.7 J	26.2 J
Metals (ug/L), Dissolved					
Arsenic	1.5	1.5	0.96 U	1.5	0.96 U
Barium	3.4	3.3	3.3	3.2	3.2
Chromium	0.18 J	0.36 J	0.51 J	0.14 UJ	0.14 UJ
Lead	2 UJ	2.3 J	2.3 J	2.2 J	2.2 J
Magnesium	169	152 U	165	178	154 U
Manganese	17.3	17.2	18	17.7	17.6
Potassium	1260	1260	1260	1290	1240
Sodium	3020	2740	2860	2850	2840
Vanadium	0.63 U	0.63 U	0.63 U	0.63 U	0.86

Prepared by_____
Checked by_____
1/5/2006

Maynard Pond Sediment - 8270C

param_name	SDRI17026000 11/4/2004 2:40:00 PM	SDRI17027000 11/4/2004 3:45:00 PM	SDRI17028000 11/5/2004 8:40:00 AM	SDRI17029000 11/5/2004 9:15:00 AM	SDRI17030000 11/4/2004 4:20:00 PM	SDRI17031000 11/5/2004 8:30:00 AM	SDRI17032000 11/5/2004 9:00:00 AM
SVOCs (ug/kg)							
Acenaphthene	48.5 J	160 J	44 UJ	45.4 UJ	242 J	68.6 J	176 UJ
Acenaphthylene	53.9 UJ	66.4 J	44 UJ	38.2 J	536 U	94.7 J	176 UJ
Anthracene	33 J	136	44 U	51.2 J	340 J	128 J	122 J
Benzo[a]anthracene	338 J	1050	44 U	327 J	4340	843 J	906 J
Benzo[a]pyrene	2240	1180	90.5	579	5550 J	1910	776
Benzo[b]fluoranthene	444 J	1890	60.1	572	9000 J	2040 J	786
Benzo[ghi]perylene	1060	604	32.3 J	302	2820 J	1100	323
Benzo[k]fluoranthene	1230	750	30.1 J	220	4100 J	183 UJ	137 J
Benzoic Acid	1080 UJ	1090 U	638 J	908 UJ	10700 U	3660 U	3530 U
Bis(2-Ethylhexyl)phthalate	73.7 J	436 J	41.5 J	52.7 J	550 J	627 J	882 U
Chrysene	2080	1480	40.4 J	402	5770	1730 J	655
Dibenz[a,h]anthracene	53.9 UJ	54.4 U	44 U	45.4 UJ	536 UJ	183 U	176 U
Dibenzofuran	539 UJ	133 J	440 U	454 UJ	5360 U	1830 U	1760 U
Fluoranthene	4830	3320	94.9	691	9660	3000 J	1220
Fluorene	51.8 J	297	44 U	26 J	365 J	73.6 J	42.4 J
Indeno[1,2,3-cd]pyrene	1210	622	48.3	359	2820 J	1130	386
Phenanthrene	1240	808	24.4 J	235	1820	520 J	480
Pyrene	3280	2100	64.3	524	9790	2180 J	937

Maynard Pond Sediment - 8270C

param_name	SDRI17033000 11/4/2004 3:50:00 PM	SDRI17034000 11/4/2004 4:00:00 PM	SDRI17035000 11/5/2004 8:50:00 AM
SVOCs (ug/kg)			
Acenaphthene	13.2 J	45 J	54.8 UJ
Acenaphthylene	39 J	187 U	54.8 UJ
Anthracene	91.7	286	54.8 U
Benzo[a]anthracene	520	1390	54.8 U
Benzo[a]pyrene	513	1450	110
Benzo[b]fluoranthene	681	885	83
Benzo[ghi]perylene	303	620	55.3 J
Benzo[k]fluoranthene	284	278	43.8 J
Benzoic Acid	885 U	3740 U	1100 U
Bis(2-Ethylhexyl)phthalate	71.5 J	935 U	274 U
Chrysene	520	1200	69.1
Dibenz[a,h]anthracene	54.2	163 J	54.8 U
Dibenzofuran	443 U	1870 U	548 U
Fluoranthene	962	2570	152
Fluorene	30.1 J	107 J	11.9 U
Indeno[1,2,3-cd]pyrene	290	659	81.6 J
Phenanthrene	330	1100	59.2 J
Pyrene	941	2780	102

Maynard Pond Sediment - 8310

param_name	SDRI17026000 11/4/2004 2:40:00 PM	SDRI17027000 11/4/2004 3:45:00 PM	SDRI17028000 11/5/2004 8:40:00 AM	SDRI17029000 11/5/2004 9:15:00 AM	SDRI17030000 11/4/2004 4:20:00 PM	SDRI17031000 11/5/2004 8:30:00 AM	SDRI17032000 11/5/2004 9:00:00 AM	SDRI17033000 11/4/2004 3:50:00 PM	SDRI17034000 11/4/2004 4:00:00 PM	SDRI17035000 11/5/2004 8:50:00 AM
PAHs (ug/kg)										
Anthracene	150	299 J	87.9 U	128	318	398 J	248	74.6 J	442	110 U
Benzo[a]anthracene	1100	1390	41.5	882	1990	2840 J	1260	417	2380	55
Benzo[a]pyrene	964	1440	46.2	880	2440 J	2620 J	992	394	1910	55.1 J
Benzo[b]fluoranthene	1240 J	1700	62.6	899	2160	3130 J	978	398	1780	49.6
Benzo[ghi]perylene	616 J	1420 J	8.79 U	590 J	1080 J	1460 J	511 J	8.85 U	921 J	11 U
Benzo[k]fluoranthene	925 J	820	29.6	486	1090	1590 J	537	235	1090	28.7
Chrysene	817	1810	32	488	1360	1780 J	650	232	1290	43.2
Fluoranthene	2330	3040	75	1420	3750	5240 J	1950	674	3950	112
Fluorene	329 J	109 U	87.9 U	90.8 U	268 U	91.4 U	88.2 U	88.5 U	234 U	110 U
Phenanthrene	791	1600	21.6 J	502	1320	1410 J	1010	317	2060	67 J
Pyrene	2060	2670	79.4	1260	3320	4500 J	1780	630	3710	11 U

Maynard Pond Sediment - Metals

param_name	SDRI17026000 11/4/2004 2:40:00 PM	SDRI17027000 11/4/2004 3:45:00 PM	SDRI17028000 11/5/2004 8:40:00 AM	SDRI17029000 11/5/2004 9:15:00 AM	SDRI17030000 11/4/2004 4:20:00 PM	SDRI17031000 11/5/2004 8:30:00 AM	SDRI17032000 11/5/2004 9:00:00 AM	SDRI17033000 11/4/2004 3:50:00 PM	SDRI17034000 11/4/2004 4:00:00 PM	SDRI17035000 11/5/2004 8:50:00 AM
Metals (mg/kg)										
Aluminum	23200	16500	12500	9450	14700	12300	10500	7430	9740	10800
Antimony	0.18 UJ	0.28 UJ	0.15 UJ	0.16 UJ	0.47 UJ	0.26 UJ	0.24 UJ	0.32 UJ	0.22 UJ	0.66 J
Arsenic	9.6	11.6	4.6	5	11.8	4.8	6.4	3.7	3.8	5.9
Barium	54.7	43.8	44	37.7	52.5	36	37.8	26.3	25.8	47.1
Beryllium	0.63	0.51	0.4	0.35	0.53	0.37	0.26	0.24	0.3	0.43
Cadmium	0.42	0.76	0.18	0.56	1.1	0.45	0.16	0.29	0.33	2.9
Calcium	1070	762	956	862	1100	1070	729	638	1180	1400
Chromium	28.4	27.8	22.7	31.4	26.9 J	29.5	37.5	13.8 J	20.5 J	13.7
Cobalt	4.8	5.7	3.6	5.4	4.7	4.2	3.2	2.3	2.7	1.8
Copper	21.9 UJ	29.1 UJ	16.7 UJ	26.2 UJ	30.8	23.8 UJ	17.5 UJ	17	16.9	18.3 UJ
Iron	15600	12600	12300	13000	16000	12700	18200	6610	8530	7380
Lead	55.4 J	219 J	24.8 J	140 J	216	242 J	170 J	59.8	90.4	148 J
Magnesium	3340	2910	3190	2940	3350	3890	3450	1730	2360	1230
Manganese	116	94.5	92.7	113	112 J	121	106	57 J	84.6 J	57.6
Mercury	0.048 J	0.058 J	0.0074 J	0.06 J	0.35	0.11 J	0.22 J	0.042	0.076	0.04 J
Molybdenum	1.2 J	1.3 J	0.74 J	0.56 UJ	1.3	1.2 J	0.67 J	0.56	0.62	0.68 J
Nickel	15.1 J	16.4 J	11.5 J	21.1 J	17.1	16.3 J	11.5 J	8.9	11.1	7.4 J
Potassium	1650	1530	2330	1360	1630	1700	1920	1110	1200	657 U
Silver	0.071 U	0.089 U	0.035 U	0.053 U	0.17	0.071 U	0.041 U	0.027	0.042	0.068 U
Sodium	383	393	91.3	69.8	175	138	57.2	82.6	119	218
Thallium	0.2 U	0.16 U	0.17 U	0.12 U	0.23	0.17 U	0.14 U	0.091	0.11	0.15 U
Thorium	5.6	4.1	5.7	4.9	4.6	5.5	4.7	3.6	4.4	0.85
Titanium	647	544	578	451	612	570	513	366	504	286
Tungsten	0.41 J	0.92 J	0.25 J	0.27 J	0.81	0.84 J	0.31 J	0.26	0.25	0.21 UJ
Uranium	2.5	2	2.1	1.3	2.1	1.7	1	1.2	1.3	1.1
Vanadium	30.3	32.1	27	24.6	35.2	30.3	30.8	16.1	20.1	13.4
Zinc	101 U	130 U	55.7 U	196 U	244	97 U	68.2 U	80.8	79.4	300 U
Zirconium	1.6 J	1.1 J	1.6 J	1.9 J	1.8 J	2 J	1.7 J	0.84 UJ	1.2 UJ	0.46 UJ

Prepared by:_____
Checked by:_____
1/5/2006

Stow Forest Soils - 8270C

param_name	SSRI17001000 10/12/2004 12:05:00 PM	SSRI17002000 10/12/2004 12:18:00 PM	SSRI17003000 10/12/2004 12:30:00 PM	SSRI17004000 10/12/2004 12:45:00 PM	SSRI17005000 10/12/2004 12:55:00 PM	SSRI17006000 10/12/2004 12:16:00 PM	SSRI17007000 10/12/2004 1:27:00 PM	SSRI17008000 10/12/2004 2:35:00 PM	SSRI17009000 10/13/2004 1:50:00 PM	SSRI17010000 10/13/2004 2:13:00 PM	SSRI17011000 10/13/2004 2:50:00 PM	SSRI17012000 10/13/2004 3:10:00 PM	SSRI17013000 10/13/2004 3:13:00 PM	SSRI17014000 10/13/2004 3:30:00 PM	SSRI17015000 10/13/2004 3:35:00 PM
SVOCs (ug/kg)															
Benzo[a]anthracene	37.7 U	31.1 J	39.6 U	39.7 U	38.9 U	33.2 J	41.8 U	39 U	42.9 U	38.3 U	35.9 U	39.5 U	42 U	38.5 U	398 U
Benzo[a]pyrene	37.7 U	39.7 U	39.6 UJ	39.7 UJ	38.9 U	36.7 J	41.8 UJ	28 J	42.9 U	38.3 U	220	39.5 U	42 U	38.5 U	398 U
Benzo[b]fluoranthene	37.7 U	39.7 U	39.6 U	39.7 UJ	38.9 U	66.2 J	41.8 UJ	61.3 J	42.9 U	38.3 U	51.6	39.5 U	42 U	38.5 U	398 U
Benzoic Acid	88 J	110 J	142 J	41.8 J	778 U	74 J	298 J	85.8 J	93.6 J	46.8 J	719 U	790 U	194 J	42.5 J	7970 U
Bis(2-Chloroethyl)ether	377 U	397 U	396 U	397 U	389 UJ	430 U	418 U	390 U	551	324 J	359 U	395 U	2590	385 U	3460 J
Chrysene	24.8 J	41.6	41.8	37.3 J	38.9 U	41.9 J	41.8 U	36.6 J	42.9 U	38.3 U	58.6	39.5 U	42 U	38.5 U	398 U
Fluoranthene	36.9 J	55.8	45.8	49.9	32 J	61.7	34.4 J	46	37.2 J	38.3 U	65.6	39.5 U	42 U	38.5 U	398 U
Phenanthrene	26.2 J	36.1 J	36.7 J	36.1 J	22.9 J	38.2 J	26.1 J	30 J	42.9 U	38.3 U	83.2	39.5 U	42 U	38.5 U	398 U
Pyrene	54.1 J	83 J	88.7 J	71.3 J	43.1 J	83 J	55.2 J	77.9 J	35.6 J	38.3 U	171	39.5 U	42 U	24.8 J	398 U

Stow Forest Soils - 8310

param_name	SSRI17001000 10/12/2004 12:05:00 PM	SSRI17002000 10/12/2004 12:18:00 PM	SSRI17003000 10/12/2004 12:30:00 PM	SSRI17004000 10/12/2004 12:45:00 PM	SSRI17005000 10/12/2004 12:55:00 PM	SSRI17006000 10/12/2004 12:16:00 PM	SSRI17007000 10/12/2004 1:27:00 PM	SSRI17008000 10/12/2004 2:35:00 PM	SSRI17009000 10/13/2004 1:50:00 PM	SSRI17010000 10/13/2004 2:13:00 PM	SSRI17011000 10/13/2004 2:50:00 PM	SSRI17012000 10/13/2004 3:10:00 PM
PAHs (ug/kg)												
Benzo[a]anthracene	18.9 U	19.8 U	19.8 U	19.9 U	19.4 UJ	21.5 U	20.9 U	19.5 U	21.5 U	1.91 UJ	25.2 J	1.98 U
Benzo[a]pyrene	18.9 U	19.8 U	19.8 U	19.9 U	19.4 UJ	21.5 U	20.9 U	19.5 U	21.5 U	1.91 U	12 J	1.98 U
Fluoranthene	16.3 J	44.7	32.8	35.5	18.8 J	48.4	20.9 U	33.2	24.7	1.91 U	16.4	20.2
Phenanthrene	189 U	35.2 J	21.3 J	24.7 J	194 UJ	39.6 J	209 U	23 J	215 U	19.1 U	15.4 J	19.8 U
Pyrene	20.1 J	69.4 J	41.2 J	44.9 J	25 J	58.1	20.9 U	38.9	29.3	1.91 U	38.3	1.98 U

Prepared by_____
Checked by_____
1/5/2006

Stow Forest Soils - 8310

param_name	SSRI17013000 10/13/2004 3:13:00 PM	SSRI17014000 10/13/2004 3:30:00 PM	SSRI17015000 10/13/2004 3:35:00 PM
PAHs (ug/kg)			
Benzo[a]anthracene	21 U	1.92 U	19.9 U
Benzo[a]pyrene	21 U	7.06 U	19.9 U
Fluoranthene	21 U	17.6	42.4 U
Phenanthrene	210 U	14.4 J	199 U
Pyrene	21 U	1.92 U	46.7 J

Prepared by_____
Checked by_____
1/5/2006

Stow Forest Soils - Metals

param_name	SSRI17001000 10/12/2004 12:05:00 PM	SSRI17002000 10/12/2004 12:18:00 PM	SSRI17003000 10/12/2004 12:30:00 PM	SSRI17004000 10/12/2004 12:45:00 PM	SSRI17005000 10/12/2004 12:55:00 PM	SSRI17006000 10/12/2004 12:16:00 PM	SSRI17007000 10/12/2004 1:27:00 PM	SSRI17008000 10/12/2004 2:35:00 PM	SSRI17009000 10/13/2004 1:50:00 PM	SSRI17010000 10/13/2004 2:13:00 PM	SSRI17011000 10/13/2004 2:50:00 PM	SSRI17012000 10/13/2004 3:10:00 PM	SSRI17013000 10/13/2004 3:13:00 PM	SSRI17014000 10/13/2004 3:30:00 PM	SSRI17015000 10/13/2004 3:35:00 PM
Metals (mg/kg)															
Aluminum	10900	9310	14500 J	9120	8490	10700	16500	11300	11200	13800	12600	14400	13100	14300	15300
Arsenic	4	7.7	6.2	6.9	7	6.7	8.8	7.5	7.1	14.1	13.8	11.3	10.8	9.3	9.4
Barium	18 J	16.8 J	12.8 U	12.7 UJ	11.8 UJ	15.7 UJ	22.9 J	18.4 J	26.3 J	16.5 J	17.8 J	23.9 J	15.6 U	19.7 J	23.9 J
Beryllium	0.38	0.35	0.37	0.27	0.23	0.29	0.46	0.34	0.41	0.46	0.4	0.45	0.4	0.43	0.45
Cadmium	0.073 U	0.082 U	0.077 U	0.08 U	0.074 U	0.1	0.13	0.069 U	0.1 U	0.089 U	0.12 U	0.11 U	0.087 U	0.12 U	0.13 U
Calcium	237 J	274 J	203	362 J	234 J	502 J	254 J	283 J	551 J	341 J	509 J	600 J	283 J	276 J	452 J
Chromium	12.4 J	12.4 J	15.5	15 J	12.5 J	12.1 J	15.9 J	12.8 J	15.9 J	17.8 J	22.7 J	20.2 J	18 J	19.4 J	18.6 J
Cobalt	2.4	1.4	1.8	2.3	2.3	1.7	2.1	2.7	3.7	4.2	4.3	4.2	2.7	3.2	2.9
Iron	9690	9790	10600	9420	9070	9100	12400	9730	12300	13900	14600	13200	12600	12300	15900
Lead	21	58.2	17.9 J	33	25.9	38.6	27.1	36.2	21.6 J	9.6 J	10.4 J	17.5 J	12.7 J	16.3 J	29.5 J
Magnesium	2130	1530	1630	2220	2080	1600	1820	2020	2240	2330	4220	3040	2380	2850	2390
Manganese	90.3 J	46.1 J	48.7	71.1 J	70.6 J	91.5 J	71.8 J	133 J	85.3	115	117	241	66.3	84.4	66.3
Mercury	35.4	50.3	44.5	58.5	27.9	60.3	55.5	70.8	67.2	19.9 U	21.4 U	41.9	34.3	48.6	66.1
Molybdenum	434	487	515	453	417	598	713	478	746	575	521	525	596	530	1220
Nickel	8.2	6.1	8.4	9.7	9.2	7.9	10.3	8.5	10.2 J	10.8 J	14.4 J	12.3 J	9.9 J	10.8 J	10.5 J
Potassium	465	372	335 J	550	337	401	403	415	939 J	575 J	1010 J	1530 J	587 J	855 J	832 J
Silver	0.056	0.047	0.022	0.041	0.033	0.029	0.11	0.038	0.076	0.07	0.04	0.045	0.052	0.043	0.069
Thorium	3570	3840	5190	4940	3690	4150	7590	4040	3770	5790	5740	6730	5930	6020	6140
Titanium	402000	374000	451000	396000	303000	374000	473000	355000	493000	499000	493000	656000	523000	611000	661000
Uranium	0.73	0.67	0.87	0.83	0.69	0.74	1.1	0.73	1.3	1.3	1.3	1.3	1.2	1.1	1.2
Vanadium	16.6	19.2	18.5	16.6	14.4	18.9	22.5	16.2	21.2 J	18 J	20.5 J	21.6 J	19.4 J	21.9 J	29.7 J

Conant Well Property Surface Water

param_name	CountOfRAHIT	CountOfRARESULT	MinOfRASQL	MaxOfRASQL	MinOfRAHIT	MaxOfRAHIT	AvgOfRARESULT	SWRI17046000 5/4/2005 8:37:00 AM	SWRI17049000 5/4/2005 8:40:00 AM	SWRI17050000 5/4/2005 8:47:00 AM
Metals, Total (ug/L)										
Aluminum	3	3			222	449	304.6666667	222 J	449 J	243 J
Barium	3	3			10.9	36	20.56666667	14.8	36	10.9
Beryllium	3	3			0.028	0.074	0.046	0.036	0.074	0.028
Cadmium	1	3	0.02	0.02	0.022	0.022	0.014	0.02 U	0.02 U	0.022
Calcium	3	3			4960	8440	6250	5350	8440	4960
Chromium	3	3			1.1	2.7	1.866666667	1.1	2.7	1.8
Cobalt	3	3			0.44	1.1	0.68	0.5	1.1	0.44
Copper	2	3	0.03	0.03	0.13	0.34	0.161666667	0.03 U	0.34	0.13
Iron	3	3			454	1040	666	504 J	1040 J	454 J
Lead	1	3	0.52	0.56	1.7	1.7	0.746666667	0.56 UJ	1.7 J	0.52 UJ
Magnesium	3	3			1360	2100	1620	1400	2100	1360
Manganese	3	3			20.8	77.6	41.5	26.1 J	77.6 J	20.8 J
Nickel	3	3			0.77	1.3	0.973333333	0.85	1.3	0.77
Potassium	3	3			856	1230	996	902 J	1230 J	856 J
Sodium	3	3			8280	72200	33960	21400	72200	8280
Titanium	2	3	2.5	2.5	3.1	11.2	5.183333333	3.1	11.2	2.5 U
Uranium	3	3			0.19	0.22	0.203333333	0.19	0.22	0.2
Uranium-235 as Mass	3	3			0.001	0.001	0.001	0.001	0.001	0.001
Uranium-238 as Mass	3	3			0.19	0.22	0.203333333	0.19	0.22	0.2
Vanadium	1	3	1	1	4.2	4.2	1.733333333	1 U	1 U	4.2
Zinc	3	3			4.9	10.7	7.3	6.3	10.7	4.9
Hardness as CaCO3 **(mg/L)**	3	3			18	29.7	22.26666667	19.1	29.7	18
Metals, Dissolved (ug/L)										
Aluminum	3	3			164	221	184	164 J	167 J	221 J
Barium	3	3			9.3	29.3	22.36666667	28.5 J	29.3 J	9.3 J
Cadmium	1	3	0.02	0.02	0.031	0.031	0.017	0.02 U	0.02 U	0.031
Calcium	3	3			4810	8130	6830	7550 J	8130 J	4810 J
Chromium	1	3	0.5	0.5	0.62	0.62	0.373333333	0.5 U	0.5 U	0.62
Cobalt	3	3			0.47	1	0.79	0.9	1	0.47
Copper	3	3			0.49	0.62	0.543333333	0.49 J	0.52 J	0.62 J
Iron	3	3			398	815	547.6666667	815	430	398
Lead	3	3			0.71	1	0.816666667	0.71 J	0.74 J	1 J
Magnesium	3	3			1250	1840	1616.666667	1760	1840	1250
Manganese	3	3			20	72.9	50.5	58.6 J	72.9 J	20 J
Nickel	3	3			1.4	2.3	1.833333333	1.8	2.3 J	1.4 J
Potassium	3	3			775	1200	1045	1200	1160	775
Sodium	3	3			9480	83700	57726.66667	83700	80000	9480
Titanium	3	3			1.5	1.8	1.633333333	1.6	1.5	1.8
Uranium	3	3			0.13	0.18	0.146666667	0.13	0.13	0.18
Uranium-235 as Mass	3	3			0.001	0.001	0.001	0.001	0.001	0.001
Uranium-238 as Mass	3	3			0.12	0.18	0.143333333	0.12	0.13	0.18
Zinc	3	3			5.5	8.9	7.1	6.9	8.9	5.5

Prepared by_____
Checked by_____
1/5/2006

Conant Well Property Sediment

param_name	CountOfRAHIT	CountOfRARESULT	MinOfRASQL	MaxOfRASQL	MinOfRAHIT	MaxOfRAHIT	AvgOfRARESULT	SDRI17037000 10/13/2004 9:22:00 AM	SDRI17039000 10/13/2004 9:40:00 AM	SDRI17040000 10/13/2004 9:46:00 AM	SDRI17041000 10/13/2004 9:55:00 AM	SDRI17043000 10/13/2004 10:15:00 AM	SDRI17046000 5/4/2005 8:58:00 AM	SDRI17047000 5/4/2005 9:38:00 AM	SDRI17048000 5/4/2005 9:07:00 AM	SDRI17049000 5/4/2005 9:16:00 AM	SDRI17050000 5/4/2005 9:24:00 AM
Semivolatile Organics (ug/Kg)																	
Benzo[a]pyrene	3	10	97	152	111	516	143.18	106 UJ	99.6 U	97 U	516	99 UJ	111 J	152 UJ	139 UJ	151 UJ	383 J
Benzo[b]fluoranthene	4	10	97	151	78.1	417	152.34	106 UJ	99.6 U	97 U	78.1 J	99 UJ	138 UJ	362 J	321 J	151 UJ	417 J
Benzoic Acid	3	10	1860	3020	3530	3970	1909.5	2130 U	1990 U	1940 U	1860 U	1980 U	2770 UJ	3750 J	3530 J	3020 UJ	3970 J
Bis(2-Ethylhexyl)phthalate	3	10	495	996	481	531	421.55	532 U	996 U	970 U	930 U	495 U	692 UJ	519 J	481 J	754 UJ	531 J
Chrysene	5	10	97	151	62.8	119	76.31	106 U	99.6 U	97 U	62.8 J	99 U	101 J	108 J	96 J	151 UJ	119 J
Fluoranthene	7	10	99	151	61.5	176	92.54	68 J	73.3 J	61.5 J	95.6	99 U	138 UJ	138 J	119 J	151 UJ	176 J
Indeno[1,2,3-cd]pyrene	1	10	93	152	532	532	106.93	106 UJ	99.6 U	97 U	93 U	99 UJ	138 UJ	152 UJ	139 UJ	151 UJ	532 J
Phenanthrene	5	10	97	151	53	87	60.73	106 U	99.6 U	97 U	53 J	99 U	87 J	58 J	53 J	151 UJ	80 J
Pyrene	9	10	99	99	60.5	192	116.45	102 J	74.2 J	60.5 J	84.3 J	99 UJ	189 J	134 J	117 J	192 J	162 J
Polyaromatic Hydrocarbons (ug/Kg)																	
Benzo[a]anthracene	5	6	4.95	4.95	39.8	140	52.62917	44.7	49	39.8 J	39.8	4.95 U	140 J				
Benzo[a]pyrene	5	6	16.1	16.1	19.6	38.5	26.04167	38.5	35.2	23.8	31.1	19.6	16.1 U				
Benzo[b]fluoranthene	1	6	16.1	50.2	53.9	53.9	23.60833	42.3 U	50.2 U	40.1 U	53.9 J	26.8 U	16.1 U				
Chrysene	5	6	4.95	4.95	34	118	45.37917	37.1	43.9	36.8 J	34	4.95 U	118 J				
Fluoranthene	6	6			40	184	81.26667	72.4	71.9	51.8	67.5	40	184				
Phenanthrene	6	6			32.3	120	58.03333	57.6	47.7 J	37 J	53.6	32.3 J	120 J				
Pyrene	6	6			46.9	147	78.08333	76.4	72.8	56.2	69.2	46.9 J	147				
Inorganics (mg/Kg)																	
Aluminum	10	10			10900	27400	22000	10900	22100	19100	17800	24700	25300	27400	25500	24400	22800
Arsenic	10	10			3.8	9.8	7.61	3.8	9	9.1	9.8	9.8	5.5	7.3	5.2	8.5	8.1
Barium	10	10			37.1	74.4	49.66	47.3 J	37.1 J	47.3 J	40.4 J	43.9 J	49.2 J	54.2 J	53.7 J	74.4 J	49.1 J
Beryllium	10	10			0.88	3.9	2.238	0.88	2	1.3	1.3	1.3	3.6	3.3	3.9	2.4	2.4
Cadmium	9	10	0.32	0.32	0.26	1	0.529	0.43	0.32 U	0.52	0.51	0.26	0.69	0.48	0.72	1	0.52
Calcium	10	10			1060	3310	1839	1580 J	1060 J	1510 J	1080 J	1080 J	2300	2110	2300	3310	2060
Chromium	10	10			13.9	29.7	22.96	13.9 J	22.2 J	20.7 J	20 J	26.5 J	22.5	29.7	22.9	24.2	27
Cobalt	10	10			1.8	4.9	3.13	1.8	2.6	2.6	2.4	3.1	2.9	4.1	3	4.9	3.9
Copper	5	10	11.4	13.4	16.3	23.5	12.525	11.4 U	11.8 U	12.7 U	13.4 U	13.4 U	19.9	17.1	16.3	23.5	17.1
Iron	10	10			3560	9520	6409	3560	5740	5460	5030	6860	5690	8790	5710	7730	9520
Lead	10	10			52.7	300	99.83	145	96.5 J	68.6 J	300 J	72.1	68.1	56.6	72.6	52.7	66.1
Magnesium	10	10			1020	2710	1867	1020	1870	1630	1430	2510	1860	2710	1260	2140	2240
Manganese	10	10			37.3	84	61.64	37.3 J	57.8	57.8	49.4	69.9 J	59.7 J	80 J	51.2 J	84 J	69.3 J
Mercury	10	10			0.068	0.161	0.1155	0.142	0.161	0.148	0.139	0.123	0.081 J	0.073 J	0.1 J	0.068 J	0.12 J
Molybdenum	10	10			1.01	2.6	1.669	1.01	1.03	1.12	1.25	1.28	1.8	2.6	1.8	2.5	2.3
Nickel	10	10			9.2	17	14.01	9.2	13.4 J	13.1 J	12.8 J	14.8	14.4	16.7	13.1	17	15.6
Potassium	10	10			430	751	595.4	606	571 J	594 J	585 J	751	430 J	591 J	509 J	643 J	674 J
Selenium	7	10	1.1	2.4	2.5	4.2	2.425	1.1 U	2.7	1.8 U	2.5	2.4 U	3.4	3.2	4.2	3.1	2.5
Silver	10	10			0.082	0.16	0.1118	0.13	0.16	0.12	0.13	0.13	0.082	0.092	0.09	0.089	0.095
Sodium	10	10			629	2540	1069.6	1170	906	1060	712	892	921	952	914	2540	629
Thallium	6	10	0.17	0.25	0.17	0.32	0.1935	0.17 U	0.32	0.23 U	0.25 U	0.24 U	0.17	0.29	0.2	0.25	0.26
Thorium	10	10			0.38	2.34	1.0932	2.34	0.882	1.23	1.21	2.29	0.48	0.85	0.38	0.7	0.57
Titanium	10	10			282	727	492.5	379	560	576	535	727	355	568	282	449	494
Tungsten	4	10	0.3	0.3	0.3	0.37	0.5145	1.59 U	1.46 UJ	1.45 UJ	1.39 UJ	1.46 U	0.3 J	0.3 U	0.37 J	0.32 J	0.33 J
Uranium	10	10			1.9	22.6	10.5	1.9	4.5	2.7	4.6	3.1	17.9	17	22.6	15.3	15.4
Uranium-235 as Mass	10	10			0.013	0.16	0.0703	0.013	0.03	0.018	0.031	0.021 J	0.12	0.11	0.16	0.1	0.1
Uranium-235 as Mass, Calculated	3	5	0.018453	0.033669	0.066599	0.133198	0.061636	0.066598835	0.082323559	0.133197669	0.018453427 U	0.0336694107 U					
Uranium-238 as Mass	10	10			1.9	22.4	10.41	1.9	4.4	2.6	4.6	3.1	17.7	16.9	22.4	15.2	15.3
Uranium-238 as Mass, Calculated	5	5			4.253421	7.257585	5.597858	6.930398572	7.257584771	4.312908983	5.234979179	4.253420583					
Uranium, Calculated Total Mass - Alpha	10	10			4.287093	23.95	12.24636	6.997003568	7.339915946	4.446118973	5.253434313	4.287093108	21.91	19.51	23.95	15.17	13.6
Vanadium	10	10			14.5	28.8	23.6	14.5	24.1 J	25.8 J	22.6 J	28.8	18.8	26.9	20.4	26.4	27.7
Zinc	5	10	30.7	48.3	34.4	78.6	32.475	43.8 UJ	30.7 U	48.3 U	46.2 U	37.3 UJ	37.9 J	36.1 J	34.6 J	78.6 J	34.4 J
Zirconium	7	10	0.336	0.41	0.495	1.9	0.99755	1.03 J	0.41 UJ	0.355 UJ	0.336 UJ	0.495 J	1.4	1.7	1.5	1.9	1.4

Prepared by_____
Checked by_____
1/5/2006

Hudson Bog Surface Water

param_name	CountOfRAHIT	CountOfRARESULT	MinOfRASQL	MaxOfRASQL	MinOfRAHIT	MaxOfRAHIT	AvgOfRARESULT	SWRI17011000 4/29/2005 10:15:00 AM	SWRI17012000 4/29/2005 10:40:00 AM	SWRI17013000 4/29/2005 10:45:00 AM	SWRI17015000 4/29/2005 11:00:00 AM	SWRI17017000 4/29/2005 11:15:00 AM	SWRI17019000 4/29/2005 11:55:00 AM	SWRI17021000 4/29/2005 12:10:00 PM	SWRI17023000 4/29/2005 12:25:00 PM	SWRI17024000 4/29/2005 11:35:00 AM	SWRI17025000 4/29/2005 12:30:00 PM
Metals, Total (ug/L)																	
Aluminum	10	10			178	319	265.9	230 J	278 J	305 J	266 J	249 J	319 J	286 J	178 J	246 J	302 J
Barium	10	10			15.3	26.4	19.13	19.4	20.3	20.5	16.1	16.9	19.7	17.3	15.3	26.4	19.4
Beryllium	10	10			0.023	0.048	0.0363	0.031	0.038	0.041	0.048	0.033	0.044	0.036	0.023	0.028	0.041
Cadmium	10	10			0.091	0.15	0.1121	0.15	0.12	0.1	0.11	0.11	0.11	0.11	0.091	0.11	0.11
Calcium	10	10			2490	3460	3067	3250	3260	3460	3310	3330	2870	2960	2490	3040	2700
Chromium	10	10			1.1	3.3	2.04	1.1	1.7	2.7	2.1	2.2	2.3	3.3	1.7	1.6	1.7
Cobalt	10	10			0.48	1.3	0.857	0.51	1.1	1.3	0.97	0.81	0.93	0.83	0.48	0.75	0.89
Copper	10	10			1.2	3.2	2.21	2.9	1.9	1.8	1.9	2.6	2.2	2.1	1.2	2.3	3.2
Iron	10	10			245	837	572.8	245 J	673 J	837 J	586 J	503 J	740 J	550 J	286 J	547 J	761 J
Lead	10	10			1	5	2.06	1.3 J	1.7 J	1.8 J	1.2 J	1 J	3.8 J	1.8 J	1.2 J	1.8 J	5 J
Magnesium	10	10			765	947	859.6	947	869	937	883	936	827	848	765	805	779
Manganese	10	10			100	237	134.9	237 J	102 J	100 J	111 J	140 J	104 J	128 J	179 J	141 J	107 J
Nickel	10	10			1.2	2.2	1.68	1.5	1.7	2.2	1.8	1.7	1.9	1.6	1.2	1.4	1.8
Potassium	10	10			1670	2000	1835	2000 J	1790 J	1880 J	1860 J	1860 J	1910 J	1910 J	1670 J	1750 J	1720 J
Silver	1	10	0.008	0.033	0.026	0.026	0.01025	0.033 U	0.016 U	0.012 U	0.01 U	0.021 U	0.026	0.02 U	0.008 U	0.018 U	0.015 U
Sodium	10	10			16400	22600	19700	16400	20100	22600	20600	19200	19600	19500	18600	19600	20800
Thallium	4	10	0.023	0.05	0.055	0.35	0.06915	0.055	0.35	0.11	0.058	0.05 U	0.048 U	0.027 U	0.05 U	0.039 U	0.023 U
Titanium	10	10			3.8	7.9	5.66	6.3	4.9	4.9	5	5.7	7.1	7.9	3.8	4.4	6.6
Tungsten	1	10	0.15	0.4	0.87	0.87	0.1975	0.4 U	0.26 U	0.18 U	0.15 U	0.23 U	0.35 U	0.87	0.2 U	0.18 U	0.26 U
Uranium	2	10	0.015	0.033	0.036	0.039	0.0182	0.031 U	0.031 U	0.025 U	0.036	0.028 U	0.039	0.033 U	0.015 U	0.02 U	0.031 U
Uranium-238 as Mass	2	10	0.015	0.033	0.036	0.039	0.0182	0.031 U	0.031 U	0.025 U	0.036	0.028 U	0.039	0.033 U	0.015 U	0.02 U	0.031 U
Zinc	10	10			22.5	45.5	34.4	31.2	40	45.5	36.2	35.1	35	31.5	22.5	34.7	32.3
Zirconium	2	10	0.5	0.5	1.1	1.1	0.42	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.1	0.5 U	1.1	0.5 U
Hardness as CaCO3 **(mg/L)**	10	10			9.37	12.5	11.203	12	11.7	12.5	11.9	12.2	10.6	10.9	9.37	10.9	9.96
Metals, Dissolved (ug/L)																	
Aluminum	10	10			143	257	204.2	155 J	257 J	257 J	238 J	189 J	208 J	199 J	143 J	169 J	227 J
Barium	10	10			11.8	15.9	13.7	13.9 J	15.9 J	15.8 J	13.4 J	11.8 J	13.7 J	12.6 J	12 J	13.6 J	14.3 J
Beryllium	7	10	0.02	0.041	0.024	0.081	0.04385	0.02 U	0.053	0.081	0.077	0.052	0.066	0.038	0.024	0.034 U	0.041 U
Cadmium	10	10			0.072	0.13	0.0897	0.13	0.11	0.075	0.086	0.072	0.078	0.074	0.086	0.091	0.095
Calcium	10	10			2270	3150	2782	2890 J	3080 J	3150 J	3100 J	2990 J	2530 J	2690 J	2270 J	2540 J	2580 J
Chromium	10	10			1	2.3	1.56	1.4	1	1.5	1.6	1.7	1.6	1.6	2.3	1.3	1.6
Cobalt	10	10			0.42	1.5	0.801	0.42	1	1.5	0.94	0.73	0.78	0.71	0.45	0.66	0.82
Copper	10	10			1.5	2.2	1.96	2.2 J	2.1 J	2.1 J	2.2 J	2.1 J	1.9 J	1.8 J	1.5 J	1.7 J	2 J
Iron	10	10			157	697	465.1	157	594	697	520	401	589	383	267	391	652
Lead	10	10			1.2	2.3	1.66	1.3 J	1.8 J	1.8 J	1.6 J	1.2 J	2.1 J	1.6 J	1.4 J	1.5 J	2.3 J
Magnesium	10	10			647	830	752.8	830	783	786	790	827	750	743	647	679	693
Manganese	10	10			92.2	202	123.84	202 J	97.8 J	92.2 J	107 J	132 J	96.4 J	120 J	162 J	124 J	105 J
Mercury	4	10	0.033	0.033	0.035	0.048	0.0267	0.033 U	0.033 U	0.033 U	0.033 U	0.048	0.033 U	0.04	0.035	0.033 U	0.045
Nickel	10	10			2	3.1	2.29	2	2.5	3.1	2.4	2.2	2.3	2.1	2.1	2	2.2
Potassium	10	10			1650	1920	1814	1880	1890	1740	1780	1900	1920	1800	1650	1780	1800
Sodium	10	10			17500	24600	20900	17500	22100	24600	21700	21100	20100	20800	18300	20400	22400
Thallium	1	10	0.047	0.15	0.39	0.39	0.0743	0.072 U	0.39	0.15 U	0.094 U	0.076 U	0.068 U	0.061 U	0.081 U	0.057 U	0.047 U
Titanium	10	10			2.4	3.5	3.05	2.9	3.3	3.4	3.5	3.1	3.4	2.9	2.4	2.7	2.9
Uranium	10	10			0.008	0.026	0.0171	0.014	0.026	0.02	0.021	0.016	0.016	0.017	0.008	0.014	0.019
Uranium-238 as Mass	10	10			0.008	0.026	0.0171	0.014	0.026	0.02	0.021	0.016	0.016	0.017	0.008	0.014	0.019
Zinc	10	10			22.1	38.1	29.69	24.5	34.7	38.1	34.1	31	29.6	26.9	22.1	26.2	29.7
Zirconium	1	10	0.5	0.5	0.53	0.53	0.278	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.53

Prepared by_____
Checked by_____
1/5/2006

Hudson Bog Sediment

param_name	CountOfRAHIT	CountOfRARESULT	MinOfRASQL	MaxOfRASQL	MinOfRAHIT	MaxOfRAHIT	AvgOfRARESULT	SDRI17012000 4/29/2005 10:40:00 AM	SDRI17014000 4/29/2005 10:55:00 AM	SDRI17016000 4/29/2005 11:10:00 AM	SDRI17020000 4/29/2005 12:00:00 PM
Semivolatile Organics (ug/Kg)											
Benzo[b]fluoranthene	1	4	103	116	109	109	67.5	109 J	103 UJ	116 UJ	103 UJ
Benzoic Acid	2	4	2060	2320	1300	1500	1247.5	1300 J	1500 J	2320 UJ	2060 UJ
Bis(2-Chloroethyl)ether	1	4	1030	1340	231	231	499	1340 UJ	231 J	1160 UJ	1030 UJ
Diethylphthalate	2	4	1030	1030	397	521	487	521 J	1030 UJ	397 J	1030 UJ
Fluoranthene	1	4	103	134	89	89	64.75	134 UJ	103 UJ	89 J	103 UJ
m+pMethylphenol	2	4	1030	1340	705	3100	1247.5	1340 UJ	705 J	3100 J	1030 UJ
Phenanthrene	3	4	103	103	72	85	70.125	85 J	72 J	72 J	103 UJ
Phenol	3	4	1030	1030	363	921	544.25	363 J	378 J	921 J	1030 UJ
Pyrene	1	4	103	134	111	111	70.25	134 UJ	103 UJ	111 J	103 UJ
Inorganics (mg/Kg)											
Mercury	4	4			0.037	0.061	0.04625	0.061 J	0.047 J	0.04 J	0.037 J
Aluminum	4	4			2670	4950	3520	4950	3310	3150	2670
Arsenic	4	4			1.1	3.8	2.775	3.8	2.6	3.6	1.1
Barium	4	4			9.1	40.1	25.325	28.3 J	23.8 J	40.1 J	9.1 J
Beryllium	4	4			0.15	0.42	0.31	0.41	0.26	0.42	0.15
Cadmium	4	4			0.088	0.38	0.2445	0.29	0.22	0.38	0.088
Calcium	4	4			170	1830	816.5	829	437	1830	170
Chromium	4	4			3.9	6.7	5.125	6.7	5.7	3.9	4.2
Cobalt	4	4			0.54	1.5	0.98	1.1	0.78	1.5	0.54
Copper	4	4			1.7	8.3	5.3	7.3	3.9	8.3	1.7
Iron	4	4			1990	4440	2930	3270	2020	4440	1990
Lead	4	4			13.2	30.6	24.575	29.8	24.7	30.6	13.2
Magnesium	4	4			141	429	299	312	314	141	429
Manganese	4	4			12.1	20.8	17.275	18.5 J	20.8 J	12.1 J	17.7 J
Molybdenum	2	4	0.19	0.45	0.83	0.85	0.5	0.85	0.45 U	0.83	0.19 U
Nickel	4	4			2.6	4.8	3.85	4.8	3.6	4.4	2.6
Potassium	4	4			144	244	209.75	244 J	221 J	230 J	144 J
Selenium	4	4			0.4	1.8	1.225	1.7	1	1.8	0.4
Silver	3	4	0.026	0.026	0.078	0.1	0.06825	0.078	0.082	0.1	0.026 U
Sodium	4	4			59.9	319	175.225	208	114	319	59.9
Thallium	4	4			0.036	0.061	0.049	0.061	0.051	0.048	0.036
Thorium	4	4			0.73	2.8	1.8325	1.9	2.8	0.73	1.9
Titanium	4	4			65.7	157	112.75	157	138	65.7	90.3
Tungsten	3	4	0.086	0.086	0.32	0.44	0.30075	0.44 J	0.32 J	0.4 J	0.086 U
Uranium	4	4			0.76	1.4	1.0925	1.4	1.3	0.91	0.76
Uranium-235 as Mass	4	4			0.0047	0.0085	0.00665	0.0085 J	0.0078 J	0.0056 J	0.0047 J
Uranium-238 as Mass	4	4			0.76	1.4	1.0925	1.4	1.3	0.91	0.76
Uranium, Calculated Total Mass - Alpha	4	4			1.06	5.19	3.59	4.26	3.85	1.06	5.19
Vanadium	4	4			4.5	9.2	7.375	9.2	7.3	8.5	4.5
Zinc	4	4			6.8	28.2	16.1	16.6 J	12.8 J	28.2 J	6.8 J
Zirconium	4	4			1.2	1.6	1.3	1.6	1.2	1.2	1.2
Percent Moisture **(%)**	4	4			2.81	25.2	11.2625	25.2	2.81	13.9	3.14

Prepared by_____
Checked by_____
1/5/2006

Hudson Bog Peat

param_name	CountOfRAHIT	CountOfRARESULT	MinOfRASQL	MaxOfRASQL	MinOfRAHIT	MaxOfRAHIT	AvgOfRARESULT	SDRI17011000 4/29/2005 10:15:00 AM	SDRI17013000 4/29/2005 10:45:00 AM	SDRI17015000 4/29/2005 11:00:00 AM	SDRI17017000 4/29/2005 11:15:00 AM	SDRI17018000 4/29/2005 11:30:00 AM	SDRI17019000 4/29/2005 11:55:00 AM	SDRI17021000 4/29/2005 12:10:00 PM	SDRI17022000 4/29/2005 12:15:00 PM	SDRI17023000 4/29/2005 12:25:00 PM	SDRI17024000 4/29/2005 11:35:00 AM	SDRI17025000 4/29/2005 12:30:00 PM
Semivolatile Organics (ug/Kg)																		
Benzo[a]anthracene	1	11	102	188	78	78	65.13636	103 UJ	153 UJ	126 UJ	102 UJ	124 UJ	125 UJ	78 J	123 UJ	102 UJ	188 UJ	131 UJ
Benzo[b]fluoranthene	5	11	102	153	122	373	127.8182	103 UJ	153 UJ	126 UJ	102 UJ	124 UJ	166 J	170 J	122 J	102 UJ	373 J	220 J
Benzo[k]fluoranthene	3	11	102	188	70	77	66.59091	103 UJ	153 UJ	126 UJ	102 UJ	124 UJ	70 J	71 J	77 J	102 UJ	188 UJ	131 UJ
Benzoic Acid	7	11	2030	2430	676	4520	1673.818	2060 UJ	996 J	1390 J	2040 UJ	1880 J	676 J	2430 UJ	1010 J	2030 UJ	4520 J	3660 J
Butylbenzylphthalate	1	11	1020	1880	2390	2390	783.6364	1030 UJ	2390 J	1260 UJ	1020 UJ	1240 UJ	1250 UJ	1220 UJ	1230 UJ	1020 UJ	1880 UJ	1310 UJ
Chrysene	4	11	102	153	53	122	70.86364	53 J	153 UJ	126 UJ	102 UJ	124 UJ	125 UJ	122 J	81 J	102 UJ	92 J	131 UJ
Diethylphthalate	3	11	1020	1880	296	15700	1943.818	296 J	15700 J	1260 UJ	1020 UJ	1240 UJ	1250 UJ	1220 UJ	1230 UJ	1020 UJ	1880 UJ	326 J
Fluoranthene	6	11	102	153	62	200	97.09091	69 J	153 UJ	126 UJ	102 J	124 UJ	175 J	200 J	123 UJ	102 UJ	146 J	62 J
m+pMethylphenol	7	11	1020	1880	2210	6960	3078.182	1030 UJ	2210 J	6960 J	2700 J	4190 J	5700 J	5060 J	4420 J	1020 UJ	1880 UJ	1310 UJ
Phenanthrene	9	11	102	131	54	133	85.31818	54 J	78 J	106 J	68 J	78 J	123 J	133 J	100 J	102 UJ	82 J	131 UJ
Phenol	4	11	1020	1880	229	2010	790	2010 J	1010 J	866 J	229 J	1240 UJ	1250 UJ	1220 UJ	1230 UJ	1020 UJ	1880 UJ	1310 UJ
Pyrene	8	11	122	153	50	179	103.0455	81 J	153 UJ	176 J	90 J	124 UJ	175 J	122 UJ	179 J	61 J	122 J	50 J
Inorganics (mg/Kg)																		
Aluminum	11	11			2370	5310	3478.182	3040	3300	2940	2760	4190	3370	2980	3700	2370	4300	5310
Arsenic	11	11			1.7	4	3.263636	2.2	3.6	3.3	2.3	3.5	4	3.7	3.8	1.7	3.8	4
Barium	11	11			15.4	47.5	29.50909	18 J	36.3 J	47.5 J	20.1 J	29.2 J	35.6 J	34 J	30.2 J	15.4 J	28.8 J	29.5 J
Beryllium	11	11			0.17	0.54	0.348182	0.2	0.48	0.23	0.17	0.41	0.36	0.33	0.4	0.24	0.54	0.47
Cadmium	11	11			0.19	0.46	0.319091	0.2	0.31	0.28	0.2	0.35	0.46	0.46	0.36	0.19	0.37	0.33
Calcium	11	11			245	1960	1150	245	1360	1960	420	895	1530	1730	1790	380	1020	1320
Chromium	11	11			3.8	8	4.909091	4.3	4.3	4	5.1	4.8	4.2	4.6	4.8	3.8	6.1	8
Cobalt	11	11			0.52	1.6	1.141818	0.59	1.5	1.3	0.75	1.3	1.4	1.3	1.6	0.52	1.1	1.2
Copper	11	11			3.1	10.3	7.563636	3.3	8.9	8.1	3.8	10.3	9.5	9.9	9	3.1	7.8	9.5
Iron	11	11			1610	3500	2822.727	1610	3330	2830	2040	3480	3270	2970	2830	1740	3500	3450
Lead	11	11			18.1	60.7	36.14545	29.1	18.1	55.4	29	39.2	42.1	60.7	36	26.1	35	26.9
Magnesium	11	11			110	380	224	141	110	380	363	158	154	323	158	263	173	241
Manganese	11	11			7.9	38	19.14545	13.2 J	7.9 J	27.4 J	22.9 J	13.2 J	14.5 J	38 J	18.2 J	18.5 J	19.6 J	17.2 J
Mercury	11	11			0.038	0.078	5.43E-02	0.043 J	0.045 J	0.065 J	0.059 J	0.054 J	0.058 J	0.074 J	0.041 J	0.038 J	0.078 J	0.042 J
Molybdenum	9	11	0.31	0.43	0.48	1	0.717273	0.43 U	0.87	0.94	0.48	0.82	1	0.99	0.8	0.31 U	0.72	0.9
Nickel	11	11			2.7	5.7	4.427273	2.7	4.1	5.4	3.5	5	4.7	5.7	4.8	2.7	4.5	5.6
Potassium	11	11			165	378	245.6364	165 J	196 J	311 J	222 J	250 J	254 J	378 J	246 J	211 J	226 J	243 J
Selenium	11	11			0.67	2.1	1.588182	1.1	2	1.7	1.1	1.7	2.1	1.9	1.7	0.67	1.7	1.8
Silver	11	11			0.05	0.14	9.69E-02	0.059	0.088	0.12	0.088	0.11	0.12	0.14	0.091	0.05	0.12	0.08
Sodium	11	11			74.9	389	238.0636	74.9	296	336	87	285	295	235	389	90.8	216	314
Thallium	11	11			0.036	0.075	4.98E-02	0.036	0.041	0.066	0.045	0.052	0.045	0.075	0.039	0.048	0.05	0.051
Thorium	11	11			0.39	2	1.116364	1.7	0.78	0.65	2	0.72	0.39	0.44	1	1.4	1.7	1.5
Titanium	11	11			66.3	157	94.21818	83.7	66.3	74.7	123	96	70.4	82.7	92	71.6	119	157
Tungsten	9	11	0.2	0.29	0.26	1.3	0.554091	0.26 J	0.29 U	1.1 J	0.42 J	0.65 J	0.64 J	1.3 J	0.56 J	0.2 U	0.51 J	0.41 J
Uranium	11	11			0.7	2.2	1.160909	0.91	0.99	0.7	1.1	1.2	0.93	1.1	1.2	0.74	1.7	2.2
Uranium-235 as Mass	11	11			0.0042	0.014	7.19E-03	0.0055 J	0.0061 J	0.0042 J	0.0067 J	0.0074 J	0.0057 J	0.0065 J	0.0076 J	0.0044 J	0.011 J	0.014 J
Uranium-238 as Mass	11	11			0.7	2.2	1.159091	0.91	0.98	0.7	1.1	1.2	0.93	1.1	1.2	0.73	1.7	2.2
Uranium, Calculated Total Mass - Alpha	11	11			1.05	4.71	2.485455	2.9	1.29	1.05	4.71	1.94	1.43	1.5	2.01	4.38	2.89	3.24
Vanadium	11	11			5.5	12.1	9.009091	6	7.4	12.1	7.3	10.4	9.7	11.6	9.3	5.5	8.8	11
Zinc	11	11			9.7	29.3	19.60909	11.6 J	18.8 J	27.7 J	11.3 J	20.5 J	29.3 J	28.6 J	20.3 J	9.7 J	19.3 J	18.6 J
Zirconium	11	11			1	1.6	1.254545	1.3	1.3	1.1	1.6	1.1	1.2	1.1	1	1.3	1.5	1.3
Percent Moisture **(%)**	11	11			1.8	46.9	19.00909	3.09	34.6	20.7	2.31	19.4	20.2	17.9	18.4	1.8	46.9	23.8
AVS/SEM (nmole/g)																		
Copper	3	3			50.9	90.5	70.5	70.1 J				50.9 J					90.5 J	
Lead	3	3			257	636	386.3333	636 J				257 J					266 J	
Nickel	3	3			51.4	380	164.6333	380 J				51.4 J					62.5 J	
Zinc	3	3			449	623	537	449 J				539 J					623 J	
Acid Volatile Sulfides	1	3	32.6	32.8	60.7	60.7	31.13333	32.8 UJ				32.6 UJ					60.7 J	

Prepared by_____
Checked by_____
1/5/2006

APPENDIX C

ProUCL OUTPUT SHEETS

Table 3
Summary Statistics
Assabet River Surface Water, Upstream

Parameter	Frequency of Detection	Percent Detected	Range of NonDetects	Range of Detected Concentrations	Mean	Std Dev	CV	Skewness	Distribution	95% UCL on the mean	Method	95th Percentile	95/95 UTL	Maximum Detected	Mean + 3 SD	Recommended UL
VOCs(MG/L)																
Methyl ethyl ketone	6 / 10	60%	0.0065 : 0.02	0.0064 - 0.066	0.022	0.02	0.909	1.233	Normal	0.033776	Student's-t UCL	0.059	0.081	0.066	0.082	0.059
Methyl Tertbutyl Ether	3 / 10	30%	0.0005 : 0.0005	0.0003 - 0.00033	0.00025	0.000033	0.132	1.206	Non-parametric	0.00029	Modified-t UCL	0.00033	*	0.00033		0.00033
Total Metals (UG/L)																
Aluminum	2 / 10	20%	12.5 : 153	916 - 4790	601.1	1497.6	2.491	2.981	Non-Parametric	3558.593	97.5% Chebyshev (Mean, Sd) UCL	4790	*	4790		4790
Barium	10 / 10	100%	:	16.2 - 89.1	26.37	22.6	0.857	2.908	Non-parametric	57.52168	95% Chebyshev (Mean, Sd) UCL	89.1	*	89.1		89.1
Beryllium	2 / 10	20%	0.025 : 0.025	0.038 - 0.28	0.042	0.084	2.000	3.111	Non-Parametric	0.20784	97.5% Chebyshev (Mean, Sd) UCL	0.28	*	0.28		0.28
Cadmium	2 / 10	20%	0.013 : 0.013	0.2 - 0.95	0.12	0.298	2.483	2.945	Non-Parametric	0.708379	97.5% Chebyshev (Mean, Sd) UCL	0.95	*	0.95		0.95
Calcium	10 / 10	100%	:	17400 - 20000	18580	725.4	0.039	0.142	Normal	19000.51	Student's-t UCL	19910	20692	20000	20756	19910
Chromium	2 / 10	20%	0.14 : 0.5	10.9 - 52.2	6.41	16.44	2.565	2.941	Non-Parametric	58.14102	99% Chebyshev (Mean, Sd) UCL	52.2	*	52.2		52.2
Cobalt	9 / 10	90%	0.35 : 0.35	0.38 - 8	1.35	2.4	1.778	2.901	Non-parametric	6.084315	97.5% Chebyshev (Mean, Sd) UCL	8	*	8		8
Copper	1 / 10	10%	2.5 : 33.8	143 - 143	17.93	44.19	2.465		Poisson				27.5	143		14.3
Iron	9 / 10	90%	210 : 210	545 - 8690	1572.7	2574.1	1.637	2.868	Lognormal	3615.526	95% Chebyshev (MVUE) UCL			8690		
Iron (log-transformed)					6.673	1.1304						6279	21239	8690	23487	6270
Lead	6 / 10	60%	0.22 : 2	1.5 - 84.5	11.52	26.36	2.288	2.888	Lognormal	57.14299	99% Chebyshev (MVUE) UCL			84.5		
Lead (log-transformed)					0.6804	1.8718						61.0	459	84.5	542	61
Magnesium	10 / 10	100%	:	4260 - 5930	4630	471.6	0.102	2.796	Non-parametric	4925.347	Modified-t UCL	5930	*	5930		5930
Manganese	10 / 10	100%	:	48.7 - 483	118.8	133.5	1.124	2.759	Non-parametric	302.8431	95% Chebyshev (Mean, Sd) UCL	483	*	483		483
Mercury	2 / 10	20%	0.037 : 0.037	0.058 - 0.2	0.041	0.057	1.390	2.920	Non-Parametric	0.119674	95% Chebyshev (Mean, Sd) UCL	0.2	*	0.20		0.2
Molybdenum	10 / 10	100%	:	1.5 - 2.5	1.75	0.28	0.160	2.639	Non-parametric	1.922059	Modified-t UCL	2.5	*	2.50		2.5
Nickel	4 / 10	40%	3.1 : 3.6	2.9 - 17.5	3.92	4.95	1.263	2.789	Non-Parametric	10.74325	95% Chebyshev (Mean, Sd) UCL	17.5	*	17.5		17.5
Potassium	10 / 10	100%	:	6330 - 7070	6709	237.3	0.035	0.107	Normal	6846.57	Student's-t UCL	7144	7400	7070	7421	7070
Silver	2 / 10	20%	0.004 : 0.049	0.34 - 1.7	0.214	0.532	2.486	2.964	Lognormal	0.931884	99% Chebyshev (MVUE) UCL	1.7	*	1.70		1.7
Sodium	10 / 10	100%	:	49000 - 65100	57070	6135	0.107	-0.102	Normal	60626.33	Student's-t UCL	68315	74929	65100	75475	65100
Thallium	1 / 10	10%	0.013 : 0.12	0.33 - 0.33	0.055	0.098	1.782		Poisson				0.125	0.33		0.125
Thorium	1 / 10	10%	0.019 : 0.2	0.7 - 0.7	0.1	0.21	2.100		Poisson				0.32	0.70		0.32
Titanium	3 / 10	30%	7 : 7	7.9 - 184	25.29	56.71	2.242	2.987	Non-Parametric	137.2762	97.5% Chebyshev (Mean, Sd) UCL	184	*	184		184
Tungsten	1 / 10	10%	0.17 : 2.4	5 - 5	0.765	1.523	1.991		Poisson				1.4	5		1.4
Uranium	1 / 10	10%	0.003 : 0.13	0.52 - 0.52	0.066	0.161	2.439		Poisson				0.125	0.52		0.125
Vanadium	2 / 10	20%	0.63 : 0.63	1.8 - 9.6	1.39	2.92	2.101	3.025	Non-Parametric	7.161526	97.5% Chebyshev (Mean, Sd) UCL	9.6	*	9.60		3.6
Zinc	2 / 10	20%	5.8 : 15.6	34.8 - 137	20.82	41.94	2.014	2.893	Non-Parametric	103.631	97.5% Chebyshev (Mean, Sd) UCL	137	*	137		137
Dissolved Metals (UG/L)																
Aluminum	1 / 10	10%	4.3 : 15	85.4 - 85.4	12.67	25.61	2.021		Poisson				21.0	85.4		21
Arsenic	6 / 10	60%	0.96 : 0.96	1.1 - 1.8	1.08	0.56	0.519	-0.042	Non-parametric	1.851436	95% Chebyshev (Mean, Sd) UCL	1.8		1.8		1.8
Barium	10 / 10	100%	:	16.5 - 18.7	17.51	0.65	0.037	0.336	Normal	17.88413	Student's-t UCL	18.7	19.4	18.7	19.5	18.7
Calcium	10 / 10	100%	:	18000 - 19800	18950	613.3	0.032	-0.275	Normal	19305.51	Student's-t UCL	20074	20735	19800	20790	19800
Cobalt	6 / 10	60%	0.35 : 0.35	0.36 - 0.47	0.305	0.118	0.387	-0.099	Non-parametric	0.373162	Modified-t UCL	0.47	*	0.47		0.47
Iron	10 / 10	100%	:	188 - 627	306.2	135.1	0.441	1.618	G/NP	393.2335	Approximate Gamma UCL	627	*	627		627
Lead	1 / 10	10%	0.17 : 0.45	2.2 - 2.2	0.35	0.65	1.857		Poisson				0.8	2.2		0.8
Magnesium	10 / 10	100%	:	3820 - 4760	4286	319.4	0.075	-0.090	Normal	4471.16	Student's-t UCL	4871	5216	4760	5244	4760
Manganese	10 / 10	100%	:	50.8 - 93.7	60.68	12.19	0.201	2.627	Non-parametric	68.28171	Modified-t UCL	93.7	*	93.7		93.7
Mercury	1 / 10	10%	0.037 : 0.037	0.067 - 0.067	0.023	0.015	0.652		Poisson				0.06	0.067		0.06
Molybdenum	10 / 10	100%	:	1.6 - 1.7	1.68	0.042	0.025	-1.779	Non-parametric	1.703192	Modified-t UCL	1.7	1.8	1.7		1.7
Nickel	10 / 10	100%	:	3 - 3.3	3.13	0.11	0.035	-0.042	Normal	3.191409	Student's-t UCL	3.33	3.44	3.30	3.46	3.3
Potassium	10 / 10	100%	:	6160 - 7440	6755	349.6	0.052	0.201	Normal	6957.681	Student's-t UCL	7396	7773	7440	7804	7396
Sodium	10 / 10	100%	:	56700 - 67300	62010	3094.2	0.050	-0.061	Normal	63803.67	Student's-t UCL	67682	71017	67300	71293	67300
Thallium	1 / 10	10%	0.013 : 0.086	0.35 - 0.35	0.05	0.11	2.200		Poisson				0.195	0.35		0.195
Uranium	6 / 10	60%	0.003 : 0.003	0.003 - 0.027	0.00375	0.00381	1.016	2.232	Non-parametric	0.009001	95% Chebyshev (Mean, Sd) UCL	0.027	*	0.027		0.027
Vanadium	2 / 10	20%	0.63 : 0.63	0.91 - 0.95	0.44	0.26	0.591	1.785	Non-parametric	0.596133	Modified-t UCL	0.95	*	0.95		0.95

Notes: 1. For 10 samples, the non-parametric 95th percentile is the 10th ordered sample, i.e., the same as the maximum.
2. For 10 samples, the non-parametric one-sided 95% UCL on the mean is the 8th ordered sample.
3. The Student-t value for 10-1 = 9 degrees of freedom and 95% level of confidence is 1.833.
4. The factor for a one-sided 95% coverage, 95% tolerance limit on 10 samples is 2.911.
5. * - To determine a one-sided 95/95 UTL for a non-parametric distribution requires more samples than available.
6. G/NP - PROUCL recommended a gamma distribution for determining the 95% UCL on the mean, other statistics generated assuming a non-parametric distribution.
7. The mean and standard deviation are computed with NDs replaced with DL/2.

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Methyl ethyl ketone	T SW8
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.849047
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.00325	Data are normal at 5% significance level	
Maximum	0.066		
Mean	0.022115	95% UCL (Assuming Normal Distribution)	
Median	0.0135	Student's-t UCL	0.033776
Standard Deviation	0.020116		
Variance	0.000405	Gamma Distribution Test	
Coefficient of Variation	0.909629	A-D Test Statistic	0.385899
Skewness	1.232521	A-D 5% Critical Value	0.741299
		K-S Test Statistic	0.200285
Gamma Statistics		K-S 5% Critical Value	0.271722
k hat	1.38556	Data follow gamma distribution	
k star (bias corrected)	1.036559	at 5% significance level	
Theta hat	0.015961		
Theta star	0.021335	95% UCLs (Assuming Gamma Distribution)	
nu hat	27.71121	Approximate Gamma UCL	0.040251
nu star	20.73118	Adjusted Gamma UCL	0.044918
Approx.Chi Square Value (.05)	11.39039		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	10.20677	Shapiro-Wilk Test Statisitic	0.947682
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-5.7291		
Maximum of log data	-2.718101	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.213898	95% H-UCL	0.064972
Standard Deviation of log data	0.97986	95% Chebyshev (MVUE) UCL	0.054161
Variance of log data	0.960126	97.5% Chebyshev (MVUE) UCL	0.067892
		99% Chebyshev (MVUE) UCL	0.094865
		95% Non-parametric UCLs	
		CLT UCL	0.032579
		Adj-CLT UCL (Adjusted for skewness)	0.035228
		Mod-t UCL (Adjusted for skewness)	0.034189
		Jackknife UCL	0.033776
		Standard Bootstrap UCL	0.032296
		Bootstrap-t UCL	0.038267
RECOMMENDATION		Hall's Bootstrap UCL	0.035205
Data are normal (0.05)		Percentile Bootstrap UCL	0.03225
		BCA Bootstrap UCL	0.03405
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.049844
		97.5% Chebyshev (Mean, Sd) UCL	0.061842
		99% Chebyshev (Mean, Sd) UCL	0.08541

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Methyl Tertbutyl Ether T SV
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.647424
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.00025	Data not normal at 5% significance level	
Maximum	0.00033		
Mean	0.00027	95% UCL (Assuming Normal Distribution)	
Median	0.00025	Student's-t UCL	0.000289
Standard Deviation	3.3E-005		
Variance	1.09E-009	Gamma Distribution Test	
Coefficient of Variation	0.122216	A-D Test Statistic	1.890091
Skewness	1.205998	A-D 5% Critical Value	0.724068
		K-S Test Statistic	0.439296
Gamma Statistics		K-S 5% Critical Value	0.265824
k hat	79.7879	Data do not follow gamma distribution	
k star (bias corrected)	55.9182	at 5% significance level	
Theta hat	3.38E-006		
Theta star	4.83E-006	95% UCLs (Assuming Gamma Distribution)	
nu hat	1595.758	Approximate Gamma UCL	0.00029
nu star	1118.364	Adjusted Gamma UCL	0.000293
Approx.Chi Square Value (.05)	1041.71		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	1028.824	Shapiro-Wilk Test Statisitic	0.64452
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-8.29405		
Maximum of log data	-8.016418	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-8.223368	95% H-UCL	0.00029
Standard Deviation of log data	0.116095	95% Chebyshev (MVUE) UCL	0.000313
Variance of log data	0.013478	97.5% Chebyshev (MVUE) UCL	0.000332
		99% Chebyshev (MVUE) UCL	0.000369
		95% Non-parametric UCLs	
		CLT UCL	0.000287
		Adj-CLT UCL (Adjusted for skewness)	0.000291
		Mod-t UCL (Adjusted for skewness)	0.00029
		Jackknife UCL	0.000289
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.000315
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	0.000335
		99% Chebyshev (Mean, Sd) UCL	0.000374

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Aluminum T SW846 3005/(

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.461703
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	6.25	Data not normal at 5% significance level	
Maximum	4790		
Mean	601.09	95% UCL (Assuming Normal Distribution)	
Median	42.85	Student's-t UCL	1469.215
Standard Deviation	1497.59		
Variance	2242775	Gamma Distribution Test	
Coefficient of Variation	2.491457	A-D Test Statistic	1.560923
Skewness	2.981465	A-D 5% Critical Value	0.809499
		K-S Test Statistic	0.404668
Gamma Statistics		K-S 5% Critical Value	0.287054
k hat	0.322503	Data do not follow gamma distribution	
k star (bias corrected)	0.292419	at 5% significance level	
Theta hat	1863.825		
Theta star	2055.577	95% UCLs (Assuming Gamma Distribution)	
nu hat	6.450068	Approximate Gamma UCL	2250.006
nu star	5.848381	Adjusted Gamma UCL	2903.28
Approx.Chi Square Value (.05)	1.562398		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	1.210839	Shapiro-Wilk Test Statisitic	0.837086
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.832581		
Maximum of log data	8.474286	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.285678	95% H-UCL	13738.09
Standard Deviation of log data	1.933341	95% Chebyshev (MVUE) UCL	1206.87
Variance of log data	3.737807	97.5% Chebyshev (MVUE) UCL	1589.972
		99% Chebyshev (MVUE) UCL	2342.501
		95% Non-parametric UCLs	
		CLT UCL	1380.059
		Adj-CLT UCL (Adjusted for skewness)	1857.152
		Mod-t UCL (Adjusted for skewness)	1543.631
		Jackknife UCL	1469.215
		Standard Bootstrap UCL	1335.669
		Bootstrap-t UCL	44850.68
RECOMMENDATION		Hall's Bootstrap UCL	12950.1
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1469.53
		BCA Bootstrap UCL	1942.98
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2665.375
		97.5% Chebyshev (Mean, Sd) UCL	3558.593
		99% Chebyshev (Mean, Sd) UCL	5313.146

Recommended UCL exceeds the maximum observation

Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Barium T SW846 3005/602

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.498446
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.842
Minimum	16.2	Data not normal at 5% significance level	
Maximum	89.1		
Mean	26.37	95% UCL (Assuming Normal Distribution)	
Median	18.45	Student's-t UCL	39.47068
Standard Deviation	22.59981		
Variance	510.7512	Gamma Distribution Test	
Coefficient of Variation	0.857027	A-D Test Statistic	2.0575
Skewness	2.90834	A-D 5% Critical Value	0.732228
		K-S Test Statistic	0.444626
Gamma Statistics		K-S 5% Critical Value	0.268469
k hat	2.98592	Data do not follow gamma distribution	
k star (bias corrected)	2.156811	at 5% significance level	
Theta hat	8.831448		
Theta star	12.22638	95% UCLs (Assuming Gamma Distribution)	
nu hat	59.71841	Approximate Gamma UCL	39.12412
nu star	43.13622	Adjusted Gamma UCL	42.00333
Approx.Chi Square Value (.05)	29.07419		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	27.08123	Shapiro-Wilk Test Statisitic	0.602431
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	2.785011		
Maximum of log data	4.489759	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.095527	95% H-UCL	38.01559
Standard Deviation of log data	0.531486	95% Chebyshev (MVUE) UCL	43.78154
Variance of log data	0.282477	97.5% Chebyshev (MVUE) UCL	51.88304
		99% Chebyshev (MVUE) UCL	67.79687
		95% Non-parametric UCLs	
		CLT UCL	38.12525
		Adj-CLT UCL (Adjusted for skewness)	45.14838
		Mod-t UCL (Adjusted for skewness)	40.56615
		Jackknife UCL	39.47068
		Standard Bootstrap UCL	37.31136
		Bootstrap-t UCL	238.3616
RECOMMENDATION		Hall's Bootstrap UCL	151.2369
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	39.29
		BCA Bootstrap UCL	46.32
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	57.52168
		97.5% Chebyshev (Mean, Sd) UCL	71.00104
		99% Chebyshev (Mean, Sd) UCL	97.47863

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Beryllium T	SW846 3005/6

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.412045
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.0125	Data not normal at 5% significance level	
Maximum	0.28		
Mean	0.0418	95% UCL (Assuming Normal Distribution)	
Median	0.0125	Student's-t UCL	0.090538
Standard Deviation	0.084078		
Variance	0.007069	Gamma Distribution Test	
Coefficient of Variation	2.011429	A-D Test Statistic	2.677158
Skewness	3.111236	A-D 5% Critical Value	0.756587
		K-S Test Statistic	0.480481
Gamma Statistics		K-S 5% Critical Value	0.275882
k hat	0.761016	Data do not follow gamma distribution	
k star (bias corrected)	0.599378	at 5% significance level	
Theta hat	0.054927		
Theta star	0.069739	95% UCLs (Assuming Gamma Distribution)	
nu hat	15.22032	Approximate Gamma UCL	0.096032
nu star	11.98756	Adjusted Gamma UCL	0.112184
Approx.Chi Square Value (.05)	5.217831		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	4.46661	Shapiro-Wilk Test Statisitic	0.5069
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-4.382027		
Maximum of log data	-1.272966	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.959935	95% H-UCL	0.090053
Standard Deviation of log data	1.006693	95% Chebyshev (MVUE) UCL	0.072592
Variance of log data	1.01343	97.5% Chebyshev (MVUE) UCL	0.09121
		99% Chebyshev (MVUE) UCL	0.127782
		95% Non-parametric UCLs	
		CLT UCL	0.085533
		Adj-CLT UCL (Adjusted for skewness)	0.113484
		Mod-t UCL (Adjusted for skewness)	0.094898
		Jackknife UCL	0.090538
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.157693
		97.5% Chebyshev (Mean, Sd) UCL	0.20784
		99% Chebyshev (Mean, Sd) UCL	0.306344

Recommended UCL exceeds the maximum observation

Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Cadmium T	SW846 3005/6
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.458708
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.0065	Data not normal at 5% significance level	
Maximum	0.95		
Mean	0.1202	95% UCL (Assuming Normal Distribution)	
Median	0.0065	Student's-t UCL	0.29285
Standard Deviation	0.297836		
Variance	0.088706	Gamma Distribution Test	
Coefficient of Variation	2.477839	A-D Test Statistic	2.470542
Skewness	2.944546	A-D 5% Critical Value	0.808599
		K-S Test Statistic	0.502612
Gamma Statistics		K-S 5% Critical Value	0.286882
k hat	0.327415	Data do not follow gamma distribution	
k star (bias corrected)	0.295857	at 5% significance level	
Theta hat	0.367118		
Theta star	0.406277	95% UCLs (Assuming Gamma Distribution)	
nu hat	6.548303	Approximate Gamma UCL	0.44531
nu star	5.917146	Adjusted Gamma UCL	0.573393
Approx.Chi Square Value (.05)	1.597183		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	1.240408	Shapiro-Wilk Test Statisitic	0.538983
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.035953		
Maximum of log data	-0.051293	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.194836	95% H-UCL	1.532254
Standard Deviation of log data	1.810864	95% Chebyshev (MVUE) UCL	0.203534
Variance of log data	3.279228	97.5% Chebyshev (MVUE) UCL	0.267152
		99% Chebyshev (MVUE) UCL	0.392119
		95% Non-parametric UCLs	
		CLT UCL	0.275119
		Adj-CLT UCL (Adjusted for skewness)	0.368827
		Mod-t UCL (Adjusted for skewness)	0.307467
		Jackknife UCL	0.29285
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.530739
		97.5% Chebyshev (Mean, Sd) UCL	0.708379
		99% Chebyshev (Mean, Sd) UCL	1.05732
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Calcium T SW846 3005/60

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.928197
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	17400	Data are normal at 5% significance level	
Maximum	20000		
Mean	18580	95% UCL (Assuming Normal Distribution)	
Median	18600	Student's-t UCL	19000.51
Standard Deviation	725.4118		
Variance	526222.2	Gamma Distribution Test	
Coefficient of Variation	0.039043	A-D Test Statistic	0.446567
Skewness	0.141986	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.201172
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	729.7078	Data follow gamma distribution	
k star (bias corrected)	510.8621	at 5% significance level	
Theta hat	25.46225		
Theta star	36.36989	95% UCLs (Assuming Gamma Distribution)	
nu hat	14594.16	Approximate Gamma UCL	19015.57
nu star	10217.24	Adjusted Gamma UCL	19092.7
Approx.Chi Square Value (.05)	9983.204		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	9942.877	Shapiro-Wilk Test Statisitic	0.92867
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	9.764225		
Maximum of log data	9.903488	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.829156	95% H-UCL	N/A
Standard Deviation of log data	0.039025	95% Chebyshev (MVUE) UCL	19579.57
Variance of log data	0.001523	97.5% Chebyshev (MVUE) UCL	20012.09
		99% Chebyshev (MVUE) UCL	20861.68
		95% Non-parametric UCLs	
		CLT UCL	18957.32
		Adj-CLT UCL (Adjusted for skewness)	18968.33
		Mod-t UCL (Adjusted for skewness)	19002.22
		Jackknife UCL	19000.51
		Standard Bootstrap UCL	18939.72
		Bootstrap-t UCL	19000.49
RECOMMENDATION		Hall's Bootstrap UCL	19059.79
Data are normal (0.05)		Percentile Bootstrap UCL	18940
		BCA Bootstrap UCL	18960
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	19579.91
		97.5% Chebyshev (Mean, Sd) UCL	20012.57
		99% Chebyshev (Mean, Sd) UCL	20862.45

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Chromium T SW846 3005/

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.462627
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.07	Data not normal at 5% significance level	
Maximum	52.2		
Mean	6.414	95% UCL (Assuming Normal Distribution)	
Median	0.1375	Student's-t UCL	15.94392
Standard Deviation	16.43993		
Variance	270.2711	Gamma Distribution Test	
Coefficient of Variation	2.563131	A-D Test Statistic	1.885652
Skewness	2.941049	A-D 5% Critical Value	0.838281
		K-S Test Statistic	0.440547
Gamma Statistics		K-S 5% Critical Value	0.291656
k hat	0.238853	Data do not follow gamma distribution	
k star (bias corrected)	0.233864	at 5% significance level	
Theta hat	26.85332		
Theta star	27.42621	95% UCLs (Assuming Gamma Distribution)	
nu hat	4.777063	Approximate Gamma UCL	29.82859
nu star	4.677278	Adjusted Gamma UCL	40.19406
Approx.Chi Square Value (.05)	1.005749		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	0.74638	Shapiro-Wilk Test Statisitic	0.696881
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-2.65926		
Maximum of log data	3.955082	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.137166	95% H-UCL	743.174
Standard Deviation of log data	2.364227	95% Chebyshev (MVUE) UCL	11.31716
Variance of log data	5.589571	97.5% Chebyshev (MVUE) UCL	15.05407
		99% Chebyshev (MVUE) UCL	22.39451
		95% Non-parametric UCLs	
		CLT UCL	14.9652
		Adj-CLT UCL (Adjusted for skewness)	20.13154
		Mod-t UCL (Adjusted for skewness)	16.74976
		Jackknife UCL	15.94392
		Standard Bootstrap UCL	14.68376
		Bootstrap-t UCL	1289.692
RECOMMENDATION		Hall's Bootstrap UCL	619.2703
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	15.7885
		BCA Bootstrap UCL	17.9215
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	29.07487
		97.5% Chebyshev (Mean, Sd) UCL	38.88025
		99% Chebyshev (Mean, Sd) UCL	58.14102
Recommended UCL exceeds the maximum observation			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Cobalt T SW846 3005/602

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.503474
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.175	Data not normal at 5% significance level	
Maximum	8		
Mean	1.3485	95% UCL (Assuming Normal Distribution)	
Median	0.45	Student's-t UCL	2.738618
Standard Deviation	2.398073		
Variance	5.750756	Gamma Distribution Test	
Coefficient of Variation	1.778327	A-D Test Statistic	1.620802
Skewness	2.90129	A-D 5% Critical Value	0.755277
		K-S Test Statistic	0.400717
Gamma Statistics		K-S 5% Critical Value	0.275546
k hat	0.798639	Data do not follow gamma distribution	
k star (bias corrected)	0.625714	at 5% significance level	
Theta hat	1.688498		
Theta star	2.155138	95% UCLs (Assuming Gamma Distribution)	
nu hat	15.97278	Approximate Gamma UCL	3.031556
nu star	12.51428	Adjusted Gamma UCL	3.526124
Approx.Chi Square Value (.05)	5.566614		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	4.785851	Shapiro-Wilk Test Statisitic	0.782113
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.742969		
Maximum of log data	2.079442	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.444303	95% H-UCL	3.683328
Standard Deviation of log data	1.075884	95% Chebyshev (MVUE) UCL	2.702544
Variance of log data	1.157527	97.5% Chebyshev (MVUE) UCL	3.415116
		99% Chebyshev (MVUE) UCL	4.814827
		95% Non-parametric UCLs	
		CLT UCL	2.595854
		Adj-CLT UCL (Adjusted for skewness)	3.339274
		Mod-t UCL (Adjusted for skewness)	2.854576
		Jackknife UCL	2.738618
		Standard Bootstrap UCL	2.540766
		Bootstrap-t UCL	23.19396
RECOMMENDATION		Hall's Bootstrap UCL	17.13957
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.707
		BCA Bootstrap UCL	3.6005
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	4.654016
		97.5% Chebyshev (Mean, Sd) UCL	6.084315
		99% Chebyshev (Mean, Sd) UCL	8.893862

Recommended UCL exceeds the maximum observation

Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Iron T SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.527397
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	105	Data not normal at 5% significance level	
Maximum	8690		
Mean	1572.7	95% UCL (Assuming Normal Distribution)	
Median	647	Student's-t UCL	3064.882
Standard Deviation	2574.143		
Variance	6626212	Gamma Distribution Test	
Coefficient of Variation	1.636767	A-D Test Statistic	1.315093
Skewness	2.868381	A-D 5% Critical Value	0.753276
		K-S Test Statistic	0.379268
Gamma Statistics		K-S 5% Critical Value	0.275033
k hat	0.856163	Data do not follow gamma distribution	
k star (bias corrected)	0.665981	at 5% significance level	
Theta hat	1836.917		
Theta star	2361.48	95% UCLs (Assuming Gamma Distribution)	
nu hat	17.12326	Approximate Gamma UCL	3430.024
nu star	13.31961	Adjusted Gamma UCL	3965.637
Approx.Chi Square Value (.05)	6.107175		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	5.282317	Shapiro-Wilk Test Statisitic	0.845254
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.65396		
Maximum of log data	9.069928	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.673418	95% H-UCL	5349.166
Standard Deviation of log data	1.130423	95% Chebyshev (MVUE) UCL	3615.526
Variance of log data	1.277856	97.5% Chebyshev (MVUE) UCL	4587.808
		99% Chebyshev (MVUE) UCL	6497.666
		95% Non-parametric UCLs	
		CLT UCL	2911.636
		Adj-CLT UCL (Adjusted for skewness)	3700.587
		Mod-t UCL (Adjusted for skewness)	3187.943
		Jackknife UCL	3064.882
		Standard Bootstrap UCL	2840.709
		Bootstrap-t UCL	14989.49
RECOMMENDATION		Hall's Bootstrap UCL	16036.21
Data are lognormal (0.05)		Percentile Bootstrap UCL	3066.7
		BCA Bootstrap UCL	3981.4
Use 95% Chebyshev (MVUE) UCL		95% Chebyshev (Mean, Sd) UCL	5120.911
		97.5% Chebyshev (Mean, Sd) UCL	6656.225
		99% Chebyshev (Mean, Sd) UCL	9672.051

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Lead T SW846 3005/6020

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.494343
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.11	Data not normal at 5% significance level	
Maximum	84.5		
Mean	11.521	95% UCL (Assuming Normal Distribution)	
Median	1.5	Student's-t UCL	26.79896
Standard Deviation	26.3558		
Variance	694.6281	Gamma Distribution Test	
Coefficient of Variation	2.287631	A-D Test Statistic	1.116407
Skewness	2.887691	A-D 5% Critical Value	0.79957
		K-S Test Statistic	0.35401
Gamma Statistics		K-S 5% Critical Value	0.285159
k hat	0.376715	Data do not follow gamma distribution	
k star (bias corrected)	0.330367	at 5% significance level	
Theta hat	30.58284		
Theta star	34.87335	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.534292	Approximate Gamma UCL	38.89487
nu star	6.607337	Adjusted Gamma UCL	49.13815
Approx.Chi Square Value (.05)	1.957151		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	1.549166	Shapiro-Wilk Test Statisitic	0.927233
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-2.207275		
Maximum of log data	4.436752	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.680377	95% H-UCL	271.9675
Standard Deviation of log data	1.87181	95% Chebyshev (MVUE) UCL	29.54693
Variance of log data	3.503671	97.5% Chebyshev (MVUE) UCL	38.85638
		99% Chebyshev (MVUE) UCL	57.14299
		95% Non-parametric UCLs	
		CLT UCL	25.22993
		Adj-CLT UCL (Adjusted for skewness)	33.36211
		Mod-t UCL (Adjusted for skewness)	28.06742
		Jackknife UCL	26.79896
		Standard Bootstrap UCL	24.76829
		Bootstrap-t UCL	340.3379
RECOMMENDATION		Hall's Bootstrap UCL	133.3652
Data are lognormal (0.05)		Percentile Bootstrap UCL	28.016
		BCA Bootstrap UCL	34.84
Use 99% Chebyshev (MVUE) UCL		95% Chebyshev (Mean, Sd) UCL	47.84996
		97.5% Chebyshev (Mean, Sd) UCL	63.56953
		99% Chebyshev (Mean, Sd) UCL	94.44758

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Magnesium T	SW846 3005
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.609393
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.842
Minimum	4260	Data not normal at 5% significance level	
Maximum	5930		
Mean	4630	95% UCL (Assuming Normal Distribution)	
Median	4495	Student's-t UCL	4903.374
Standard Deviation	471.593		
Variance	222400	Gamma Distribution Test	
Coefficient of Variation	0.101856	A-D Test Statistic	1.572244
Skewness	2.795674	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.378465
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	122.4715	Data do not follow gamma distribution	
k star (bias corrected)	85.79672	at 5% significance level	
Theta hat	37.80471		
Theta star	53.96476	95% UCLs (Assuming Gamma Distribution)	
nu hat	2449.43	Approximate Gamma UCL	4902.048
nu star	1715.934	Adjusted Gamma UCL	4951.307
Approx.Chi Square Value (.05)	1620.706		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	1604.582	Shapiro-Wilk Test Statisitic	0.644856
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	8.357024		
Maximum of log data	8.687779	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.436224	95% H-UCL	N/A
Standard Deviation of log data	0.092213	95% Chebyshev (MVUE) UCL	5217.54
Variance of log data	0.008503	97.5% Chebyshev (MVUE) UCL	5472.296
		99% Chebyshev (MVUE) UCL	5972.714
		95% Non-parametric UCLs	
		CLT UCL	4875.298
		Adj-CLT UCL (Adjusted for skewness)	5016.173
		Mod-t UCL (Adjusted for skewness)	4925.347
		Jackknife UCL	4903.374
		Standard Bootstrap UCL	4862.259
		Bootstrap-t UCL	5401.171
RECOMMENDATION		Hall's Bootstrap UCL	5910.87
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	4908
		BCA Bootstrap UCL	5024
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	5280.046
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	5561.322
		99% Chebyshev (Mean, Sd) UCL	6113.833

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Manganese T	SW846 3005
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.536605
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	48.7	Data not normal at 5% significance level	
Maximum	483		
Mean	118.83	95% UCL (Assuming Normal Distribution)	
Median	67.7	Student's-t UCL	196.2158
Standard Deviation	133.4971		
Variance	17821.48	Gamma Distribution Test	
Coefficient of Variation	1.12343	A-D Test Statistic	1.772282
Skewness	2.758715	A-D 5% Critical Value	0.737042
		K-S Test Statistic	0.409678
Gamma Statistics		K-S 5% Critical Value	0.270335
k hat	1.799667	Data do not follow gamma distribution	
k star (bias corrected)	1.326433	at 5% significance level	
Theta hat	66.02889		
Theta star	89.58611	95% UCLs (Assuming Gamma Distribution)	
nu hat	35.99333	Approximate Gamma UCL	199.7059
nu star	26.52867	Adjusted Gamma UCL	219.489
Approx.Chi Square Value (.05)	15.78522		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	14.36246	Shapiro-Wilk Test Statisitic	0.692804
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	3.885679		
Maximum of log data	6.180017	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.474838	95% H-UCL	200.0345
Standard Deviation of log data	0.69373	95% Chebyshev (MVUE) UCL	215.5452
Variance of log data	0.481261	97.5% Chebyshev (MVUE) UCL	261.8369
		99% Chebyshev (MVUE) UCL	352.768
		95% Non-parametric UCLs	
		CLT UCL	188.2683
		Adj-CLT UCL (Adjusted for skewness)	227.6196
		Mod-t UCL (Adjusted for skewness)	202.3538
		Jackknife UCL	196.2158
		Standard Bootstrap UCL	184.058
		Bootstrap-t UCL	1096.894
RECOMMENDATION		Hall's Bootstrap UCL	841.8009
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	190.91
		BCA Bootstrap UCL	243.25
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	302.8431
		97.5% Chebyshev (Mean, Sd) UCL	382.4657
		99% Chebyshev (Mean, Sd) UCL	538.8689

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Mercury T SW846 7470A
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.463462
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.0185	Data not normal at 5% significance level	
Maximum	0.2		
Mean	0.0406	95% UCL (Assuming Normal Distribution)	
Median	0.0185	Student's-t UCL	0.073854
Standard Deviation	0.057367		
Variance	0.003291	Gamma Distribution Test	
Coefficient of Variation	1.412972	A-D Test Statistic	2.487861
Skewness	2.919921	A-D 5% Critical Value	0.742951
		K-S Test Statistic	0.484556
Gamma Statistics		K-S 5% Critical Value	0.272202
k hat	1.294219	Data do not follow gamma distribution	
k star (bias corrected)	0.97262	at 5% significance level	
Theta hat	0.03137		
Theta star	0.041743	95% UCLs (Assuming Gamma Distribution)	
nu hat	25.88439	Approximate Gamma UCL	0.075597
nu star	19.4524	Adjusted Gamma UCL	0.084736
Approx.Chi Square Value (.05)	10.44701		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	9.320322	Shapiro-Wilk Test Statisitic	0.529615
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-3.989985		
Maximum of log data	-1.609438	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.637663	95% H-UCL	0.074321
Standard Deviation of log data	0.798011	95% Chebyshev (MVUE) UCL	0.074506
Variance of log data	0.636822	97.5% Chebyshev (MVUE) UCL	0.091687
		99% Chebyshev (MVUE) UCL	0.125436
		95% Non-parametric UCLs	
		CLT UCL	0.070439
		Adj-CLT UCL (Adjusted for skewness)	0.088337
		Mod-t UCL (Adjusted for skewness)	0.076646
		Jackknife UCL	0.073854
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.119674
		97.5% Chebyshev (Mean, Sd) UCL	0.15389
		99% Chebyshev (Mean, Sd) UCL	0.2211

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Molybdenum T SW846 30(

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.638092
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.842
Minimum	1.5	Data not normal at 5% significance level	
Maximum	2.5		
Mean	1.75	95% UCL (Assuming Normal Distribution)	
Median	1.7	Student's-t UCL	1.909924
Standard Deviation	0.275882		
Variance	0.076111	Gamma Distribution Test	
Coefficient of Variation	0.157647	A-D Test Statistic	1.455433
Skewness	2.639176	A-D 5% Critical Value	0.72435
		K-S Test Statistic	0.3658
Gamma Statistics		K-S 5% Critical Value	0.265856
k hat	53.66104	Data do not follow gamma distribution	
k star (bias corrected)	37.6294	at 5% significance level	
Theta hat	0.032612		
Theta star	0.046506	95% UCLs (Assuming Gamma Distribution)	
nu hat	1073.221	Approximate Gamma UCL	1.908967
nu star	752.5879	Adjusted Gamma UCL	1.938321
Approx.Chi Square Value (.05)	689.9172		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	679.4688	Shapiro-Wilk Test Statisitic	0.695013
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.405465		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.550269	95% H-UCL	1.903888
Standard Deviation of log data	0.137906	95% Chebyshev (MVUE) UCL	2.081513
Variance of log data	0.019018	97.5% Chebyshev (MVUE) UCL	2.225561
		99% Chebyshev (MVUE) UCL	2.508516
		95% Non-parametric UCLs	
		CLT UCL	1.8935
		Adj-CLT UCL (Adjusted for skewness)	1.971299
		Mod-t UCL (Adjusted for skewness)	1.922059
		Jackknife UCL	1.909924
		Standard Bootstrap UCL	1.883801
		Bootstrap-t UCL	2.184022
RECOMMENDATION		Hall's Bootstrap UCL	2.612348
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.91
		BCA Bootstrap UCL	1.93
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	2.130278
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	2.294824
		99% Chebyshev (Mean, Sd) UCL	2.618044

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Nickel T SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.550915
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	1.55	Data not normal at 5% significance level	
Maximum	17.5		
Mean	3.915	95% UCL (Assuming Normal Distribution)	
Median	1.75	Student's-t UCL	6.786586
Standard Deviation	4.953733		
Variance	24.53947	Gamma Distribution Test	
Coefficient of Variation	1.265321	A-D Test Statistic	1.421669
Skewness	2.789434	A-D 5% Critical Value	0.740367
		K-S Test Statistic	0.302102
Gamma Statistics		K-S 5% Critical Value	0.271451
k hat	1.43713	Data do not follow gamma distribution	
k star (bias corrected)	1.072658	at 5% significance level	
Theta hat	2.724179		
Theta star	3.649813	95% UCLs (Assuming Gamma Distribution)	
nu hat	28.7426	Approximate Gamma UCL	7.041549
nu star	21.45315	Adjusted Gamma UCL	7.840194
Approx.Chi Square Value (.05)	11.92765		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	10.71263	Shapiro-Wilk Test Statisitic	0.740539
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.438255		
Maximum of log data	2.862201	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.978188	95% H-UCL	7.374371
Standard Deviation of log data	0.789536	95% Chebyshev (MVUE) UCL	7.442912
Variance of log data	0.623367	97.5% Chebyshev (MVUE) UCL	9.15027
		99% Chebyshev (MVUE) UCL	12.50404
		95% Non-parametric UCLs	
		CLT UCL	6.491676
		Adj-CLT UCL (Adjusted for skewness)	7.968162
		Mod-t UCL (Adjusted for skewness)	7.016888
		Jackknife UCL	6.786586
		Standard Bootstrap UCL	6.348789
		Bootstrap-t UCL	19.4361
RECOMMENDATION		Hall's Bootstrap UCL	16.28284
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	6.755
		BCA Bootstrap UCL	8.255
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	10.74325
		97.5% Chebyshev (Mean, Sd) UCL	13.69784
		99% Chebyshev (Mean, Sd) UCL	19.50156

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Potassium T SW846 3005/	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.967356
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	6330	Data are normal at 5% significance level	
Maximum	7070		
Mean	6709	95% UCL (Assuming Normal Distribution)	
Median	6670	Student's-t UCL	6846.57
Standard Deviation	237.3207		
Variance	56321.11	Gamma Distribution Test	
Coefficient of Variation	0.035373	A-D Test Statistic	0.203109
Skewness	0.107191	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.121539
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	888.8933	Data follow gamma distribution	
k star (bias corrected)	622.292	at 5% significance level	
Theta hat	7.547588		
Theta star	10.78111	95% UCLs (Assuming Gamma Distribution)	
nu hat	17777.87	Approximate Gamma UCL	6851.259
nu star	12445.84	Adjusted Gamma UCL	6876.411
Approx.Chi Square Value (.05)	12187.42		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	12142.84	Shapiro-Wilk Test Statisitic	0.968683
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.753056		
Maximum of log data	8.863616	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.810643	95% H-UCL	N/A
Standard Deviation of log data	0.035353	95% Chebyshev (MVUE) UCL	7035.967
Variance of log data	0.00125	97.5% Chebyshev (MVUE) UCL	7177.447
		99% Chebyshev (MVUE) UCL	7455.357
		95% Non-parametric UCLs	
		CLT UCL	6832.442
		Adj-CLT UCL (Adjusted for skewness)	6835.16
		Mod-t UCL (Adjusted for skewness)	6846.994
		Jackknife UCL	6846.57
		Standard Bootstrap UCL	6828.643
		Bootstrap-t UCL	6854.355
RECOMMENDATION		Hall's Bootstrap UCL	6844.498
Data are normal (0.05)		Percentile Bootstrap UCL	6825
		BCA Bootstrap UCL	6830
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7036.124
		97.5% Chebyshev (Mean, Sd) UCL	7177.671
		99% Chebyshev (Mean, Sd) UCL	7455.712

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Silver T SW846 3005/6020	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.466156
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.002	Data not normal at 5% significance level	
Maximum	1.7		
Mean	0.2136	95% UCL (Assuming Normal Distribution)	
Median	0.01425	Student's-t UCL	0.522217
Standard Deviation	0.532391		
Variance	0.28344	Gamma Distribution Test	
Coefficient of Variation	2.492467	A-D Test Statistic	1.365384
Skewness	2.963887	A-D 5% Critical Value	0.813765
		K-S Test Statistic	0.397368
Gamma Statistics		K-S 5% Critical Value	0.287862
k hat	0.29964	Data do not follow gamma distribution	
k star (bias corrected)	0.276415	at 5% significance level	
Theta hat	0.712856		
Theta star	0.772752	95% UCLs (Assuming Gamma Distribution)	
nu hat	5.992797	Approximate Gamma UCL	0.841477
nu star	5.528291	Adjusted Gamma UCL	1.09713
Approx.Chi Square Value (.05)	1.403298		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	1.076302	Shapiro-Wilk Test Statisitic	0.867221
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-6.214608		
Maximum of log data	0.530628	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.845415	95% H-UCL	10.23121
Standard Deviation of log data	2.10332	95% Chebyshev (MVUE) UCL	0.47593
Variance of log data	4.423953	97.5% Chebyshev (MVUE) UCL	0.629745
		99% Chebyshev (MVUE) UCL	0.931884
		95% Non-parametric UCLs	
		CLT UCL	0.490522
		Adj-CLT UCL (Adjusted for skewness)	0.659128
		Mod-t UCL (Adjusted for skewness)	0.548516
		Jackknife UCL	0.522217
		Standard Bootstrap UCL	0.471745
		Bootstrap-t UCL	14.74378
RECOMMENDATION		Hall's Bootstrap UCL	4.744851
Data are lognormal (0.05)		Percentile Bootstrap UCL	0.5186
		BCA Bootstrap UCL	0.68775
Use 99% Chebyshev (MVUE) UCL		95% Chebyshev (Mean, Sd) UCL	0.94745
		97.5% Chebyshev (Mean, Sd) UCL	1.264988
		99% Chebyshev (Mean, Sd) UCL	1.888729

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Sodium T SW846 3005/60	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.907025
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	49000	Data are normal at 5% significance level	
Maximum	65100		
Mean	57070	95% UCL (Assuming Normal Distribution)	
Median	58500	Student's-t UCL	60626.33
Standard Deviation	6134.973		
Variance	37637889	Gamma Distribution Test	
Coefficient of Variation	0.107499	A-D Test Statistic	0.441119
Skewness	-0.101568	A-D 5% Critical Value	0.723904
		K-S Test Statistic	0.171247
Gamma Statistics		K-S 5% Critical Value	0.265806
k hat	95.00323	Data follow gamma distribution	
k star (bias corrected)	66.56893	at 5% significance level	
Theta hat	600.7164		
Theta star	857.3069	95% UCLs (Assuming Gamma Distribution)	
nu hat	1900.065	Approximate Gamma UCL	60900.62
nu star	1331.379	Adjusted Gamma UCL	61597.82
Approx.Chi Square Value (.05)	1247.635		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	1233.514	Shapiro-Wilk Test Statisitic	0.90269
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	10.79958		
Maximum of log data	11.08368	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	10.94676	95% H-UCL	60969.07
Standard Deviation of log data	0.108612	95% Chebyshev (MVUE) UCL	65624.46
Variance of log data	0.011797	97.5% Chebyshev (MVUE) UCL	69325.15
		99% Chebyshev (MVUE) UCL	76594.44
		95% Non-parametric UCLs	
		CLT UCL	60261.1
		Adj-CLT UCL (Adjusted for skewness)	60194.52
		Mod-t UCL (Adjusted for skewness)	60615.94
		Jackknife UCL	60626.33
		Standard Bootstrap UCL	60164.95
		Bootstrap-t UCL	60675.54
RECOMMENDATION		Hall's Bootstrap UCL	59775.86
Data are normal (0.05)		Percentile Bootstrap UCL	59760
		BCA Bootstrap UCL	59990
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	65526.48
		97.5% Chebyshev (Mean, Sd) UCL	69185.6
		99% Chebyshev (Mean, Sd) UCL	76373.24

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Titanium T SW846 3005/6(

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.460086
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.842
Minimum	3.5	Data not normal at 5% significance level	
Maximum	184		
Mean	25.29	95% UCL (Assuming Normal Distribution)	
Median	3.5	Student's-t UCL	58.16165
Standard Deviation	56.70643		
Variance	3215.619	Gamma Distribution Test	
Coefficient of Variation	2.242247	A-D Test Statistic	2.145947
Skewness	2.986879	A-D 5% Critical Value	0.776859
		K-S Test Statistic	0.41073
Gamma Statistics		K-S 5% Critical Value	0.280818
k hat	0.501641	Data do not follow gamma distribution	
k star (bias corrected)	0.417815	at 5% significance level	
Theta hat	50.41453		
Theta star	60.52912	95% UCLs (Assuming Gamma Distribution)	
nu hat	10.03282	Approximate Gamma UCL	71.82418
nu star	8.356308	Adjusted Gamma UCL	87.57987
Approx.Chi Square Value (.05)	2.942338		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	2.413009	Shapiro-Wilk Test Statisitic	0.617528
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.252763		
Maximum of log data	5.214936	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.964845	95% H-UCL	106.9233
Standard Deviation of log data	1.365767	95% Chebyshev (MVUE) UCL	46.75032
Variance of log data	1.865319	97.5% Chebyshev (MVUE) UCL	60.21552
		99% Chebyshev (MVUE) UCL	86.66531
		95% Non-parametric UCLs	
		CLT UCL	54.78576
		Adj-CLT UCL (Adjusted for skewness)	72.88375
		Mod-t UCL (Adjusted for skewness)	60.98457
		Jackknife UCL	58.16165
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	103.4544
		97.5% Chebyshev (Mean, Sd) UCL	137.2762
		99% Chebyshev (Mean, Sd) UCL	203.7126

Recommended UCL exceeds the maximum observation

Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bac	Variable:	Vanadium T SW846 3005/
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.440551
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.315	Data not normal at 5% significance level	
Maximum	9.6		
Mean	1.392	95% UCL (Assuming Normal Distribution)	
Median	0.315	Student's-t UCL	3.085546
Standard Deviation	2.921513		
Variance	8.53524	Gamma Distribution Test	
Coefficient of Variation	2.098788	A-D Test Statistic	2.529629
Skewness	3.02475	A-D 5% Critical Value	0.766405
		K-S Test Statistic	0.49139
Gamma Statistics		K-S 5% Critical Value	0.278275
k hat	0.63218	Data do not follow gamma distribution	
k star (bias corrected)	0.509193	at 5% significance level	
Theta hat	2.201903		
Theta star	2.733738	95% UCLs (Assuming Gamma Distribution)	
nu hat	12.64361	Approximate Gamma UCL	3.494927
nu star	10.18386	Adjusted Gamma UCL	4.156194
Approx.Chi Square Value (.05)	4.056145		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	3.410796	Shapiro-Wilk Test Statisitic	0.533083
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.155183		
Maximum of log data	2.261763	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.639191	95% H-UCL	3.876737
Standard Deviation of log data	1.157151	95% Chebyshev (MVUE) UCL	2.510456
Variance of log data	1.338999	97.5% Chebyshev (MVUE) UCL	3.191713
		99% Chebyshev (MVUE) UCL	4.52991
		95% Non-parametric UCLs	
		CLT UCL	2.91162
		Adj-CLT UCL (Adjusted for skewness)	3.855851
		Mod-t UCL (Adjusted for skewness)	3.232827
		Jackknife UCL	3.085546
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5.419028
		97.5% Chebyshev (Mean, Sd) UCL	7.161526
		99% Chebyshev (Mean, Sd) UCL	10.58433
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Zinc T SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.490456
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	2.9	Data not normal at 5% significance level	
Maximum	137		
Mean	20.815	95% UCL (Assuming Normal Distribution)	
Median	4.35	Student's-t UCL	45.12422
Standard Deviation	41.93549		
Variance	1758.586	Gamma Distribution Test	
Coefficient of Variation	2.014677	A-D Test Statistic	1.833351
Skewness	2.892691	A-D 5% Critical Value	0.768069
		K-S Test Statistic	0.382898
Gamma Statistics		K-S 5% Critical Value	0.27868
k hat	0.611407	Data do not follow gamma distribution	
k star (bias corrected)	0.494652	at 5% significance level	
Theta hat	34.04442		
Theta star	42.08012	95% UCLs (Assuming Gamma Distribution)	
nu hat	12.22814	Approximate Gamma UCL	53.15276
nu star	9.893033	Adjusted Gamma UCL	63.42631
Approx.Chi Square Value (.05)	3.874182		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	3.246657	Shapiro-Wilk Test Statisitic	0.709348
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.064711		
Maximum of log data	4.919981	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.027889	95% H-UCL	71.30507
Standard Deviation of log data	1.232674	95% Chebyshev (MVUE) UCL	40.52828
Variance of log data	1.519485	97.5% Chebyshev (MVUE) UCL	51.79022
		99% Chebyshev (MVUE) UCL	73.91213
		95% Non-parametric UCLs	
		CLT UCL	42.62768
		Adj-CLT UCL (Adjusted for skewness)	55.58945
		Mod-t UCL (Adjusted for skewness)	47.14599
		Jackknife UCL	45.12422
		Standard Bootstrap UCL	41.37111
		Bootstrap-t UCL	548.4771
RECOMMENDATION		Hall's Bootstrap UCL	377.7961
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	44.535
		BCA Bootstrap UCL	57.8
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	78.61909
		97.5% Chebyshev (Mean, Sd) UCL	103.631
		99% Chebyshev (Mean, Sd) UCL	152.7619
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Arsenic D SW846 3005/60

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.832206
Number of Unique Samples	7	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.48	Data not normal at 5% significance level	
Maximum	1.8		
Mean	1.082	95% UCL (Assuming Normal Distribution)	
Median	1.15	Student's-t UCL	1.405582
Standard Deviation	0.558207		
Variance	0.311596	Gamma Distribution Test	
Coefficient of Variation	0.515903	A-D Test Statistic	0.937565
Skewness	-0.042176	A-D 5% Critical Value	0.730504
		K-S Test Statistic	0.279512
Gamma Statistics		K-S 5% Critical Value	0.268072
k hat	3.600563	Data do not follow gamma distribution	
k star (bias corrected)	2.587061	at 5% significance level	
Theta hat	0.300509		
Theta star	0.418235	95% UCLs (Assuming Gamma Distribution)	
nu hat	72.01126	Approximate Gamma UCL	1.545774
nu star	51.74121	Adjusted Gamma UCL	1.647936
Approx.Chi Square Value (.05)	36.21746		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	33.97218	Shapiro-Wilk Test Statisitic	0.784112
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.733969		
Maximum of log data	0.587787	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.066436	95% H-UCL	1.77783
Standard Deviation of log data	0.593052	95% Chebyshev (MVUE) UCL	2.009243
Variance of log data	0.351711	97.5% Chebyshev (MVUE) UCL	2.40537
		99% Chebyshev (MVUE) UCL	3.183485
		95% Non-parametric UCLs	
		CLT UCL	1.372351
		Adj-CLT UCL (Adjusted for skewness)	1.369835
		Mod-t UCL (Adjusted for skewness)	1.40519
		Jackknife UCL	1.405582
		Standard Bootstrap UCL	1.358653
		Bootstrap-t UCL	1.404335
RECOMMENDATION		Hall's Bootstrap UCL	1.324799
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	1.356
		BCA Bootstrap UCL	1.346
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	1.851436
		97.5% Chebyshev (Mean, Sd) UCL	2.184371
		99% Chebyshev (Mean, Sd) UCL	2.838359
Recommended UCL exceeds the maximum observation			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Barium D SW846 3005/602

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.986747
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	16.5	Data are normal at 5% significance level	
Maximum	18.7		
Mean	17.51	95% UCL (Assuming Normal Distribution)	
Median	17.45	Student's-t UCL	17.88413
Standard Deviation	0.645411		
Variance	0.416556	Gamma Distribution Test	
Coefficient of Variation	0.03686	A-D Test Statistic	0.14218
Skewness	0.336061	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.130749
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	822.2174	Data follow gamma distribution	
k star (bias corrected)	575.6188	at 5% significance level	
Theta hat	0.021296		
Theta star	0.030419	95% UCLs (Assuming Gamma Distribution)	
nu hat	16444.35	Approximate Gamma UCL	17.8963
nu star	11512.38	Adjusted Gamma UCL	17.96464
Approx.Chi Square Value (.05)	11263.88		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	11221.03	Shapiro-Wilk Test Statisitic	0.989521
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.80336		
Maximum of log data	2.928524	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.862164	95% H-UCL	N/A
Standard Deviation of log data	0.03672	95% Chebyshev (MVUE) UCL	18.39635
Variance of log data	0.001348	97.5% Chebyshev (MVUE) UCL	18.77988
		99% Chebyshev (MVUE) UCL	19.53326
		95% Non-parametric UCLs	
		CLT UCL	17.84571
		Adj-CLT UCL (Adjusted for skewness)	17.86889
		Mod-t UCL (Adjusted for skewness)	17.88775
		Jackknife UCL	17.88413
		Standard Bootstrap UCL	17.82123
		Bootstrap-t UCL	17.90897
RECOMMENDATION		Hall's Bootstrap UCL	17.93467
Data are normal (0.05)		Percentile Bootstrap UCL	17.86
		BCA Bootstrap UCL	17.85
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	18.39964
		97.5% Chebyshev (Mean, Sd) UCL	18.78458
		99% Chebyshev (Mean, Sd) UCL	19.54074

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Calcium D SW846 3005/60	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.936906
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.842
Minimum	18000	Data are normal at 5% significance level	
Maximum	19800		
Mean	18950	95% UCL (Assuming Normal Distribution)	
Median	19100	Student's-t UCL	19305.51
Standard Deviation	613.279		
Variance	376111.1	Gamma Distribution Test	
Coefficient of Variation	0.032363	A-D Test Statistic	0.366068
Skewness	-0.274573	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.178606
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	1055.18	Data follow gamma distribution	
k star (bias corrected)	738.6927	at 5% significance level	
Theta hat	17.95902		
Theta star	25.65343	95% UCLs (Assuming Gamma Distribution)	
nu hat	21103.6	Approximate Gamma UCL	19318.3
nu star	14773.85	Adjusted Gamma UCL	19383.34
Approx.Chi Square Value (.05)	14492.19		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	14443.56	Shapiro-Wilk Test Statisitic	0.935055
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	9.798127		
Maximum of log data	9.893437	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.849085	95% H-UCL	N/A
Standard Deviation of log data	0.032498	95% Chebyshev (MVUE) UCL	19798.97
Variance of log data	0.001056	97.5% Chebyshev (MVUE) UCL	20166.31
		99% Chebyshev (MVUE) UCL	20887.87
		95% Non-parametric UCLs	
		CLT UCL	19269
		Adj-CLT UCL (Adjusted for skewness)	19251
		Mod-t UCL (Adjusted for skewness)	19302.7
		Jackknife UCL	19305.51
		Standard Bootstrap UCL	19257.28
		Bootstrap-t UCL	19289.39
RECOMMENDATION		Hall's Bootstrap UCL	19219.97
Data are normal (0.05)		Percentile Bootstrap UCL	19250
		BCA Bootstrap UCL	19240
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	19795.35
		97.5% Chebyshev (Mean, Sd) UCL	20161.13
		99% Chebyshev (Mean, Sd) UCL	20879.64

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Cobalt D SW846 3005/602

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.811912
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.175	Data not normal at 5% significance level	
Maximum	0.47		
Mean	0.305	95% UCL (Assuming Normal Distribution)	
Median	0.36	Student's-t UCL	0.373357
Standard Deviation	0.117922		
Variance	0.013906	Gamma Distribution Test	
Coefficient of Variation	0.386629	A-D Test Statistic	1.124934
Skewness	-0.099099	A-D 5% Critical Value	0.727922
		K-S Test Statistic	0.315556
Gamma Statistics		K-S 5% Critical Value	0.267151
k hat	6.740811	Data do not follow gamma distribution	
k star (bias corrected)	4.785235	at 5% significance level	
Theta hat	0.045247		
Theta star	0.063738	95% UCLs (Assuming Gamma Distribution)	
nu hat	134.8162	Approximate Gamma UCL	0.393734
nu star	95.70469	Adjusted Gamma UCL	0.412032
Approx.Chi Square Value (.05)	74.13623		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	70.84377	Shapiro-Wilk Test Statisitic	0.770611
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.742969		
Maximum of log data	-0.755023	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.263449	95% H-UCL	0.416509
Standard Deviation of log data	0.422677	95% Chebyshev (MVUE) UCL	0.486913
Variance of log data	0.178655	97.5% Chebyshev (MVUE) UCL	0.565123
		99% Chebyshev (MVUE) UCL	0.718751
		95% Non-parametric UCLs	
		CLT UCL	0.366337
		Adj-CLT UCL (Adjusted for skewness)	0.365088
		Mod-t UCL (Adjusted for skewness)	0.373162
		Jackknife UCL	0.373357
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.467544
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	0.537877
		99% Chebyshev (Mean, Sd) UCL	0.676032

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Iron D SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.817563
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	188	Data not normal at 5% significance level	
Maximum	627		
Mean	306.2	95% UCL (Assuming Normal Distribution)	
Median	264	Student's-t UCL	384.5091
Standard Deviation	135.0899		
Variance	18249.29	Gamma Distribution Test	
Coefficient of Variation	0.441182	A-D Test Statistic	0.523235
Skewness	1.617658	A-D 5% Critical Value	0.727687
		K-S Test Statistic	0.216723
Gamma Statistics		K-S 5% Critical Value	0.267109
k hat	7.008016	Data follow gamma distribution	
k star (bias corrected)	4.972278	at 5% significance level	
Theta hat	43.69282		
Theta star	61.58143	95% UCLs (Assuming Gamma Distribution)	
nu hat	140.1603	Approximate Gamma UCL	393.2335
nu star	99.44556	Adjusted Gamma UCL	411.1208
Approx.Chi Square Value (.05)	77.43549		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	74.06638	Shapiro-Wilk Test Statisitic	0.898076
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	5.236442		
Maximum of log data	6.440947	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.651198	95% H-UCL	401.0138
Standard Deviation of log data	0.387347	95% Chebyshev (MVUE) UCL	468.7503
Variance of log data	0.150038	97.5% Chebyshev (MVUE) UCL	539.8695
		99% Chebyshev (MVUE) UCL	679.5695
		95% Non-parametric UCLs	
		CLT UCL	376.4668
		Adj-CLT UCL (Adjusted for skewness)	399.817
		Mod-t UCL (Adjusted for skewness)	388.1512
		Jackknife UCL	384.5091
		Standard Bootstrap UCL	372.6892
		Bootstrap-t UCL	426.0311
RECOMMENDATION		Hall's Bootstrap UCL	459.5301
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	377.6
		BCA Bootstrap UCL	400.1
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	492.4086
		97.5% Chebyshev (Mean, Sd) UCL	572.9812
		99% Chebyshev (Mean, Sd) UCL	731.2505

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Magnesium D	SW846 300

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.941951
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	3820	Data are normal at 5% significance level	
Maximum	4760		
Mean	4286	95% UCL (Assuming Normal Distribution)	
Median	4370	Student's-t UCL	4471.16
Standard Deviation	319.4161		
Variance	102026.7	Gamma Distribution Test	
Coefficient of Variation	0.074525	A-D Test Statistic	0.350637
Skewness	-0.090319	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.188617
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	198.6591	Data follow gamma distribution	
k star (bias corrected)	139.128	at 5% significance level	
Theta hat	21.57465		
Theta star	30.80616	95% UCLs (Assuming Gamma Distribution)	
nu hat	3973.181	Approximate Gamma UCL	4481.834
nu star	2782.56	Adjusted Gamma UCL	4517.004
Approx.Chi Square Value (.05)	2660.976		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	2640.257	Shapiro-Wilk Test Statisitic	0.93894
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.248006		
Maximum of log data	8.468003	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.36059	95% H-UCL	N/A
Standard Deviation of log data	0.07497	95% Chebyshev (MVUE) UCL	4729.162
Variance of log data	0.005621	97.5% Chebyshev (MVUE) UCL	4920.9
		99% Chebyshev (MVUE) UCL	5297.534
		95% Non-parametric UCLs	
		CLT UCL	4452.144
		Adj-CLT UCL (Adjusted for skewness)	4449.061
		Mod-t UCL (Adjusted for skewness)	4470.679
		Jackknife UCL	4471.16
		Standard Bootstrap UCL	4443.425
		Bootstrap-t UCL	4462.681
RECOMMENDATION		Hall's Bootstrap UCL	4443.055
Data are normal (0.05)		Percentile Bootstrap UCL	4438
		BCA Bootstrap UCL	4448
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	4726.285
		97.5% Chebyshev (Mean, Sd) UCL	4916.796
		99% Chebyshev (Mean, Sd) UCL	5291.019

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Manganese D	SW846 300
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.663725
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	50.8	Data not normal at 5% significance level	
Maximum	93.7		
Mean	60.68	95% UCL (Assuming Normal Distribution)	
Median	57.35	Student's-t UCL	67.74782
Standard Deviation	12.1926		
Variance	148.6596	Gamma Distribution Test	
Coefficient of Variation	0.200933	A-D Test Statistic	1.174523
Skewness	2.627251	A-D 5% Critical Value	0.724473
		K-S Test Statistic	0.268871
Gamma Statistics		K-S 5% Critical Value	0.266021
k hat	34.37381	Data do not follow gamma distribution	
k star (bias corrected)	24.12834	at 5% significance level	
Theta hat	1.765297		
Theta star	2.514885	95% UCLs (Assuming Gamma Distribution)	
nu hat	687.4763	Approximate Gamma UCL	67.68586
nu star	482.5667	Adjusted Gamma UCL	68.99869
Approx.Chi Square Value (.05)	432.6184		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	424.387	Shapiro-Wilk Test Statisitic	0.737349
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	3.927896		
Maximum of log data	4.540098	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.090998	95% H-UCL	67.44395
Standard Deviation of log data	0.170841	95% Chebyshev (MVUE) UCL	74.89077
Variance of log data	0.029187	97.5% Chebyshev (MVUE) UCL	81.07909
		99% Chebyshev (MVUE) UCL	93.23484
		95% Non-parametric UCLs	
		CLT UCL	67.02196
		Adj-CLT UCL (Adjusted for skewness)	70.44474
		Mod-t UCL (Adjusted for skewness)	68.28171
		Jackknife UCL	67.74782
		Standard Bootstrap UCL	66.5169
		Bootstrap-t UCL	79.5338
RECOMMENDATION		Hall's Bootstrap UCL	94.73865
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	67.66
		BCA Bootstrap UCL	71.43
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	77.48634
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	84.75846
		99% Chebyshev (Mean, Sd) UCL	99.04313

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Molybdenum D	SW846 30(
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.509631
Number of Unique Samples	2	Shapiro-Wilk 5% Critical Value	0.842
Minimum	1.6	Data not normal at 5% significance level	
Maximum	1.7		
Mean	1.68	95% UCL (Assuming Normal Distribution)	
Median	1.7	Student's-t UCL	1.704442
Standard Deviation	0.042164		
Variance	0.001778	Gamma Distribution Test	
Coefficient of Variation	0.025097	A-D Test Statistic	2.663947
Skewness	-1.778781	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.491471
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	1721.534	Data do not follow gamma distribution	
k star (bias corrected)	1205.141	at 5% significance level	
Theta hat	0.000976		
Theta star	0.001394	95% UCLs (Assuming Gamma Distribution)	
nu hat	34430.69	Approximate Gamma UCL	1.705479
nu star	24102.81	Adjusted Gamma UCL	1.709966
Approx.Chi Square Value (.05)	23742.74		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	23680.43	Shapiro-Wilk Test Statisitic	0.509631
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.470004		
Maximum of log data	0.530628	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.518503	95% H-UCL	N/A
Standard Deviation of log data	0.025562	95% Chebyshev (MVUE) UCL	1.739203
Variance of log data	0.000653	97.5% Chebyshev (MVUE) UCL	1.764817
		99% Chebyshev (MVUE) UCL	1.815132
		95% Non-parametric UCLs	
		CLT UCL	1.701931
		Adj-CLT UCL (Adjusted for skewness)	1.693918
		Mod-t UCL (Adjusted for skewness)	1.703192
		Jackknife UCL	1.704442
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/A
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	1.738119
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	1.763267
		99% Chebyshev (Mean, Sd) UCL	1.812665
Recommended UCL exceeds the maximum observation			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Nickel D SW846 3005/602(	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.873592
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.842
Minimum	3	Data are normal at 5% significance level	
Maximum	3.3		
Mean	3.13	95% UCL (Assuming Normal Distribution)	
Median	3.15	Student's-t UCL	3.191409
Standard Deviation	0.105935		
Variance	0.011222	Gamma Distribution Test	
Coefficient of Variation	0.033845	A-D Test Statistic	0.669893
Skewness	-0.042058	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.258529
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	968.5492	Data follow gamma distribution	
k star (bias corrected)	678.0511	at 5% significance level	
Theta hat	0.003232		
Theta star	0.004616	95% UCLs (Assuming Gamma Distribution)	
nu hat	19370.98	Approximate Gamma UCL	3.193537
nu star	13561.02	Adjusted Gamma UCL	3.204764
Approx.Chi Square Value (.05)	13291.22		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	13244.65	Shapiro-Wilk Test Statisitic	0.871527
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.098612		
Maximum of log data	1.193922	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.140517	95% H-UCL	N/A
Standard Deviation of log data	0.033888	95% Chebyshev (MVUE) UCL	3.276221
Variance of log data	0.001148	97.5% Chebyshev (MVUE) UCL	3.339491
		99% Chebyshev (MVUE) UCL	3.463771
		95% Non-parametric UCLs	
		CLT UCL	3.185102
		Adj-CLT UCL (Adjusted for skewness)	3.184626
		Mod-t UCL (Adjusted for skewness)	3.191334
		Jackknife UCL	3.191409
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	3.276021
		97.5% Chebyshev (Mean, Sd) UCL	3.339205
		99% Chebyshev (Mean, Sd) UCL	3.463317

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Potassium D SW846 3005/	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.953032
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	6160	Data are normal at 5% significance level	
Maximum	7440		
Mean	6755	95% UCL (Assuming Normal Distribution)	
Median	6815	Student's-t UCL	6957.681
Standard Deviation	349.6427		
Variance	122250	Gamma Distribution Test	
Coefficient of Variation	0.051761	A-D Test Statistic	0.318685
Skewness	0.201491	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.204906
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	415.7003	Data follow gamma distribution	
k star (bias corrected)	291.0569	at 5% significance level	
Theta hat	16.24969		
Theta star	23.20852	95% UCLs (Assuming Gamma Distribution)	
nu hat	8314.006	Approximate Gamma UCL	6966.062
nu star	5821.137	Adjusted Gamma UCL	7003.621
Approx.Chi Square Value (.05)	5644.765		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	5614.493	Shapiro-Wilk Test Statisitic	0.955834
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.725832		
Maximum of log data	8.914626	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.816835	95% H-UCL	N/A
Standard Deviation of log data	0.0517	95% Chebyshev (MVUE) UCL	7236.489
Variance of log data	0.002673	97.5% Chebyshev (MVUE) UCL	7444.831
		99% Chebyshev (MVUE) UCL	7854.079
		95% Non-parametric UCLs	
		CLT UCL	6936.866
		Adj-CLT UCL (Adjusted for skewness)	6944.394
		Mod-t UCL (Adjusted for skewness)	6958.855
		Jackknife UCL	6957.681
		Standard Bootstrap UCL	6926.882
		Bootstrap-t UCL	6950.5
RECOMMENDATION		Hall's Bootstrap UCL	6986.185
Data are normal (0.05)		Percentile Bootstrap UCL	6934
		BCA Bootstrap UCL	6936
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7236.949
		97.5% Chebyshev (Mean, Sd) UCL	7445.489
		99% Chebyshev (Mean, Sd) UCL	7855.125

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Sodium D SW846 3005/60	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.988441
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	56700	Data are normal at 5% significance level	
Maximum	67300		
Mean	62010	95% UCL (Assuming Normal Distribution)	
Median	62050	Student's-t UCL	63803.67
Standard Deviation	3094.242		
Variance	9574333	Gamma Distribution Test	
Coefficient of Variation	0.049899	A-D Test Statistic	0.152479
Skewness	-0.060919	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.132618
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	444.4309	Data follow gamma distribution	
k star (bias corrected)	311.1683	at 5% significance level	
Theta hat	139.5268		
Theta star	199.2812	95% UCLs (Assuming Gamma Distribution)	
nu hat	8888.618	Approximate Gamma UCL	63882.35
nu star	6223.366	Adjusted Gamma UCL	64215.32
Approx.Chi Square Value (.05)	6040.963		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	6009.64	Shapiro-Wilk Test Statisitic	0.986507
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	10.94553		
Maximum of log data	11.11692	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	11.03393	95% H-UCL	N/A
Standard Deviation of log data	0.050075	95% Chebyshev (MVUE) UCL	66291.24
Variance of log data	0.002508	97.5% Chebyshev (MVUE) UCL	68143.65
		99% Chebyshev (MVUE) UCL	71782.37
		95% Non-parametric UCLs	
		CLT UCL	63619.46
		Adj-CLT UCL (Adjusted for skewness)	63599.32
		Mod-t UCL (Adjusted for skewness)	63800.53
		Jackknife UCL	63803.67
		Standard Bootstrap UCL	63564.01
		Bootstrap-t UCL	63774.12
RECOMMENDATION		Hall's Bootstrap UCL	63846.34
Data are normal (0.05)		Percentile Bootstrap UCL	63570
		BCA Bootstrap UCL	63390
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	66275.12
		97.5% Chebyshev (Mean, Sd) UCL	68120.64
		99% Chebyshev (Mean, Sd) UCL	71745.81

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Uranium D SW846 3005/6(

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.676167
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.0015	Data not normal at 5% significance level	
Maximum	0.0135		
Mean	0.00375	95% UCL (Assuming Normal Distribution)	
Median	0.002	Student's-t UCL	0.005958
Standard Deviation	0.00381		
Variance	1.45E-005	Gamma Distribution Test	
Coefficient of Variation	1.015923	A-D Test Statistic	0.97283
Skewness	2.232397	A-D 5% Critical Value	0.737684
		K-S Test Statistic	0.279041
Gamma Statistics		K-S 5% Critical Value	0.270565
k hat	1.711816	Data do not follow gamma distribution	
k star (bias corrected)	1.264938	at 5% significance level	
Theta hat	0.002191		
Theta star	0.002965	95% UCLs (Assuming Gamma Distribution)	
nu hat	34.23632	Approximate Gamma UCL	0.006393
nu star	25.29875	Adjusted Gamma UCL	0.007046
Approx.Chi Square Value (.05)	14.83872		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	13.46439	Shapiro-Wilk Test Statisitic	0.809242
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-6.50229		
Maximum of log data	-4.305066	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-5.905675	95% H-UCL	0.007277
Standard Deviation of log data	0.772211	95% Chebyshev (MVUE) UCL	0.007443
Variance of log data	0.59631	97.5% Chebyshev (MVUE) UCL	0.009132
		99% Chebyshev (MVUE) UCL	0.012449
		95% Non-parametric UCLs	
		CLT UCL	0.005732
		Adj-CLT UCL (Adjusted for skewness)	0.00664
		Mod-t UCL (Adjusted for skewness)	0.0061
		Jackknife UCL	0.005958
		Standard Bootstrap UCL	0.005611
		Bootstrap-t UCL	0.009837
RECOMMENDATION		Hall's Bootstrap UCL	0.013196
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.00575
		BCA Bootstrap UCL	0.0066
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.009001
		97.5% Chebyshev (Mean, Sd) UCL	0.011274
		99% Chebyshev (Mean, Sd) UCL	0.015737

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Vanadium D SW846 3005/	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.517971
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.315	Data not normal at 5% significance level	
Maximum	0.95		
Mean	0.438	95% UCL (Assuming Normal Distribution)	
Median	0.315	Student's-t UCL	0.588415
Standard Deviation	0.259478		
Variance	0.067329	Gamma Distribution Test	
Coefficient of Variation	0.592416	A-D Test Statistic	2.646519
Skewness	1.784647	A-D 5% Critical Value	0.729425
		K-S Test Statistic	0.494349
Gamma Statistics		K-S 5% Critical Value	0.267594
k hat	4.578215	Data do not follow gamma distribution	
k star (bias corrected)	3.271417	at 5% significance level	
Theta hat	0.09567		
Theta star	0.133887	95% UCLs (Assuming Gamma Distribution)	
nu hat	91.56429	Approximate Gamma UCL	0.599372
nu star	65.42834	Adjusted Gamma UCL	0.633939
Approx.Chi Square Value (.05)	47.81273		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	45.2056	Shapiro-Wilk Test Statisitic	0.514882
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.155183		
Maximum of log data	-0.051293	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.938707	95% H-UCL	0.603054
Standard Deviation of log data	0.456484	95% Chebyshev (MVUE) UCL	0.703461
Variance of log data	0.208378	97.5% Chebyshev (MVUE) UCL	0.822113
		99% Chebyshev (MVUE) UCL	1.055182
		95% Non-parametric UCLs	
		CLT UCL	0.572967
		Adj-CLT UCL (Adjusted for skewness)	0.622448
		Mod-t UCL (Adjusted for skewness)	0.596133
		Jackknife UCL	0.588415
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.795666
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	0.950428
		99% Chebyshev (Mean, Sd) UCL	1.254429

Table 4
Summary Statistics
Assabet River Surface Water, Site

Parameter	Frequency of Detection	Percent Detected	Range of NonDetects	Range of Detected Concentrations	Mean	Std Dev	CV	Skewness	Distribution	95% UCL on the mean	Method	95th Percentile	95/95 UTL	Maximum Detected	Mean + 3 SD
VOCs (MG/L)															
Methyl ethyl ketone	4 / 10	40%	0.001 : 0.018	0.00033 - 0.0035	0.0025	0.0029	1.160	1.518765	G/NP	0.005291	Approximate Gamma UCL	0.009	*	0.0035	
Methyl Tertbutyl Ether	7 / 10	70%	0.0005 : 0.0005	0.00026 - 0.0003	0.00027	0.000018	0.067	0.304	Normal	0.00028	Student's-t UCL	0.00030	0.00032	0.00030	0.00032
Trichloroethene	5 / 10	50%	0.0005 : 0.0005	0.00026 - 0.00032	0.00027	0.000025	0.093	1.790	Non-parametric	0.00028	Modified-t UCL	0.00032	*	0.00032	
Total Metals (UG/L)															
Aluminum	10 / 10	100%	:	38.5 - 66.6	54.18	7.44	0.137	-0.716	Normal	58.49202	Student's-t UCL	67.8	75.8	66.6	76.5
Arsenic	3 / 10	30%	0.96 : 3.5	0.98 - 1.1	1.11	0.51	0.459	-0.104	Normal	1.408285	Student's-t UCL	1.75	*	1.1	
Barium	10 / 10	100%	:	16 - 17.5	16.82	0.51	0.030	-0.467	Normal	17.11533	Student's-t UCL	17.8	18.3	17.5	18.4
Cadmium	1 / 10	10%	0.013 : 0.013	0.017 - 0.017	0.0076	0.0033	0.434	3.162	Non-parametric	0.00965	Modified-t UCL		0.014	0.017	
Calcium	10 / 10	100%	:	17800 - 19700	18720	731.5	0.039	0.066	Normal	19144.04	Student's-t UCL	20061	20849	19700	20915
Cobalt	10 / 10	100%	:	0.35 - 0.41	0.374	0.018	0.048	0.467	Normal	0.384654	Student's-t UCL	0.41	0.43	0.41	0.43
Copper	10 / 10	100%	:	3.3 - 9.3	5.08	1.875	0.369	1.363	Normal	6.166823	Student's-t UCL	8.52	10.54	9.30	10.71
Iron	10 / 10	100%	:	505 - 586	556.3	26.4	0.047	-0.945	Normal	571.6249	Student's-t UCL	604.7	633.2	586	635.5
Lead	7 / 10	70%	1.1 : 1.2	1.2 - 3.3	1.38	0.818	0.593	1.419	Normal	1.859499	Student's-t UCL	2.88	3.77	3.30	3.83
Magnesium	10 / 10	100%	:	4220 - 4770	4462	180.4	0.040	0.483	Normal	4566.55	Student's-t UCL	4793	4987	4770	5003
Manganese	10 / 10	100%	:	50.5 - 61.7	57.6	3.39	0.059	-0.990	Normal	59.53409	Student's-t UCL	63.8	67.4	61.7	67.8
Molybdenum	10 / 10	100%	:	1.6 - 1.9	1.78	0.132	0.074	-0.643	Non-parametric	1.854908	Modified-t UCL	1.9	*	1.9	
Nickel	10 / 10	100%	:	2.8 - 5	3.23	0.65	0.201	2.682	Non-parametric	3.635771	Modified-t UCL	5	*	5	
Potassium	10 / 10	100%	:	6490 - 8190	6961	500	0.072	1.842	G/NP	7256.222	Approximate Gamma UCL	8190		8190	
Sodium	10 / 10	100%	:	49500 - 60200	55570	36093	0.650	-0.549	Normal	57662.22	Student's-t UCL	121728	66077	60200	163849
Thallium	1 / 10	10%	0.013 : 0.032	0.45 - 0.45	0.052	0.14	2.692		Poisson				0.105	0.45	
Uranium	10 / 10	100%	:	0.004 - 0.097	0.02065	0.027851	1.349	2.737	G/NP	0.042868	Approximate Gamma UCL	0.097	*	0.097	
Vanadium	1 / 10	10%	0.63 : 5.5	0.9 - 0.9	1.39	0.9	0.647		Poisson				4.5	0.9	
Zinc	10 / 10	100%	:	7.5 - 17.1	9.53	2.87	0.301	2.411	G/NP	11.20188	Approximate Gamma UCL	17.1	*	17.1	
Zirconium	1 / 10	10%	0.054 : 0.37	0.96 - 0.96	0.18	0.28	1.556		Poisson				0.6	0.96	
Dissolved Metals (UG/L)															
Aluminum	10 / 10	100%	:	4.7 - 21.6	10.68	6.01	0.563	0.757	Normal	14.16632	Student's-t UCL	21.7	28.2	21.6	28.7
Arsenic	7 / 10	70%	0.96 : 0.96	0.96 - 1.6	1.1	0.47	0.427	-0.538	G/NP	1.490713	Approximate Gamma UCL	1.6	*	1.60	
Barium	10 / 10	100%	:	16.2 - 17.7	16.94	0.5	0.030	0.028	Normal	17.22816	Student's-t UCL	17.9	18.4	17.7	18.4
Calcium	10 / 10	100%	:	18100 - 19900	18870	614.7	0.033	0.275	Normal	19226.35	Student's-t UCL	19997	20660	19900	20714.1
Copper	10 / 10	100%	:	2.2 - 2.6	2.34	0.135	0.058	0.772	Normal	2.418251	Student's-t UCL	2.59	2.73	2.60	2.75
Iron	10 / 10	100%	:	208 - 327	253.3	42.9	0.169	0.639	Non-parametric	278.6115	Modified-t UCL	327	*	327	
Lead	10 / 10	100%	:	0.21 - 0.49	0.345	0.097	0.281	0.007	Normal	0.401152	Student's-t UCL	0.52	0.63	0.49	0.636
Magnesium	10 / 10	100%	:	3950 - 4290	4049	104.2	0.026	1.463	Normal	4109.394	Student's-t UCL	4240	4352	4290	4361.6
Manganese	10 / 10	100%	:	46.1 - 59.4	50.35	4.67	0.093	1.151	Non-parametric	53.14673	Modified-t UCL	59.4	*	59.4	
Mercury	1 / 10	10%	0.037 : 0.037	0.21 - 0.21	0.038	0.061	1.605		Poisson				0.085	0.21	
Molybdenum	10 / 10	100%	:	1.6 - 2.1	1.83	0.183	0.100	-0.144	Normal	1.936011	Student's-t UCL	2.17	2.36	2.1	2.379
Nickel	10 / 10	100%	:	2.9 - 4.7	3.23	0.53	0.164	2.972	Non-parametric	3.560365	Modified-t UCL	4.7	*	4.7	
Potassium	10 / 10	100%	:	6400 - 7310	6886	332.7	0.048	-0.121	Normal	7078.844	Student's-t UCL	7496	7854	7310	
Selenium	4 / 10	40%	1.5 : 3.3	1.5 - 2.7	1.53	0.59	0.386	0.531	Normal	1.869717	Student's-t UCL		*	2.7	
Sodium	10 / 10	100%	:	56300 - 64400	5890	2513.7	0.427	1.563	G/NP	60177.1	Approximate Gamma UCL	64400	*	64400	
Thallium	1 / 10	10%	0.013 : 0.04	0.39 - 0.39	0.047	0.12	2.553		Poisson				0.105	0.39	
Uranium	6 / 10	60%	0.003 : 0.003	0.026 - 0.036	0.0103	0.007711	0.749	-0.365	Non-parametric	0.020929	95% Chebyshev (Mean, Sd) UCL	0.036	*	0.036	
Zinc	4 / 10	40%	6 : 9	10.4 - 14	7.12	4.5	0.632	0.586402	Non-parametric	13.32284	95% Chebyshev (Mean, Sd) UCL	14	*	14	
Zirconium	1 / 10	10%	0.072 : 1.1	1.1 - 1.1	0.25	0.34	1.360		Poisson				0.75	1.10	

Notes: 1. For 10 samples, the non-parametric 95th percentile is the 10th ordered sample, i.e., the same as the maximum.
2. For 10 samples, the non-parametric one-sided 95% UCL on the mean is the 8th ordered sample.
3. The Student-t value for 10-1 = 9 degrees of freedom and 95% level of confidence is 1.833.
4. The factor for a one-sided 95% coverage, 95% tolerance limit on 10 samples is 2.911.
5. * - To determine a one-sided 95/95 UTL for a non-parametric distribution requires more samples than available.
6. G/NP - PROUCL recommended a gamma distribution for determining the 95% UCL on the mean, other statistics generated assuming a non-parametric distribution.
7. The mean and standard deviation are computed with NDs replaced with DL/2.
8. Shaded cell highlights an ordered value that is a 1/2DL value.

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Methyl ethyl ketone	T	SW8

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.76581
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.00033	Data not normal at 5% significance level	
Maximum	0.009		
Mean	0.002478	95% UCL (Assuming Normal Distribution)	
Median	0.000825	Student's-t UCL	0.004185
Standard Deviation	0.002945		
Variance	8.67E-006	Gamma Distribution Test	
Coefficient of Variation	1.188453	A-D Test Statistic	0.733236
Skewness	1.518765	A-D 5% Critical Value	0.751742
		K-S Test Statistic	0.27771
Gamma Statistics		K-S 5% Critical Value	0.27464
k hat	0.900232	Data follow approximate gamma distibution	
k star (bias corrected)	0.696829	at 5% significance level	
Theta hat	0.002753		
Theta star	0.003556	95% UCLs (Assuming Gamma Distribution)	
nu hat	18.00464	Approximate Gamma UCL	0.005291
nu star	13.93658	Adjusted Gamma UCL	0.006092
Approx.Chi Square Value (.05)	6.526817		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	5.669	Shapiro-Wilk Test Statisitic	0.871105
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-8.016418		
Maximum of log data	-4.710531	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-6.649682	95% H-UCL	0.011036
Standard Deviation of log data	1.203638	95% Chebyshev (MVUE) UCL	0.006606
Variance of log data	1.448744	97.5% Chebyshev (MVUE) UCL	0.008426
		99% Chebyshev (MVUE) UCL	0.012
		95% Non-parametric UCLs	
		CLT UCL	0.00401
		Adj-CLT UCL (Adjusted for skewness)	0.004488
		Mod-t UCL (Adjusted for skewness)	0.00426
		Jackknife UCL	0.004185
		Standard Bootstrap UCL	0.003906
		Bootstrap-t UCL	0.005629
RECOMMENDATION		Hall's Bootstrap UCL	0.005797
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	0.004103
		BCA Bootstrap UCL	0.004455
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	0.006537
		97.5% Chebyshev (Mean, Sd) UCL	0.008294
		99% Chebyshev (Mean, Sd) UCL	0.011744

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Methyl Tertbutyl Ether	T	SV

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.919119
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.00025	Data are normal at 5% significance level	
Maximum	0.0003		
Mean	0.00027	95% UCL (Assuming Normal Distribution)	
Median	0.00027	Student's-t UCL	0.00028
Standard Deviation	1.76E-005		
Variance	3.11E-010	Gamma Distribution Test	
Coefficient of Variation	0.065327	A-D Test Statistic	0.373487
Skewness	0.303721	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.186884
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	262.3766	Data follow gamma distribution	
k star (bias corrected)	183.7303	at 5% significance level	
Theta hat	1.03E-006		
Theta star	1.47E-006	95% UCLs (Assuming Gamma Distribution)	
nu hat	5247.532	Approximate Gamma UCL	0.000281
nu star	3674.606	Adjusted Gamma UCL	0.000283
Approx.Chi Square Value (.05)	3534.713		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	3510.802	Shapiro-Wilk Test Statisitic	0.918178
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-8.29405		
Maximum of log data	-8.111728	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-8.218995	95% H-UCL	N/A
Standard Deviation of log data	0.064987	95% Chebyshev (MVUE) UCL	0.000294
Variance of log data	0.004223	97.5% Chebyshev (MVUE) UCL	0.000305
		99% Chebyshev (MVUE) UCL	0.000325
		95% Non-parametric UCLs	
		CLT UCL	0.000279
		Adj-CLT UCL (Adjusted for skewness)	0.00028
		Mod-t UCL (Adjusted for skewness)	0.00028
		Jackknife UCL	0.00028
		Standard Bootstrap UCL	0.000279
		Bootstrap-t UCL	0.000281
RECOMMENDATION		Hall's Bootstrap UCL	0.000279
Data are normal (0.05)		Percentile Bootstrap UCL	0.000279
		BCA Bootstrap UCL	0.000278
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.000294
		97.5% Chebyshev (Mean, Sd) UCL	0.000305
		99% Chebyshev (Mean, Sd) UCL	0.000325

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Trichloroethene T	SW846 8
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.66921
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.00025	Data not normal at 5% significance level	
Maximum	0.00032		
Mean	0.000265	95% UCL (Assuming Normal Distribution)	
Median	0.000255	Student's-t UCL	0.000279
Standard Deviation	2.46E-005		
Variance	6.06E-010	Gamma Distribution Test	
Coefficient of Variation	0.092861	A-D Test Statistic	1.557266
Skewness	1.789525	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.377748
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	139.6547	Data do not follow gamma distribution	
k star (bias corrected)	97.82499	at 5% significance level	
Theta hat	1.9E-006		
Theta star	2.71E-006	95% UCLs (Assuming Gamma Distribution)	
nu hat	2793.095	Approximate Gamma UCL	0.00028
nu star	1956.5	Adjusted Gamma UCL	0.000282
Approx.Chi Square Value (.05)	1854.735		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	1837.472	Shapiro-Wilk Test Statisitic	0.679981
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-8.29405		
Maximum of log data	-8.04719	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-8.239365	95% H-UCL	N/A
Standard Deviation of log data	0.087491	95% Chebyshev (MVUE) UCL	0.000297
Variance of log data	0.007655	97.5% Chebyshev (MVUE) UCL	0.000311
		99% Chebyshev (MVUE) UCL	0.000338
		95% Non-parametric UCLs	
		CLT UCL	0.000278
		Adj-CLT UCL (Adjusted for skewness)	0.000283
		Mod-t UCL (Adjusted for skewness)	0.00028
		Jackknife UCL	0.000279
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.000299
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	0.000314
		99% Chebyshev (Mean, Sd) UCL	0.000342

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Aluminum T	SW846 3005/(

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.928934
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	38.5	Data are normal at 5% significance level	
Maximum	66.6		
Mean	54.18	95% UCL (Assuming Normal Distribution)	
Median	55.55	Student's-t UCL	58.49202
Standard Deviation	7.438608		
Variance	55.33289	Gamma Distribution Test	
Coefficient of Variation	0.137294	A-D Test Statistic	0.507893
Skewness	-0.716463	A-D 5% Critical Value	0.724343
		K-S Test Statistic	0.210029
Gamma Statistics		K-S 5% Critical Value	0.265855
k hat	54.37472	Data follow gamma distribution	
k star (bias corrected)	38.12897	at 5% significance level	
Theta hat	0.996419		
Theta star	1.420967	95% UCLs (Assuming Gamma Distribution)	
nu hat	1087.494	Approximate Gamma UCL	59.067
nu star	762.5794	Adjusted Gamma UCL	59.96908
Approx.Chi Square Value (.05)	699.4863		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	688.9642	Shapiro-Wilk Test Statisitic	0.892873
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	3.650658		
Maximum of log data	4.198705	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.983088	95% H-UCL	59.35582
Standard Deviation of log data	0.146553	95% Chebyshev (MVUE) UCL	65.17213
Variance of log data	0.021478	97.5% Chebyshev (MVUE) UCL	69.91828
		99% Chebyshev (MVUE) UCL	79.24117
		95% Non-parametric UCLs	
		CLT UCL	58.04918
		Adj-CLT UCL (Adjusted for skewness)	57.47972
		Mod-t UCL (Adjusted for skewness)	58.4032
		Jackknife UCL	58.49202
		Standard Bootstrap UCL	57.85284
		Bootstrap-t UCL	58.05052
RECOMMENDATION		Hall's Bootstrap UCL	57.8597
Data are normal (0.05)		Percentile Bootstrap UCL	57.62
		BCA Bootstrap UCL	57.48
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	64.43341
		97.5% Chebyshev (Mean, Sd) UCL	68.87007
		99% Chebyshev (Mean, Sd) UCL	77.58503

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Arsenic T SW846 3005/602	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.879512
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.48	Data are normal at 5% significance level	
Maximum	1.75		
Mean	1.112	95% UCL (Assuming Normal Distribution)	
Median	1.1	Student's-t UCL	1.408285
Standard Deviation	0.511116		
Variance	0.26124	Gamma Distribution Test	
Coefficient of Variation	0.459637	A-D Test Statistic	0.640291
Skewness	-0.104144	A-D 5% Critical Value	0.729417
		K-S Test Statistic	0.217155
Gamma Statistics		K-S 5% Critical Value	0.267647
k hat	4.442953	Data follow gamma distribution	
k star (bias corrected)	3.176734	at 5% significance level	
Theta hat	0.250284		
Theta star	0.350045	95% UCLs (Assuming Gamma Distribution)	
nu hat	88.85907	Approximate Gamma UCL	1.529419
nu star	63.53468	Adjusted Gamma UCL	1.619129
Approx.Chi Square Value (.05)	46.19437		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	43.63491	Shapiro-Wilk Test Statisitic	0.832496
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.733969		
Maximum of log data	0.559616	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.010578	95% H-UCL	1.716399
Standard Deviation of log data	0.536868	95% Chebyshev (MVUE) UCL	1.974079
Variance of log data	0.288227	97.5% Chebyshev (MVUE) UCL	2.341549
		99% Chebyshev (MVUE) UCL	3.063373
		95% Non-parametric UCLs	
		CLT UCL	1.377856
		Adj-CLT UCL (Adjusted for skewness)	1.372169
		Mod-t UCL (Adjusted for skewness)	1.407397
		Jackknife UCL	1.408285
		Standard Bootstrap UCL	1.359023
		Bootstrap-t UCL	1.384575
RECOMMENDATION		Hall's Bootstrap UCL	1.354856
Data are normal (0.05)		Percentile Bootstrap UCL	1.354
		BCA Bootstrap UCL	1.339
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	1.816525
		97.5% Chebyshev (Mean, Sd) UCL	2.121374
		99% Chebyshev (Mean, Sd) UCL	2.72019

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Barium T SW846 3005/602
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.936164
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	16	Data are normal at 5% significance level	
Maximum	17.5		
Mean	16.82	95% UCL (Assuming Normal Distribution)	
Median	16.95	Student's-t UCL	17.11533
Standard Deviation	0.509466		
Variance	0.259556	Gamma Distribution Test	
Coefficient of Variation	0.030289	A-D Test Statistic	0.345116
Skewness	-0.466595	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.220187
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	1201.254	Data follow gamma distribution	
k star (bias corrected)	840.9443	at 5% significance level	
Theta hat	0.014002		
Theta star	0.020001	95% UCLs (Assuming Gamma Distribution)	
nu hat	24025.08	Approximate Gamma UCL	17.12609
nu star	16818.89	Adjusted Gamma UCL	17.1801
Approx.Chi Square Value (.05)	16518.29		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	16466.35	Shapiro-Wilk Test Statisitic	0.933002
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.772589		
Maximum of log data	2.862201	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.822152	95% H-UCL	N/A
Standard Deviation of log data	0.030479	95% Chebyshev (MVUE) UCL	17.52673
Variance of log data	0.000929	97.5% Chebyshev (MVUE) UCL	17.83252
		99% Chebyshev (MVUE) UCL	18.43319
		95% Non-parametric UCLs	
		CLT UCL	17.085
		Adj-CLT UCL (Adjusted for skewness)	17.0596
		Mod-t UCL (Adjusted for skewness)	17.11137
		Jackknife UCL	17.11533
		Standard Bootstrap UCL	17.07601
		Bootstrap-t UCL	17.07789
RECOMMENDATION		Hall's Bootstrap UCL	17.04691
Data are normal (0.05)		Percentile Bootstrap UCL	17.07
		BCA Bootstrap UCL	17.05
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	17.52225
		97.5% Chebyshev (Mean, Sd) UCL	17.82611
		99% Chebyshev (Mean, Sd) UCL	18.423

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Cadmium T SW846 3005/6

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.365957
Number of Unique Samples	2	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.0065	Data not normal at 5% significance level	
Maximum	0.017		
Mean	0.00755	95% UCL (Assuming Normal Distribution)	
Median	0.0065	Student's-t UCL	0.009475
Standard Deviation	0.00332		
Variance	1.1E-005	Gamma Distribution Test	
Coefficient of Variation	0.439787	A-D Test Statistic	3.307996
Skewness	3.162278	A-D 5% Critical Value	0.725507
		K-S Test Statistic	0.533203
Gamma Statistics		K-S 5% Critical Value	0.266711
k hat	9.491228	Data do not follow gamma distribution	
k star (bias corrected)	6.710526	at 5% significance level	
Theta hat	0.000795		
Theta star	0.001125	95% UCLs (Assuming Gamma Distribution)	
nu hat	189.8246	Approximate Gamma UCL	0.009344
nu star	134.2105	Adjusted Gamma UCL	0.009704
Approx.Chi Square Value (.05)	108.4409		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	104.4186	Shapiro-Wilk Test Statisitic	0.365957
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.035953		
Maximum of log data	-4.074542	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.939812	95% H-UCL	0.009161
Standard Deviation of log data	0.304025	95% Chebyshev (MVUE) UCL	0.010607
Variance of log data	0.092431	97.5% Chebyshev (MVUE) UCL	0.011969
		99% Chebyshev (MVUE) UCL	0.014645
		95% Non-parametric UCLs	
		CLT UCL	0.009277
		Adj-CLT UCL (Adjusted for skewness)	0.010399
		Mod-t UCL (Adjusted for skewness)	0.00965
		Jackknife UCL	0.009475
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/A
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.012127
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	0.014107
		99% Chebyshev (Mean, Sd) UCL	0.017997

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Calcium T SW846 3005/60

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.909099
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	17800	Data are normal at 5% significance level	
Maximum	19700		
Mean	18720	95% UCL (Assuming Normal Distribution)	
Median	18750	Student's-t UCL	19144.04
Standard Deviation	731.5129		
Variance	535111.1	Gamma Distribution Test	
Coefficient of Variation	0.039077	A-D Test Statistic	0.388905
Skewness	0.066336	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.171624
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	728.0625	Data follow gamma distribution	
k star (bias corrected)	509.7104	at 5% significance level	
Theta hat	25.71208		
Theta star	36.72673	95% UCLs (Assuming Gamma Distribution)	
nu hat	14561.25	Approximate Gamma UCL	19159.36
nu star	10194.21	Adjusted Gamma UCL	19237.16
Approx.Chi Square Value (.05)	9960.436		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	9920.155	Shapiro-Wilk Test Statisitic	0.909346
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	9.786954		
Maximum of log data	9.888374	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.836661	95% H-UCL	N/A
Standard Deviation of log data	0.039067	95% Chebyshev (MVUE) UCL	19728.2
Variance of log data	0.001526	97.5% Chebyshev (MVUE) UCL	20164.44
		99% Chebyshev (MVUE) UCL	21021.37
		95% Non-parametric UCLs	
		CLT UCL	19100.5
		Adj-CLT UCL (Adjusted for skewness)	19105.68
		Mod-t UCL (Adjusted for skewness)	19144.85
		Jackknife UCL	19144.04
		Standard Bootstrap UCL	19077.27
		Bootstrap-t UCL	19113.97
RECOMMENDATION		Hall's Bootstrap UCL	19068.7
Data are normal (0.05)		Percentile Bootstrap UCL	19070
		BCA Bootstrap UCL	19100
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	19728.32
		97.5% Chebyshev (Mean, Sd) UCL	20164.62
		99% Chebyshev (Mean, Sd) UCL	21021.65

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Cobalt T SW846 3005/602

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.941635
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.35	Data are normal at 5% significance level	
Maximum	0.41		
Mean	0.374	95% UCL (Assuming Normal Distribution)	
Median	0.375	Student's-t UCL	0.384654
Standard Deviation	0.018379		
Variance	0.000338	Gamma Distribution Test	
Coefficient of Variation	0.049141	A-D Test Statistic	0.298981
Skewness	0.467145	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.159634
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	464.6794	Data follow gamma distribution	
k star (bias corrected)	325.3423	at 5% significance level	
Theta hat	0.000805		
Theta star	0.00115	95% UCLs (Assuming Gamma Distribution)	
nu hat	9293.589	Approximate Gamma UCL	0.385038
nu star	6506.845	Adjusted Gamma UCL	0.387
Approx.Chi Square Value (.05)	6320.308		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	6288.264	Shapiro-Wilk Test Statisitic	0.945053
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.049822		
Maximum of log data	-0.891598	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.984576	95% H-UCL	N/A
Standard Deviation of log data	0.0488	95% Chebyshev (MVUE) UCL	0.399161
Variance of log data	0.002381	97.5% Chebyshev (MVUE) UCL	0.410048
		99% Chebyshev (MVUE) UCL	0.431435
		95% Non-parametric UCLs	
		CLT UCL	0.38356
		Adj-CLT UCL (Adjusted for skewness)	0.384477
		Mod-t UCL (Adjusted for skewness)	0.384797
		Jackknife UCL	0.384654
		Standard Bootstrap UCL	0.382989
		Bootstrap-t UCL	0.38577
RECOMMENDATION		Hall's Bootstrap UCL	0.386512
Data are normal (0.05)		Percentile Bootstrap UCL	0.383
		BCA Bootstrap UCL	0.383
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.399333
		97.5% Chebyshev (Mean, Sd) UCL	0.410295
		99% Chebyshev (Mean, Sd) UCL	0.431827

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Copper T SW846 3005/602

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.860165
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	3.3	Data are normal at 5% significance level	
Maximum	9.3		
Mean	5.08	95% UCL (Assuming Normal Distribution)	
Median	4.55	Student's-t UCL	6.166823
Standard Deviation	1.874863		
Variance	3.515111	Gamma Distribution Test	
Coefficient of Variation	0.369068	A-D Test Statistic	0.429401
Skewness	1.362603	A-D 5% Critical Value	0.725488
		K-S Test Statistic	0.193212
Gamma Statistics		K-S 5% Critical Value	0.266708
k hat	9.512402	Data follow gamma distribution	
k star (bias corrected)	6.725348	at 5% significance level	
Theta hat	0.53404		
Theta star	0.755351	95% UCLs (Assuming Gamma Distribution)	
nu hat	190.248	Approximate Gamma UCL	6.285633
nu star	134.507	Adjusted Gamma UCL	6.527462
Approx.Chi Square Value (.05)	108.7075		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	104.6801	Shapiro-Wilk Test Statisitic	0.91858
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.193922		
Maximum of log data	2.230014	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.571828	95% H-UCL	6.374333
Standard Deviation of log data	0.334468	95% Chebyshev (MVUE) UCL	7.417198
Variance of log data	0.111869	97.5% Chebyshev (MVUE) UCL	8.435901
		99% Chebyshev (MVUE) UCL	10.43694
		95% Non-parametric UCLs	
		CLT UCL	6.055207
		Adj-CLT UCL (Adjusted for skewness)	6.32818
		Mod-t UCL (Adjusted for skewness)	6.209401
		Jackknife UCL	6.166823
		Standard Bootstrap UCL	5.980331
		Bootstrap-t UCL	6.632644
RECOMMENDATION		Hall's Bootstrap UCL	7.017576
Data are normal (0.05)		Percentile Bootstrap UCL	6.02
		BCA Bootstrap UCL	6.18
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7.66432
		97.5% Chebyshev (Mean, Sd) UCL	8.782558
		99% Chebyshev (Mean, Sd) UCL	10.97912

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Iron T SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.909746
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	505	Data are normal at 5% significance level	
Maximum	586		
Mean	556.3	95% UCL (Assuming Normal Distribution)	
Median	561.5	Student's-t UCL	571.6249
Standard Deviation	26.43672		
Variance	698.9	Gamma Distribution Test	
Coefficient of Variation	0.047522	A-D Test Statistic	0.436621
Skewness	-0.944845	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.192299
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	479.3567	Data follow gamma distribution	
k star (bias corrected)	335.6164	at 5% significance level	
Theta hat	1.160514		
Theta star	1.657547	95% UCLs (Assuming Gamma Distribution)	
nu hat	9587.134	Approximate Gamma UCL	572.4596
nu star	6712.327	Adjusted Gamma UCL	575.3311
Approx.Chi Square Value (.05)	6522.85		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	6490.293	Shapiro-Wilk Test Statisitic	0.900334
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	6.224558		
Maximum of log data	6.37332	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.320264	95% H-UCL	N/A
Standard Deviation of log data	0.048475	95% Chebyshev (MVUE) UCL	593.4867
Variance of log data	0.00235	97.5% Chebyshev (MVUE) UCL	609.5741
		99% Chebyshev (MVUE) UCL	641.1746
		95% Non-parametric UCLs	
		CLT UCL	570.051
		Adj-CLT UCL (Adjusted for skewness)	567.382
		Mod-t UCL (Adjusted for skewness)	571.2086
		Jackknife UCL	571.6249
		Standard Bootstrap UCL	569.5777
		Bootstrap-t UCL	569.1432
RECOMMENDATION		Hall's Bootstrap UCL	567.6713
Data are normal (0.05)		Percentile Bootstrap UCL	568.7
		BCA Bootstrap UCL	567.4
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	592.7405
		97.5% Chebyshev (Mean, Sd) UCL	608.5083
		99% Chebyshev (Mean, Sd) UCL	639.4812

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Lead T SW846 3005/6020

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.855092
Number of Unique Samples	7	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.55	Data are normal at 5% significance level	
Maximum	3.3		
Mean	1.385	95% UCL (Assuming Normal Distribution)	
Median	1.25	Student's-t UCL	1.859499
Standard Deviation	0.818552		
Variance	0.670028	Gamma Distribution Test	
Coefficient of Variation	0.591012	A-D Test Statistic	0.402657
Skewness	1.419212	A-D 5% Critical Value	0.730648
		K-S Test Statistic	0.18412
Gamma Statistics		K-S 5% Critical Value	0.268104
k hat	3.548956	Data follow gamma distribution	
k star (bias corrected)	2.550936	at 5% significance level	
Theta hat	0.390256		
Theta star	0.542938	95% UCLs (Assuming Gamma Distribution)	
nu hat	70.97913	Approximate Gamma UCL	1.984148
nu star	51.01872	Adjusted Gamma UCL	2.116369
Approx.Chi Square Value (.05)	35.61273		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	33.3878	Shapiro-Wilk Test Statisitic	0.920464
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.597837		
Maximum of log data	1.193922	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.178248	95% H-UCL	2.204198
Standard Deviation of log data	0.575203	95% Chebyshev (MVUE) UCL	2.506755
Variance of log data	0.330859	97.5% Chebyshev (MVUE) UCL	2.992451
		99% Chebyshev (MVUE) UCL	3.946509
		95% Non-parametric UCLs	
		CLT UCL	1.810769
		Adj-CLT UCL (Adjusted for skewness)	1.934898
		Mod-t UCL (Adjusted for skewness)	1.878861
		Jackknife UCL	1.859499
		Standard Bootstrap UCL	1.788497
		Bootstrap-t UCL	2.062432
RECOMMENDATION		Hall's Bootstrap UCL	3.763338
Data are normal (0.05)		Percentile Bootstrap UCL	1.825
		BCA Bootstrap UCL	1.91
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	2.513296
		97.5% Chebyshev (Mean, Sd) UCL	3.001511
		99% Chebyshev (Mean, Sd) UCL	3.960515

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Magnesium T SW846 3005

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.942788
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	4220	Data are normal at 5% significance level	
Maximum	4770		
Mean	4462	95% UCL (Assuming Normal Distribution)	
Median	4440	Student's-t UCL	4566.55
Standard Deviation	180.3577		
Variance	32528.89	Gamma Distribution Test	
Coefficient of Variation	0.040421	A-D Test Statistic	0.312048
Skewness	0.48302	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.199692
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	686.3412	Data follow gamma distribution	
k star (bias corrected)	480.5055	at 5% significance level	
Theta hat	6.50114		
Theta star	9.286054	95% UCLs (Assuming Gamma Distribution)	
nu hat	13726.82	Approximate Gamma UCL	4569.919
nu star	9610.11	Adjusted Gamma UCL	4589.037
Approx.Chi Square Value (.05)	9383.167		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	9344.077	Shapiro-Wilk Test Statisitic	0.946772
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.34759		
Maximum of log data	8.470102	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.402624	95% H-UCL	N/A
Standard Deviation of log data	0.040152	95% Chebyshev (MVUE) UCL	4708.973
Variance of log data	0.001612	97.5% Chebyshev (MVUE) UCL	4815.844
		99% Chebyshev (MVUE) UCL	5025.773
		95% Non-parametric UCLs	
		CLT UCL	4555.813
		Adj-CLT UCL (Adjusted for skewness)	4565.121
		Mod-t UCL (Adjusted for skewness)	4568.002
		Jackknife UCL	4566.55
		Standard Bootstrap UCL	4551.35
		Bootstrap-t UCL	4579.903
RECOMMENDATION		Hall's Bootstrap UCL	4585.058
Data are normal (0.05)		Percentile Bootstrap UCL	4550
		BCA Bootstrap UCL	4561
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	4710.606
		97.5% Chebyshev (Mean, Sd) UCL	4818.178
		99% Chebyshev (Mean, Sd) UCL	5029.482

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Manganese T SW846 3005

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.916137
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	50.5	Data are normal at 5% significance level	
Maximum	61.7		
Mean	57.57	95% UCL (Assuming Normal Distribution)	
Median	57.85	Student's-t UCL	59.53409
Standard Deviation	3.388231		
Variance	11.48011	Gamma Distribution Test	
Coefficient of Variation	0.058854	A-D Test Statistic	0.441113
Skewness	-0.989929	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.238065
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	309.7517	Data follow gamma distribution	
k star (bias corrected)	216.8929	at 5% significance level	
Theta hat	0.185859		
Theta star	0.265431	95% UCLs (Assuming Gamma Distribution)	
nu hat	6195.035	Approximate Gamma UCL	59.66187
nu star	4337.858	Adjusted Gamma UCL	60.03534
Approx.Chi Square Value (.05)	4185.763		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	4159.725	Shapiro-Wilk Test Statisitic	0.902154
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	3.921973		
Maximum of log data	4.122284	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.051387	95% H-UCL	N/A
Standard Deviation of log data	0.060456	95% Chebyshev (MVUE) UCL	62.37077
Variance of log data	0.003655	97.5% Chebyshev (MVUE) UCL	64.44734
		99% Chebyshev (MVUE) UCL	68.52634
		95% Non-parametric UCLs	
		CLT UCL	59.33238
		Adj-CLT UCL (Adjusted for skewness)	58.97399
		Mod-t UCL (Adjusted for skewness)	59.47819
		Jackknife UCL	59.53409
		Standard Bootstrap UCL	59.22716
		Bootstrap-t UCL	59.23867
RECOMMENDATION		Hall's Bootstrap UCL	59.02831
Data are normal (0.05)		Percentile Bootstrap UCL	59.21
		BCA Bootstrap UCL	58.95
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	62.24035
		97.5% Chebyshev (Mean, Sd) UCL	64.26122
		99% Chebyshev (Mean, Sd) UCL	68.23082

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Molybdenum T	SW846 300
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.773499
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.842
Minimum	1.6	Data not normal at 5% significance level	
Maximum	1.9		
Mean	1.78	95% UCL (Assuming Normal Distribution)	
Median	1.8	Student's-t UCL	1.856319
Standard Deviation	0.131656		
Variance	0.017333	Gamma Distribution Test	
Coefficient of Variation	0.073964	A-D Test Statistic	1.070796
Skewness	-0.6427	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.271813
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	197.4268	Data do not follow gamma distribution	
k star (bias corrected)	138.2655	at 5% significance level	
Theta hat	0.009016		
Theta star	0.012874	95% UCLs (Assuming Gamma Distribution)	
nu hat	3948.537	Approximate Gamma UCL	1.861593
nu star	2765.309	Adjusted Gamma UCL	1.876248
Approx.Chi Square Value (.05)	2644.106		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	2623.454	Shapiro-Wilk Test Statisitic	0.766805
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.470004		
Maximum of log data	0.641854	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.574079	95% H-UCL	N/A
Standard Deviation of log data	0.075596	95% Chebyshev (MVUE) UCL	1.965637
Variance of log data	0.005715	97.5% Chebyshev (MVUE) UCL	2.045934
		99% Chebyshev (MVUE) UCL	2.203662
		95% Non-parametric UCLs	
		CLT UCL	1.848481
		Adj-CLT UCL (Adjusted for skewness)	1.839439
		Mod-t UCL (Adjusted for skewness)	1.854908
		Jackknife UCL	1.856319
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	1.961475
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	2.04
		99% Chebyshev (Mean, Sd) UCL	2.194246

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Nickel T SW846 3005/602(

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.634912
Number of Unique Samples	7	Shapiro-Wilk 5% Critical Value	0.842
Minimum	2.8	Data not normal at 5% significance level	
Maximum	5		
Mean	3.23	95% UCL (Assuming Normal Distribution)	
Median	3.05	Student's-t UCL	3.606718
Standard Deviation	0.649872		
Variance	0.422333	Gamma Distribution Test	
Coefficient of Variation	0.201199	A-D Test Statistic	1.262645
Skewness	2.682333	A-D 5% Critical Value	0.724473
		K-S Test Statistic	0.327378
Gamma Statistics		K-S 5% Critical Value	0.26602
k hat	34.47988	Data do not follow gamma distribution	
k star (bias corrected)	24.20258	at 5% significance level	
Theta hat	0.093678		
Theta star	0.133457	95% UCLs (Assuming Gamma Distribution)	
nu hat	689.5976	Approximate Gamma UCL	3.602299
nu star	484.0516	Adjusted Gamma UCL	3.672057
Approx.Chi Square Value (.05)	434.0247		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	425.7796	Shapiro-Wilk Test Statisitic	0.70135
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.029619		
Maximum of log data	1.609438	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.157911	95% H-UCL	3.588571
Standard Deviation of log data	0.170296	95% Chebyshev (MVUE) UCL	3.983846
Variance of log data	0.029001	97.5% Chebyshev (MVUE) UCL	4.312182
		99% Chebyshev (MVUE) UCL	4.957133
		95% Non-parametric UCLs	
		CLT UCL	3.56803
		Adj-CLT UCL (Adjusted for skewness)	3.75429
		Mod-t UCL (Adjusted for skewness)	3.635771
		Jackknife UCL	3.606718
		Standard Bootstrap UCL	3.550307
		Bootstrap-t UCL	4.222206
RECOMMENDATION		Hall's Bootstrap UCL	4.861979
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3.6
		BCA Bootstrap UCL	3.81
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	4.125786
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	4.513394
		99% Chebyshev (Mean, Sd) UCL	5.274774

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Potassium T SW846 3005/

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.819438
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	6490	Data not normal at 5% significance level	
Maximum	8190		
Mean	6961	95% UCL (Assuming Normal Distribution)	
Median	6885	Student's-t UCL	7250.846
Standard Deviation	500.01		
Variance	250010	Gamma Distribution Test	
Coefficient of Variation	0.07183	A-D Test Statistic	0.62665
Skewness	1.84163	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.223381
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	229.4564	Data follow gamma distribution	
k star (bias corrected)	160.6861	at 5% significance level	
Theta hat	30.33692		
Theta star	43.32048	95% UCLs (Assuming Gamma Distribution)	
nu hat	4589.128	Approximate Gamma UCL	7256.222
nu star	3213.723	Adjusted Gamma UCL	7309.131
Approx.Chi Square Value (.05)	3082.971		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	3060.654	Shapiro-Wilk Test Statisitic	0.844884
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.778018		
Maximum of log data	9.010669	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.845898	95% H-UCL	N/A
Standard Deviation of log data	0.06855	95% Chebyshev (MVUE) UCL	7618.486
Variance of log data	0.004699	97.5% Chebyshev (MVUE) UCL	7903.18
		99% Chebyshev (MVUE) UCL	8462.408
		95% Non-parametric UCLs	
		CLT UCL	7221.079
		Adj-CLT UCL (Adjusted for skewness)	7319.472
		Mod-t UCL (Adjusted for skewness)	7266.194
		Jackknife UCL	7250.846
		Standard Bootstrap UCL	7210.532
		Bootstrap-t UCL	7492.122
RECOMMENDATION		Hall's Bootstrap UCL	8570.473
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	7224
		BCA Bootstrap UCL	7331
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	7650.216
		97.5% Chebyshev (Mean, Sd) UCL	7948.441
		99% Chebyshev (Mean, Sd) UCL	8534.245

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Sodium T SW846 3005/60

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.910609
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	49500	Data are normal at 5% significance level	
Maximum	60200		
Mean	55570	95% UCL (Assuming Normal Distribution)	
Median	57250	Student's-t UCL	57662.22
Standard Deviation	3609.263		
Variance	13026778	Gamma Distribution Test	
Coefficient of Variation	0.06495	A-D Test Statistic	0.536137
Skewness	-0.549053	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.276788
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	257.7274	Data follow approximate gamma distibution	
k star (bias corrected)	180.4758	at 5% significance level	
Theta hat	215.6154		
Theta star	307.9082	95% UCLs (Assuming Gamma Distribution)	
nu hat	5154.548	Approximate Gamma UCL	57789.65
nu star	3609.517	Adjusted Gamma UCL	58186.83
Approx.Chi Square Value (.05)	3470.879		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	3447.186	Shapiro-Wilk Test Statisitic	0.904767
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	10.80973		
Maximum of log data	11.00543	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	10.92346	95% H-UCL	N/A
Standard Deviation of log data	0.066052	95% Chebyshev (MVUE) UCL	60632.54
Variance of log data	0.004363	97.5% Chebyshev (MVUE) UCL	62822.58
		99% Chebyshev (MVUE) UCL	67124.5
		95% Non-parametric UCLs	
		CLT UCL	57447.35
		Adj-CLT UCL (Adjusted for skewness)	57235.61
		Mod-t UCL (Adjusted for skewness)	57629.19
		Jackknife UCL	57662.22
		Standard Bootstrap UCL	57326.31
		Bootstrap-t UCL	57494.95
RECOMMENDATION		Hall's Bootstrap UCL	57117.91
Data are normal (0.05)		Percentile Bootstrap UCL	57320
		BCA Bootstrap UCL	57220
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	60545.03
		97.5% Chebyshev (Mean, Sd) UCL	62697.72
		99% Chebyshev (Mean, Sd) UCL	66926.28

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Uranium T SW846 3005/6(

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.603046
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.002	Data not normal at 5% significance level	
Maximum	0.097		
Mean	0.02065	95% UCL (Assuming Normal Distribution)	
Median	0.01775	Student's-t UCL	0.036795
Standard Deviation	0.027851		
Variance	0.000776	Gamma Distribution Test	
Coefficient of Variation	1.348709	A-D Test Statistic	0.664733
Skewness	2.736766	A-D 5% Critical Value	0.749504
		K-S Test Statistic	0.286191
Gamma Statistics		K-S 5% Critical Value	0.274066
k hat	0.964551	Data follow approximate gamma distibution	
k star (bias corrected)	0.741852	at 5% significance level	
Theta hat	0.021409		
Theta star	0.027836	95% UCLs (Assuming Gamma Distribution)	
nu hat	19.29102	Approximate Gamma UCL	0.042868
nu star	14.83704	Adjusted Gamma UCL	0.049081
Approx.Chi Square Value (.05)	7.147156		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	6.242422	Shapiro-Wilk Test Statisitic	0.909366
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-6.214608		
Maximum of log data	-2.333044	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.481035	95% H-UCL	0.085059
Standard Deviation of log data	1.164279	95% Chebyshev (MVUE) UCL	0.05444
Variance of log data	1.355546	97.5% Chebyshev (MVUE) UCL	0.069248
		99% Chebyshev (MVUE) UCL	0.098336
		95% Non-parametric UCLs	
		CLT UCL	0.035137
		Adj-CLT UCL (Adjusted for skewness)	0.043281
		Mod-t UCL (Adjusted for skewness)	0.038065
		Jackknife UCL	0.036795
		Standard Bootstrap UCL	0.034378
		Bootstrap-t UCL	0.060368
RECOMMENDATION		Hall's Bootstrap UCL	0.093536
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	0.03595
		BCA Bootstrap UCL	0.04675
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	0.05904
		97.5% Chebyshev (Mean, Sd) UCL	0.075651
		99% Chebyshev (Mean, Sd) UCL	0.108281

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Zinc T SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.693098
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	7.5	Data not normal at 5% significance level	
Maximum	17.1		
Mean	9.53	95% UCL (Assuming Normal Distribution)	
Median	8.5	Student's-t UCL	11.19558
Standard Deviation	2.873268		
Variance	8.255667	Gamma Distribution Test	
Coefficient of Variation	0.301497	A-D Test Statistic	0.971673
Skewness	2.411284	A-D 5% Critical Value	0.724748
		K-S Test Statistic	0.240027
Gamma Statistics		K-S 5% Critical Value	0.266348
k hat	16.12025	Data follow approximate gamma distibution	
k star (bias corrected)	11.35084	at 5% significance level	
Theta hat	0.591182		
Theta star	0.839585	95% UCLs (Assuming Gamma Distribution)	
nu hat	322.405	Approximate Gamma UCL	11.20188
nu star	227.0168	Adjusted Gamma UCL	11.52614
Approx.Chi Square Value (.05)	193.1346		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	187.7012	Shapiro-Wilk Test Statisitic	0.783112
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	2.014903		
Maximum of log data	2.839078	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.223107	95% H-UCL	11.16031
Standard Deviation of log data	0.247354	95% Chebyshev (MVUE) UCL	12.74557
Variance of log data	0.061184	97.5% Chebyshev (MVUE) UCL	14.15289
		99% Chebyshev (MVUE) UCL	16.9173
		95% Non-parametric UCLs	
		CLT UCL	11.02453
		Adj-CLT UCL (Adjusted for skewness)	11.76482
		Mod-t UCL (Adjusted for skewness)	11.31105
		Jackknife UCL	11.19558
		Standard Bootstrap UCL	10.9612
		Bootstrap-t UCL	13.9032
RECOMMENDATION		Hall's Bootstrap UCL	16.51955
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	11.14
		BCA Bootstrap UCL	12.05
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	13.49053
		97.5% Chebyshev (Mean, Sd) UCL	15.20425
		99% Chebyshev (Mean, Sd) UCL	18.57053

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Aluminum D SW846 3005/

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.877473
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	4.7	Data are normal at 5% significance level	
Maximum	21.6		
Mean	10.68	95% UCL (Assuming Normal Distribution)	
Median	8.55	Student's-t UCL	14.16632
Standard Deviation	6.014205		
Variance	36.17067	Gamma Distribution Test	
Coefficient of Variation	0.563128	A-D Test Statistic	0.45048
Skewness	0.757164	A-D 5% Critical Value	0.73022
		K-S Test Statistic	0.219008
Gamma Statistics		K-S 5% Critical Value	0.268007
k hat	3.702644	Data follow gamma distribution	
k star (bias corrected)	2.658517	at 5% significance level	
Theta hat	2.884426		
Theta star	4.017277	95% UCLs (Assuming Gamma Distribution)	
nu hat	74.05287	Approximate Gamma UCL	15.17689
nu star	53.17035	Adjusted Gamma UCL	16.16408
Approx.Chi Square Value (.05)	37.41606		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	35.13095	Shapiro-Wilk Test Statisitic	0.915249
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.547563		
Maximum of log data	3.072693	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.227299	95% H-UCL	16.6433
Standard Deviation of log data	0.558328	95% Chebyshev (MVUE) UCL	19.02876
Variance of log data	0.31173	97.5% Chebyshev (MVUE) UCL	22.65297
		99% Chebyshev (MVUE) UCL	29.77204
		95% Non-parametric UCLs	
		CLT UCL	13.80828
		Adj-CLT UCL (Adjusted for skewness)	14.29485
		Mod-t UCL (Adjusted for skewness)	14.24222
		Jackknife UCL	14.16632
		Standard Bootstrap UCL	13.63972
		Bootstrap-t UCL	15.12212
RECOMMENDATION		Hall's Bootstrap UCL	13.69362
Data are normal (0.05)		Percentile Bootstrap UCL	13.9
		BCA Bootstrap UCL	13.98
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	18.97001
		97.5% Chebyshev (Mean, Sd) UCL	22.5571
		99% Chebyshev (Mean, Sd) UCL	29.60326

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Arsenic D SW846 3005/60

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.821938
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.48	Data not normal at 5% significance level	
Maximum	1.6		
Mean	1.1	95% UCL (Assuming Normal Distribution)	
Median	1.25	Student's-t UCL	1.370021
Standard Deviation	0.465809		
Variance	0.216978	Gamma Distribution Test	
Coefficient of Variation	0.423462	A-D Test Statistic	0.997254
Skewness	-0.538306	A-D 5% Critical Value	0.729441
		K-S Test Statistic	0.235109
Gamma Statistics		K-S 5% Critical Value	0.267486
k hat	4.856442	Data follow approximate gamma distibution	
k star (bias corrected)	3.466176	at 5% significance level	
Theta hat	0.226503		
Theta star	0.317353	95% UCLs (Assuming Gamma Distribution)	
nu hat	97.12884	Approximate Gamma UCL	1.490713
nu star	69.32352	Adjusted Gamma UCL	1.573879
Approx.Chi Square Value (.05)	51.15396		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	48.4509	Shapiro-Wilk Test Statisitic	0.768952
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.733969		
Maximum of log data	0.470004	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.011164	95% H-UCL	1.671281
Standard Deviation of log data	0.519908	95% Chebyshev (MVUE) UCL	1.929957
Variance of log data	0.270304	97.5% Chebyshev (MVUE) UCL	2.282442
		99% Chebyshev (MVUE) UCL	2.97483
		95% Non-parametric UCLs	
		CLT UCL	1.34229
		Adj-CLT UCL (Adjusted for skewness)	1.315497
		Mod-t UCL (Adjusted for skewness)	1.365841
		Jackknife UCL	1.370021
		Standard Bootstrap UCL	1.33048
		Bootstrap-t UCL	1.338992
RECOMMENDATION		Hall's Bootstrap UCL	1.305956
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	1.332
		BCA Bootstrap UCL	1.314
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	1.742073
		97.5% Chebyshev (Mean, Sd) UCL	2.019899
		99% Chebyshev (Mean, Sd) UCL	2.565633

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Barium D SW846 3005/602

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.931455
Number of Unique Samples	7	Shapiro-Wilk 5% Critical Value	0.842
Minimum	16.2	Data are normal at 5% significance level	
Maximum	17.7		
Mean	16.94	95% UCL (Assuming Normal Distribution)	
Median	17	Student's-t UCL	17.22816
Standard Deviation	0.497103		
Variance	0.247111	Gamma Distribution Test	
Coefficient of Variation	0.029345	A-D Test Statistic	0.393441
Skewness	0.027678	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.174561
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	1290.023	Data follow gamma distribution	
k star (bias corrected)	903.0827	at 5% significance level	
Theta hat	0.013132		
Theta star	0.018758	95% UCLs (Assuming Gamma Distribution)	
nu hat	25800.46	Approximate Gamma UCL	17.23733
nu star	18061.65	Adjusted Gamma UCL	17.28978
Approx.Chi Square Value (.05)	17750.11		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	17696.26	Shapiro-Wilk Test Statisitic	0.931267
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.785011		
Maximum of log data	2.873565	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.82929	95% H-UCL	N/A
Standard Deviation of log data	0.029354	95% Chebyshev (MVUE) UCL	17.62546
Variance of log data	0.000862	97.5% Chebyshev (MVUE) UCL	17.92206
		99% Chebyshev (MVUE) UCL	18.50467
		95% Non-parametric UCLs	
		CLT UCL	17.19857
		Adj-CLT UCL (Adjusted for skewness)	17.20004
		Mod-t UCL (Adjusted for skewness)	17.22839
		Jackknife UCL	17.22816
		Standard Bootstrap UCL	17.19013
		Bootstrap-t UCL	17.21648
RECOMMENDATION		Hall's Bootstrap UCL	17.23045
Data are normal (0.05)		Percentile Bootstrap UCL	17.19
		BCA Bootstrap UCL	17.19
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	17.62521
		97.5% Chebyshev (Mean, Sd) UCL	17.9217
		99% Chebyshev (Mean, Sd) UCL	18.5041

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Calcium D SW846 3005/6(

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.93687
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.842
Minimum	18100	Data are normal at 5% significance level	
Maximum	19900		
Mean	18870	95% UCL (Assuming Normal Distribution)	
Median	18900	Student's-t UCL	19226.35
Standard Deviation	614.7267		
Variance	377888.9	Gamma Distribution Test	
Coefficient of Variation	0.032577	A-D Test Statistic	0.318389
Skewness	0.274647	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.175925
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	1051.224	Data follow gamma distribution	
k star (bias corrected)	735.9233	at 5% significance level	
Theta hat	17.95051		
Theta star	25.64126	95% UCLs (Assuming Gamma Distribution)	
nu hat	21024.47	Approximate Gamma UCL	19237.44
nu star	14718.47	Adjusted Gamma UCL	19302.34
Approx.Chi Square Value (.05)	14437.34		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	14388.8	Shapiro-Wilk Test Statisitic	0.937265
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	9.803667		
Maximum of log data	9.898475	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.844853	95% H-UCL	N/A
Standard Deviation of log data	0.032483	95% Chebyshev (MVUE) UCL	19714.95
Variance of log data	0.001055	97.5% Chebyshev (MVUE) UCL	20080.57
		99% Chebyshev (MVUE) UCL	20798.76
		95% Non-parametric UCLs	
		CLT UCL	19189.75
		Adj-CLT UCL (Adjusted for skewness)	19207.79
		Mod-t UCL (Adjusted for skewness)	19229.16
		Jackknife UCL	19226.35
		Standard Bootstrap UCL	19179.6
		Bootstrap-t UCL	19251.89
RECOMMENDATION		Hall's Bootstrap UCL	19227.74
Data are normal (0.05)		Percentile Bootstrap UCL	19180
		BCA Bootstrap UCL	19200
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	19717.34
		97.5% Chebyshev (Mean, Sd) UCL	20083.99
		99% Chebyshev (Mean, Sd) UCL	20804.19

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Copper D SW846 3005/60

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.896081
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.842
Minimum	2.2	Data are normal at 5% significance level	
Maximum	2.6		
Mean	2.34	95% UCL (Assuming Normal Distribution)	
Median	2.3	Student's-t UCL	2.418251
Standard Deviation	0.13499		
Variance	0.018222	Gamma Distribution Test	
Coefficient of Variation	0.057688	A-D Test Statistic	0.460374
Skewness	0.772417	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.217681
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	340.9937	Data follow gamma distribution	
k star (bias corrected)	238.7623	at 5% significance level	
Theta hat	0.006862		
Theta star	0.009801	95% UCLs (Assuming Gamma Distribution)	
nu hat	6819.875	Approximate Gamma UCL	2.420931
nu star	4775.246	Adjusted Gamma UCL	2.435364
Approx.Chi Square Value (.05)	4615.611		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	4588.257	Shapiro-Wilk Test Statisitic	0.901091
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.788457		
Maximum of log data	0.955511	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.848684	95% H-UCL	N/A
Standard Deviation of log data	0.05681	95% Chebyshev (MVUE) UCL	2.523248
Variance of log data	0.003227	97.5% Chebyshev (MVUE) UCL	2.602555
		99% Chebyshev (MVUE) UCL	2.758337
		95% Non-parametric UCLs	
		CLT UCL	2.410215
		Adj-CLT UCL (Adjusted for skewness)	2.421356
		Mod-t UCL (Adjusted for skewness)	2.419989
		Jackknife UCL	2.418251
		Standard Bootstrap UCL	2.406419
		Bootstrap-t UCL	2.439604
RECOMMENDATION		Hall's Bootstrap UCL	2.451473
Data are normal (0.05)		Percentile Bootstrap UCL	2.41
		BCA Bootstrap UCL	2.41
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	2.52607
		97.5% Chebyshev (Mean, Sd) UCL	2.606583
		99% Chebyshev (Mean, Sd) UCL	2.764735

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Iron D SW846 3005/6020

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.833769
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	208	Data not normal at 5% significance level	
Maximum	327		
Mean	253.3	95% UCL (Assuming Normal Distribution)	
Median	228.5	Student's-t UCL	278.1551
Standard Deviation	42.87721		
Variance	1838.456	Gamma Distribution Test	
Coefficient of Variation	0.169274	A-D Test Statistic	0.893903
Skewness	0.638612	A-D 5% Critical Value	0.724441
		K-S Test Statistic	0.309389
Gamma Statistics		K-S 5% Critical Value	0.265958
k hat	40.50594	Data do not follow gamma distribution	
k star (bias corrected)	28.42082	at 5% significance level	
Theta hat	6.253404		
Theta star	8.912479	95% UCLs (Assuming Gamma Distribution)	
nu hat	810.1188	Approximate Gamma UCL	280.0589
nu star	568.4165	Adjusted Gamma UCL	285.0442
Approx.Chi Square Value (.05)	514.1058		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	505.1143	Shapiro-Wilk Test Statisitic	0.841682
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	5.337538		
Maximum of log data	5.78996	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.52218	95% H-UCL	280.6244
Standard Deviation of log data	0.16427	95% Chebyshev (MVUE) UCL	310.6973
Variance of log data	0.026985	97.5% Chebyshev (MVUE) UCL	335.5622
		99% Chebyshev (MVUE) UCL	384.4045
		95% Non-parametric UCLs	
		CLT UCL	275.6025
		Adj-CLT UCL (Adjusted for skewness)	278.5283
		Mod-t UCL (Adjusted for skewness)	278.6115
		Jackknife UCL	278.1551
		Standard Bootstrap UCL	275.0467
		Bootstrap-t UCL	279.2837
RECOMMENDATION		Hall's Bootstrap UCL	271.1884
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	274.6
		BCA Bootstrap UCL	276.9
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	312.4022
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	337.9757
		99% Chebyshev (Mean, Sd) UCL	388.21

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Lead D SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.952735
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.21	Data are normal at 5% significance level	
Maximum	0.49		
Mean	0.345	95% UCL (Assuming Normal Distribution)	
Median	0.355	Student's-t UCL	0.401152
Standard Deviation	0.096868		
Variance	0.009383	Gamma Distribution Test	
Coefficient of Variation	0.280776	A-D Test Statistic	0.274339
Skewness	0.006876	A-D 5% Critical Value	0.724887
		K-S Test Statistic	0.173632
Gamma Statistics		K-S 5% Critical Value	0.266474
k hat	13.39855	Data follow gamma distribution	
k star (bias corrected)	9.445648	at 5% significance level	
Theta hat	0.025749		
Theta star	0.036525	95% UCLs (Assuming Gamma Distribution)	
nu hat	267.9709	Approximate Gamma UCL	0.41221
nu star	188.913	Adjusted Gamma UCL	0.425385
Approx.Chi Square Value (.05)	158.1113		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	153.214	Shapiro-Wilk Test Statisitic	0.941643
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.560648		
Maximum of log data	-0.71335	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.101992	95% H-UCL	0.421111
Standard Deviation of log data	0.294741	95% Chebyshev (MVUE) UCL	0.486686
Variance of log data	0.086872	97.5% Chebyshev (MVUE) UCL	0.547818
		99% Chebyshev (MVUE) UCL	0.667901
		95% Non-parametric UCLs	
		CLT UCL	0.395386
		Adj-CLT UCL (Adjusted for skewness)	0.395457
		Mod-t UCL (Adjusted for skewness)	0.401163
		Jackknife UCL	0.401152
		Standard Bootstrap UCL	0.392032
		Bootstrap-t UCL	0.399467
RECOMMENDATION		Hall's Bootstrap UCL	0.392095
Data are normal (0.05)		Percentile Bootstrap UCL	0.394
		BCA Bootstrap UCL	0.395
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.478523
		97.5% Chebyshev (Mean, Sd) UCL	0.536298
		99% Chebyshev (Mean, Sd) UCL	0.649787

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Magnesium D SW846 3005

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.860809
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.842
Minimum	3950	Data are normal at 5% significance level	
Maximum	4290		
Mean	4049	95% UCL (Assuming Normal Distribution)	
Median	4020	Student's-t UCL	4109.394
Standard Deviation	104.1847		
Variance	10854.44	Gamma Distribution Test	
Coefficient of Variation	0.025731	A-D Test Statistic	0.514955
Skewness	1.463244	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.191294
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	1710.852	Data follow gamma distribution	
k star (bias corrected)	1197.663	at 5% significance level	
Theta hat	2.366657		
Theta star	3.380751	95% UCLs (Assuming Gamma Distribution)	
nu hat	34217.04	Approximate Gamma UCL	4110.6
nu star	23953.26	Adjusted Gamma UCL	4121.449
Approx.Chi Square Value (.05)	23594.3		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	23532.2	Shapiro-Wilk Test Statisitic	0.868009
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.281471		
Maximum of log data	8.364042	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.305933	95% H-UCL	N/A
Standard Deviation of log data	0.025365	95% Chebyshev (MVUE) UCL	4190.56
Variance of log data	0.000643	97.5% Chebyshev (MVUE) UCL	4251.818
		99% Chebyshev (MVUE) UCL	4372.148
		95% Non-parametric UCLs	
		CLT UCL	4103.191
		Adj-CLT UCL (Adjusted for skewness)	4119.481
		Mod-t UCL (Adjusted for skewness)	4111.935
		Jackknife UCL	4109.394
		Standard Bootstrap UCL	4100.542
		Bootstrap-t UCL	4142.723
RECOMMENDATION		Hall's Bootstrap UCL	4171.225
Data are normal (0.05)		Percentile Bootstrap UCL	4104
		BCA Bootstrap UCL	4120
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	4192.609
		97.5% Chebyshev (Mean, Sd) UCL	4254.748
		99% Chebyshev (Mean, Sd) UCL	4376.809

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Manganese D SW846 300

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.793617
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	46.1	Data not normal at 5% significance level	
Maximum	59.4		
Mean	50.35	95% UCL (Assuming Normal Distribution)	
Median	48.3	Student's-t UCL	53.05714
Standard Deviation	4.670058		
Variance	21.80944	Gamma Distribution Test	
Coefficient of Variation	0.092752	A-D Test Statistic	1.051013
Skewness	1.150921	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.365979
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	135.9441	Data do not follow gamma distribution	
k star (bias corrected)	95.22751	at 5% significance level	
Theta hat	0.370373		
Theta star	0.528734	95% UCLs (Assuming Gamma Distribution)	
nu hat	2718.881	Approximate Gamma UCL	53.15161
nu star	1904.55	Adjusted Gamma UCL	53.65791
Approx.Chi Square Value (.05)	1804.162		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	1787.138	Shapiro-Wilk Test Statisitic	0.80374
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	3.830813		
Maximum of log data	4.084294	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.915316	95% H-UCL	N/A
Standard Deviation of log data	0.089331	95% Chebyshev (MVUE) UCL	56.54861
Variance of log data	0.00798	97.5% Chebyshev (MVUE) UCL	59.23278
		99% Chebyshev (MVUE) UCL	64.5053
		95% Non-parametric UCLs	
		CLT UCL	52.77912
		Adj-CLT UCL (Adjusted for skewness)	53.35344
		Mod-t UCL (Adjusted for skewness)	53.14673
		Jackknife UCL	53.05714
		Standard Bootstrap UCL	52.68406
		Bootstrap-t UCL	54.2852
RECOMMENDATION		Hall's Bootstrap UCL	52.44641
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	52.7
		BCA Bootstrap UCL	53.16
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	56.78723
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	59.57263
		99% Chebyshev (Mean, Sd) UCL	65.044

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Molybdenum D	SW846 30(
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.899929
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.842
Minimum	1.6	Data are normal at 5% significance level	
Maximum	2.1		
Mean	1.83	95% UCL (Assuming Normal Distribution)	
Median	1.85	Student's-t UCL	1.936011
Standard Deviation	0.182878		
Variance	0.033444	Gamma Distribution Test	
Coefficient of Variation	0.099933	A-D Test Statistic	0.508257
Skewness	-0.144424	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.21052
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	109.7291	Data follow gamma distribution	
k star (bias corrected)	76.87704	at 5% significance level	
Theta hat	0.016677		
Theta star	0.023804	95% UCLs (Assuming Gamma Distribution)	
nu hat	2194.582	Approximate Gamma UCL	1.943888
nu star	1537.541	Adjusted Gamma UCL	1.964553
Approx.Chi Square Value (.05)	1447.46		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	1432.234	Shapiro-Wilk Test Statisitic	0.88942
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.470004		
Maximum of log data	0.741937	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.599752	95% H-UCL	1.945695
Standard Deviation of log data	0.101104	95% Chebyshev (MVUE) UCL	2.085316
Variance of log data	0.010222	97.5% Chebyshev (MVUE) UCL	2.195764
		99% Chebyshev (MVUE) UCL	2.412717
		95% Non-parametric UCLs	
		CLT UCL	1.925124
		Adj-CLT UCL (Adjusted for skewness)	1.922302
		Mod-t UCL (Adjusted for skewness)	1.935571
		Jackknife UCL	1.936011
		Standard Bootstrap UCL	1.920409
		Bootstrap-t UCL	1.932044
RECOMMENDATION		Hall's Bootstrap UCL	1.921794
Data are normal (0.05)		Percentile Bootstrap UCL	1.92
		BCA Bootstrap UCL	1.9
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	2.08208
		97.5% Chebyshev (Mean, Sd) UCL	2.191156
		99% Chebyshev (Mean, Sd) UCL	2.405413

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Nickel D SW846 3005/602(

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.536673
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.842
Minimum	2.9	Data not normal at 5% significance level	
Maximum	4.7		
Mean	3.23	95% UCL (Assuming Normal Distribution)	
Median	3.1	Student's-t UCL	3.534356
Standard Deviation	0.52504		
Variance	0.275667	Gamma Distribution Test	
Coefficient of Variation	0.162551	A-D Test Statistic	1.944298
Skewness	2.972309	A-D 5% Critical Value	0.724367
		K-S Test Statistic	0.408399
Gamma Statistics		K-S 5% Critical Value	0.265857
k hat	52.1394	Data do not follow gamma distribution	
k star (bias corrected)	36.56424	at 5% significance level	
Theta hat	0.061949		
Theta star	0.088338	95% UCLs (Assuming Gamma Distribution)	
nu hat	1042.788	Approximate Gamma UCL	3.527953
nu star	731.2849	Adjusted Gamma UCL	3.58302
Approx.Chi Square Value (.05)	669.5243		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	659.2345	Shapiro-Wilk Test Statisitic	0.57792
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.064711		
Maximum of log data	1.547563	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.162862	95% H-UCL	3.515085
Standard Deviation of log data	0.138637	95% Chebyshev (MVUE) UCL	3.844444
Variance of log data	0.01922	97.5% Chebyshev (MVUE) UCL	4.111681
		99% Chebyshev (MVUE) UCL	4.636616
		95% Non-parametric UCLs	
		CLT UCL	3.503099
		Adj-CLT UCL (Adjusted for skewness)	3.669849
		Mod-t UCL (Adjusted for skewness)	3.560365
		Jackknife UCL	3.534356
		Standard Bootstrap UCL	3.486208
		Bootstrap-t UCL	4.474633
RECOMMENDATION		Hall's Bootstrap UCL	4.694293
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	3.55
		BCA Bootstrap UCL	3.6
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	3.953717
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	4.26687
		99% Chebyshev (Mean, Sd) UCL	4.881999

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Potassium D SW846 3005/

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.907516
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	6400	Data are normal at 5% significance level	
Maximum	7310		
Mean	6886	95% UCL (Assuming Normal Distribution)	
Median	6890	Student's-t UCL	7078.844
Standard Deviation	332.6727		
Variance	110671.1	Gamma Distribution Test	
Coefficient of Variation	0.048311	A-D Test Statistic	0.426621
Skewness	-0.120584	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.180354
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	473.8263	Data follow gamma distribution	
k star (bias corrected)	331.745	at 5% significance level	
Theta hat	14.53275		
Theta star	20.7569	95% UCLs (Assuming Gamma Distribution)	
nu hat	9476.525	Approximate Gamma UCL	7087.217
nu star	6634.901	Adjusted Gamma UCL	7122.977
Approx.Chi Square Value (.05)	6446.526		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	6414.162	Shapiro-Wilk Test Statisitic	0.907277
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.764053		
Maximum of log data	8.896999	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.83619	95% H-UCL	N/A
Standard Deviation of log data	0.048497	95% Chebyshev (MVUE) UCL	7346.431
Variance of log data	0.002352	97.5% Chebyshev (MVUE) UCL	7545.652
		99% Chebyshev (MVUE) UCL	7936.982
		95% Non-parametric UCLs	
		CLT UCL	7059.039
		Adj-CLT UCL (Adjusted for skewness)	7054.753
		Mod-t UCL (Adjusted for skewness)	7078.176
		Jackknife UCL	7078.844
		Standard Bootstrap UCL	7046.802
		Bootstrap-t UCL	7074.324
RECOMMENDATION		Hall's Bootstrap UCL	7057.431
Data are normal (0.05)		Percentile Bootstrap UCL	7047
		BCA Bootstrap UCL	7045
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7344.558
		97.5% Chebyshev (Mean, Sd) UCL	7542.976
		99% Chebyshev (Mean, Sd) UCL	7932.73

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Selenium D SW846 3005/6

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.949266
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.75	Data are normal at 5% significance level	
Maximum	2.7		
Mean	1.53	95% UCL (Assuming Normal Distribution)	
Median	1.475	Student's-t UCL	1.869717
Standard Deviation	0.586041		
Variance	0.343444	Gamma Distribution Test	
Coefficient of Variation	0.383034	A-D Test Statistic	0.285822
Skewness	0.531369	A-D 5% Critical Value	0.727454
		K-S Test Statistic	0.155764
Gamma Statistics		K-S 5% Critical Value	0.267066
k hat	7.273079	Data follow gamma distribution	
k star (bias corrected)	5.157822	at 5% significance level	
Theta hat	0.210365		
Theta star	0.296637	95% UCLs (Assuming Gamma Distribution)	
nu hat	145.4616	Approximate Gamma UCL	1.955355
nu star	103.1564	Adjusted Gamma UCL	2.042498
Approx.Chi Square Value (.05)	80.71647		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	77.27272	Shapiro-Wilk Test Statisitic	0.934535
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.287682		
Maximum of log data	0.993252	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.354949	95% H-UCL	2.056911
Standard Deviation of log data	0.406107	95% Chebyshev (MVUE) UCL	2.405219
Variance of log data	0.164923	97.5% Chebyshev (MVUE) UCL	2.78167
		99% Chebyshev (MVUE) UCL	3.521135
		95% Non-parametric UCLs	
		CLT UCL	1.834828
		Adj-CLT UCL (Adjusted for skewness)	1.868102
		Mod-t UCL (Adjusted for skewness)	1.874907
		Jackknife UCL	1.869717
		Standard Bootstrap UCL	1.814487
		Bootstrap-t UCL	1.899497
RECOMMENDATION		Hall's Bootstrap UCL	1.981411
Data are normal (0.05)		Percentile Bootstrap UCL	1.825
		BCA Bootstrap UCL	1.85
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	2.337802
		97.5% Chebyshev (Mean, Sd) UCL	2.687339
		99% Chebyshev (Mean, Sd) UCL	3.373936

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Sodium D SW846 3005/60

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.83002
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	56300	Data not normal at 5% significance level	
Maximum	64400		
Mean	58690	95% UCL (Assuming Normal Distribution)	
Median	57700	Student's-t UCL	60147.15
Standard Deviation	2513.718		
Variance	6318778	Gamma Distribution Test	
Coefficient of Variation	0.04283	A-D Test Statistic	0.71816
Skewness	1.563412	A-D 5% Critical Value	0.72385
		K-S Test Statistic	0.220455
Gamma Statistics		K-S 5% Critical Value	0.2658
k hat	626.4567	Data follow gamma distribution	
k star (bias corrected)	438.5863	at 5% significance level	
Theta hat	93.68565		
Theta star	133.8163	95% UCLs (Assuming Gamma Distribution)	
nu hat	12529.13	Approximate Gamma UCL	60177.1
nu star	8771.727	Adjusted Gamma UCL	60440.73
Approx.Chi Square Value (.05)	8554.959		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	8517.644	Shapiro-Wilk Test Statisitic	0.840877
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	10.93845		
Maximum of log data	11.07287	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	10.97923	95% H-UCL	N/A
Standard Deviation of log data	0.041772	95% Chebyshev (MVUE) UCL	62068.94
Variance of log data	0.001745	97.5% Chebyshev (MVUE) UCL	63531.35
		99% Chebyshev (MVUE) UCL	66403.97
		95% Non-parametric UCLs	
		CLT UCL	59997.51
		Adj-CLT UCL (Adjusted for skewness)	60417.43
		Mod-t UCL (Adjusted for skewness)	60212.65
		Jackknife UCL	60147.15
		Standard Bootstrap UCL	59938.78
		Bootstrap-t UCL	61754.31
RECOMMENDATION		Hall's Bootstrap UCL	66639.83
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	59970
		BCA Bootstrap UCL	60420
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	62154.92
		97.5% Chebyshev (Mean, Sd) UCL	63654.2
		99% Chebyshev (Mean, Sd) UCL	66599.23

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Uranium D SW846 3005/6(

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.752964
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.0015	Data not normal at 5% significance level	
Maximum	0.018		
Mean	0.0103	95% UCL (Assuming Normal Distribution)	
Median	0.014	Student's-t UCL	0.01477
Standard Deviation	0.007711		
Variance	5.95E-005	Gamma Distribution Test	
Coefficient of Variation	0.748616	A-D Test Statistic	1.477696
Skewness	-0.364565	A-D 5% Critical Value	0.745927
		K-S Test Statistic	0.315392
Gamma Statistics		K-S 5% Critical Value	0.273068
k hat	1.129572	Data do not follow gamma distribution	
k star (bias corrected)	0.857367	at 5% significance level	
Theta hat	0.009119		
Theta star	0.012014	95% UCLs (Assuming Gamma Distribution)	
nu hat	22.59143	Approximate Gamma UCL	0.020124
nu star	17.14734	Adjusted Gamma UCL	0.022769
Approx.Chi Square Value (.05)	8.776259		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	7.756889	Shapiro-Wilk Test Statisitic	0.689515
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-6.50229		
Maximum of log data	-4.017384	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-5.079615	95% H-UCL	0.057491
Standard Deviation of log data	1.228005	95% Chebyshev (MVUE) UCL	0.032954
Variance of log data	1.507997	97.5% Chebyshev (MVUE) UCL	0.042099
		99% Chebyshev (MVUE) UCL	0.060062
		95% Non-parametric UCLs	
		CLT UCL	0.014311
		Adj-CLT UCL (Adjusted for skewness)	0.01401
		Mod-t UCL (Adjusted for skewness)	0.014723
		Jackknife UCL	0.01477
		Standard Bootstrap UCL	0.014063
		Bootstrap-t UCL	0.014565
RECOMMENDATION		Hall's Bootstrap UCL	0.013432
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.0142
		BCA Bootstrap UCL	0.0137
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.020929
		97.5% Chebyshev (Mean, Sd) UCL	0.025527
		99% Chebyshev (Mean, Sd) UCL	0.034561

Recommended UCL exceeds the maximum observation

Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Zinc D SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.790142
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	3	Data not normal at 5% significance level	
Maximum	14		
Mean	7.115	95% UCL (Assuming Normal Distribution)	
Median	4.325	Student's-t UCL	9.725677
Standard Deviation	4.503644		
Variance	20.28281	Gamma Distribution Test	
Coefficient of Variation	0.632979	A-D Test Statistic	0.974536
Skewness	0.586402	A-D 5% Critical Value	0.732536
		K-S Test Statistic	0.29866
Gamma Statistics		K-S 5% Critical Value	0.268593
k hat	2.895152	Data do not follow gamma distribution	
k star (bias corrected)	2.093273	at 5% significance level	
Theta hat	2.457557		
Theta star	3.398983	95% UCLs (Assuming Gamma Distribution)	
nu hat	57.90304	Approximate Gamma UCL	10.62641
nu star	41.86546	Adjusted Gamma UCL	11.4225
Approx.Chi Square Value (.05)	28.03137		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	26.07772	Shapiro-Wilk Test Statisitic	0.818084
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.098612		
Maximum of log data	2.639057	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.779673	95% H-UCL	12.05502
Standard Deviation of log data	0.632308	95% Chebyshev (MVUE) UCL	13.40716
Variance of log data	0.399814	97.5% Chebyshev (MVUE) UCL	16.14653
		99% Chebyshev (MVUE) UCL	21.52749
		95% Non-parametric UCLs	
		CLT UCL	9.457563
		Adj-CLT UCL (Adjusted for skewness)	9.739752
		Mod-t UCL (Adjusted for skewness)	9.769693
		Jackknife UCL	9.725677
		Standard Bootstrap UCL	9.341135
		Bootstrap-t UCL	10.45872
RECOMMENDATION		Hall's Bootstrap UCL	8.825502
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	9.43
		BCA Bootstrap UCL	9.59
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	13.32284
		97.5% Chebyshev (Mean, Sd) UCL	16.00898
		99% Chebyshev (Mean, Sd) UCL	21.28538

Table 5
Summary Statistics
Assabet River Surface Water, Downstream

Parameter	Frequency of Detection	Percent Detected	Range of NonDetects	Range of Detected Concentrations	Mean	Std Dev	CV	Skewness	Distribution	95% UCL on the mean	Method	95th Percentile	95/95 UTL	Maximum Detected	Mean + 3 SD
VOCs (UG/L)															
Methyl ethyl ketone	5 / 5	100%	:	0.0023 - 0.011	0.00544	0.00346	0.636	1.228	Normal	0.009	Student's-t UCL	0.013	0.020	0.011	0.016
Methyl Tertbutyl Ether	3 / 5	60%	0.0005 : 0.0005	0.00025 - 0.00027	0.000258	0.000011	0.043	0.609	Non-parametric	0.00027	Modified-t UCL	0.00027	*	0.00027	
Total Metals (UG/L)															
Aluminum	5 / 5	100%	:	42.3 - 180	86.2	55.3	0.642	1.719	Normal	138.897	Student's-t UCL	204.1	318.4	180.0	252.1
Arsenic	4 / 5	80%	0.96 : 0.96	0.97 - 2.3	1.25	0.69	0.552	0.865	Normal	1.907	Student's-t UCL	2.72	4.14	2.30	3.32
Barium	5 / 5	100%	:	16.8 - 20.7	17.92	1.61	0.090	1.906	G/NP	19.662	Approximate Gamma UCL	20.7	*	20.7	
Cadmium	2 / 5	40%	0.013 : 0.013	0.017 - 0.022	0.012	0.0073	0.608	0.865	Normal	0.019	Student's-t UCL	0.022	*	0.022	
Calcium	5 / 5	100%	:	20200 - 21000	20600	374.2	0.018	-0.382	Normal	20956.730	Student's-t UCL	21398	22172	21000	21723
Cobalt	5 / 5	100%	:	0.41 - 0.81	0.528	0.166	0.314	1.758	Normal	0.686	Student's-t UCL	0.88	1.22	0.81	1.03
Copper	5 / 5	100%	:	3.3 - 7.1	4.44	1.57	0.354	1.710	Normal	5.939	Student's-t UCL	7.79	11.05	7.10	9.15
Iron	5 / 5	100%	:	482 - 975	630.8	203.9	0.323	1.705	Normal	825.202	Student's-t UCL	1066	1488	975	1243
Lead	5 / 5	100%	:	1.2 - 4.8	2.16	1.52	0.704	1.960	G/NP	4.444	Approximate Gamma UCL	4.8	*	4.8	
Magnesium	5 / 5	100%	:	4780 - 5160	5020	159.4	0.032	-0.993	Normal	5171.945	Student's-t UCL	5360	5690	5160	5498
Manganese	5 / 5	100%	:	62.6 - 151	91.44	36	0.394	1.555	Normal	125.730	Student's-t UCL	168.2	242.6	151	199.4
Molybdenum	5 / 5	100%	:	1.8 - 2	1.94	0.089	0.046	-1.258	Normal	2.025	Student's-t UCL	2.13	2.31	2.00	2.21
Nickel	5 / 5	100%	:	3.7 - 4.2	3.88	0.19	0.049	1.517	Normal	4.063	Student's-t UCL	4.29	4.69	4.20	4.45
Potassium	5 / 5	100%	:	7430 - 7980	7590	224.6	0.030	1.921	Lognormal	7818.522	Modified-t UCL			7980	
Potassium (log-transform)					8.934	0.0291						8071	8572	7980	8278
Selenium	1 / 5	20%	1.5 : 1.5	1.7 - 1.7	0.94	0.42	0.447	2.236	Non-parametric	1.377	Modified-t UCL	1.7	*	1.7	
Sodium	5 / 5	100%	:	60800 - 66500	64560	2296	0.036	-1.463	Normal	66749.270	Student's-t UCL	69455	74209	66500	71448
Titanium	1 / 5	20%	7 : 7	8.2 - 8.2	4.44	2.1	0.473	2.236	Non-parametric	6.601	Modified-t UCL	8.2	*	8.2	
Uranium	5 / 5	100%	:	0.037 - 0.067	0.0296	0.020968	0.708	2.204	Non-parametric	0.070	95% Chebyshev (Mean, Sd) UCL	0.074	0.097	0.067	0.093
Zinc	5 / 5	100%	:	7.3 - 12.3	9.24	1.9	0.206	1.208	Normal	11.051	Student's-t UCL	13.29	17.22	12.30	14.94
Dissolved Metals (UG/L)															
Aluminum	5 / 5	100%	:	12.6 - 15.1	14.06	1.17	0.083	-0.564	Normal	15.179	Student's-t UCL	16.55	18.99	15.10	17.57
Arsenic	4 / 5	80%	0.96 : 0.96	0.98 - 2.2	1.31	0.71	0.542	0.299	Normal	1.992	Student's-t UCL	2.82	4.31	2.20	3.44
Barium	5 / 5	100%	:	17.2 - 17.8	17.48	0.3	0.017	0.315	Normal	17.769	Student's-t UCL	18.12	18.75	17.80	18.38
Calcium	5 / 5	100%	:	19900 - 21400	20440	568.3	0.028	1.613	Normal	20981.840	Student's-t UCL	21652	22828	21400	22145
Cobalt	5 / 5	100%	:	0.38 - 0.49	0.426	0.051	0.120	0.459	Normal	0.475	Student's-t UCL	0.53	0.64	0.49	0.58
Copper	5 / 5	100%	:	2.3 - 2.9	2.54	0.23	0.091	1.033	Normal	2.759	Student's-t UCL	3.03	3.51	2.90	3.23
Iron	5 / 5	100%	:	171 - 392	271.4	82.1	0.303	0.532	Normal	349.655	Student's-t UCL	446.4	616.3	392.0	517.7
Lead	5 / 5	100%	:	0.23 - 0.44	0.35	0.094	0.269	-0.553	Normal	0.440	Student's-t UCL	0.55	0.74	0.44	0.63
Magnesium	5 / 5	100%	:	4470 - 4660	4550	74.2	0.016	0.735	Normal	4620.705	Student's-t UCL	4708	4862	4660	4773
Manganese	5 / 5	100%	:	55.5 - 106	76.74	21.14	0.275	0.689	Normal	96.895	Student's-t UCL	121.8	165.6	106.0	140.2
Molybdenum	5 / 5	100%	:	2 - 2.1	2.02	0.045	0.022	2.236	Non-parametric	2.066	Modified-t UCL	2.1	*	2.1	
Nickel	5 / 5	100%	:	3.7 - 3.9	3.78	0.084	0.022	0.512	Normal	3.860	Student's-t UCL	3.96	4.13	3.90	4.03
Potassium	5 / 5	100%	:	7570 - 8340	7942	339.7	0.043	-0.017	Normal	8265.830	Student's-t UCL	8666	9369	8340	8961
Selenium	4 / 5	80%	1.5 : 1.5	2.3 - 2.6	2.07	0.75	0.362	-2.082	Non-parametric	3.528	95% Chebyshev (Mean, Sd) UCL	2.6	*	2.6	
Sodium	5 / 5	100%	:	67300 - 73100	70400	2218	0.032	-0.309	Normal	72514.720	Student's-t UCL	75129	79720	73100	77054
Uranium	5 / 5	100%	:	0.027 - 0.035	0.015	0.001541	0.103	1.281	Normal	0.016	Student's-t UCL	0.018	0.043	0.035	0.020
Zinc	2 / 5	40%	7.9 : 9.5	10.8 - 11	6.92	3.65	0.527	0.580009	G/NP	12.734	Approximate Gamma UCL	11	*	11	
Zirconium	1 / 5	20%	0.15 : 0.51	1.4 - 1.4	0.404	0.56	1.386	2.163493	G/NP	1.670	Approximate Gamma UCL	1.4	*	1.4	

Notes: 1. For 5 samples, the non-parametric 95th percentile is the 5th ordered sample, i.e., the same as the maximum.
2. For 5 samples, the non-parametric one-sided 95% UCL on the mean is the 4th ordered sample.
3. The Student-t value for 5-1 = 4 degrees of freedom and 95% level of confidence is 2.132.
4. The factor for a one-sided 95% coverage, 95% tolerance limit is 4.202.
5. * - To determine a one-sided 95/95 UTL for a non-parametric distribution requires more samples than available.
6. G/NP - PROUCL recommended a gamma distribution for determining the 95% UCL on the mean, other statistics generated assuming a non-parametric distribution.
7. The mean and standard deviation are computed with NDs replaced with DL/2.

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Methyl ethyl ketone	T	SW8

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.888144
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	0.0023	Data are normal at 5% significance level	
Maximum	0.011		
Mean	0.00544	95% UCL (Assuming Normal Distribution)	
Median	0.0052	Student's-t UCL	0.008743
Standard Deviation	0.003465		
Variance	1.2E-005	Gamma Distribution Test	
Coefficient of Variation	0.636863	A-D Test Statistic	0.278909
Skewness	1.228456	A-D 5% Critical Value	0.682154
		K-S Test Statistic	0.216392
Gamma Statistics		K-S 5% Critical Value	0.359088
k hat	3.34273	Data follow gamma distribution	
k star (bias corrected)	1.470425	at 5% significance level	
Theta hat	0.001627		
Theta star	0.0037	95% UCLs (Assuming Gamma Distribution)	
nu hat	33.4273	Approximate Gamma UCL	0.011338
nu star	14.70425	Adjusted Gamma UCL	0.016269
Approx.Chi Square Value (.05)	7.055116		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	4.916861	Shapiro-Wilk Test Statisitic	0.951927
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-6.074846		
Maximum of log data	-4.50986	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-5.370948	95% H-UCL	0.016252
Standard Deviation of log data	0.625182	95% Chebyshev (MVUE) UCL	0.011919
Variance of log data	0.390852	97.5% Chebyshev (MVUE) UCL	0.014733
		99% Chebyshev (MVUE) UCL	0.02026
		95% Non-parametric UCLs	
		CLT UCL	0.007989
		Adj-CLT UCL (Adjusted for skewness)	0.008898
		Mod-t UCL (Adjusted for skewness)	0.008885
		Jackknife UCL	0.008743
		Standard Bootstrap UCL	0.007744
		Bootstrap-t UCL	0.010504
RECOMMENDATION		Hall's Bootstrap UCL	0.018866
Data are normal (0.05)		Percentile Bootstrap UCL	0.0078
		BCA Bootstrap UCL	0.00824
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.012194
		97.5% Chebyshev (Mean, Sd) UCL	0.015116
		99% Chebyshev (Mean, Sd) UCL	0.020856

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Methyl Tertbutyl Ether T SV

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.683879
Number of Unique Samples	2	Shapiro-Wilk 5% Critical Value	0.762
Minimum	0.00025	Data not normal at 5% significance level	
Maximum	0.00027		
Mean	0.000258	95% UCL (Assuming Normal Distribution)	
Median	0.00025	Student's-t UCL	0.000268
Standard Deviation	1.1E-005		
Variance	1.2E-010	Gamma Distribution Test	
Coefficient of Variation	0.042459	A-D Test Statistic	0.946324
Skewness	0.608581	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.392899
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	700.201	Data do not follow gamma distribution	
k star (bias corrected)	280.2137	at 5% significance level	
Theta hat	3.68E-007		
Theta star	9.21E-007	95% UCLs (Assuming Gamma Distribution)	
nu hat	7002.01	Approximate Gamma UCL	0.00027
nu star	2802.137	Adjusted Gamma UCL	0.000275
Approx.Chi Square Value (.05)	2680.122		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	2626.877	Shapiro-Wilk Test Statisitic	0.683879
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-8.29405		
Maximum of log data	-8.217089	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-8.263265	95% H-UCL	N/A
Standard Deviation of log data	0.042153	95% Chebyshev (MVUE) UCL	0.000279
Variance of log data	0.001777	97.5% Chebyshev (MVUE) UCL	0.000288
		99% Chebyshev (MVUE) UCL	0.000306
		95% Non-parametric UCLs	
		CLT UCL	0.000266
		Adj-CLT UCL (Adjusted for skewness)	0.000267
		Mod-t UCL (Adjusted for skewness)	0.000269
		Jackknife UCL	0.000268
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/A
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.000279
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	0.000289
		99% Chebyshev (Mean, Sd) UCL	0.000307

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Aluminum T	SW846 3005/6

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.822008
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	42.3	Data are normal at 5% significance level	
Maximum	180		
Mean	86.2	95% UCL (Assuming Normal Distribution)	
Median	66.6	Student's-t UCL	138.8968
Standard Deviation	55.27309		
Variance	3055.115	Gamma Distribution Test	
Coefficient of Variation	0.641219	A-D Test Statistic	0.353236
Skewness	1.718796	A-D 5% Critical Value	0.68152
		K-S Test Statistic	0.220464
Gamma Statistics		K-S 5% Critical Value	0.358646
k hat	3.798432	Data follow gamma distribution	
k star (bias corrected)	1.652706	at 5% significance level	
Theta hat	22.69357		
Theta star	52.15688	95% UCLs (Assuming Gamma Distribution)	
nu hat	37.98432	Approximate Gamma UCL	170.9421
nu star	16.52706	Adjusted Gamma UCL	238.8632
Approx.Chi Square Value (.05)	8.334007		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	5.96422	Shapiro-Wilk Test Statisitic	0.94007
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	3.744787		
Maximum of log data	5.192957	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.3193	95% H-UCL	212.7052
Standard Deviation of log data	0.56097	95% Chebyshev (MVUE) UCL	176.8723
Variance of log data	0.314687	97.5% Chebyshev (MVUE) UCL	216.626
		99% Chebyshev (MVUE) UCL	294.7144
		95% Non-parametric UCLs	
		CLT UCL	126.8589
		Adj-CLT UCL (Adjusted for skewness)	147.1614
		Mod-t UCL (Adjusted for skewness)	142.0636
		Jackknife UCL	138.8968
		Standard Bootstrap UCL	121.9223
		Bootstrap-t UCL	245.6046
RECOMMENDATION		Hall's Bootstrap UCL	310.6021
Data are normal (0.05)		Percentile Bootstrap UCL	120.96
		BCA Bootstrap UCL	136.42
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	193.9471
		97.5% Chebyshev (Mean, Sd) UCL	240.5694
		99% Chebyshev (Mean, Sd) UCL	332.1497

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Arsenic T SW846 3005/602

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.94207
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	0.48	Data are normal at 5% significance level	
Maximum	2.3		
Mean	1.25	95% UCL (Assuming Normal Distribution)	
Median	1	Student's-t UCL	1.906872
Standard Deviation	0.688985		
Variance	0.4747	Gamma Distribution Test	
Coefficient of Variation	0.551188	A-D Test Statistic	0.231516
Skewness	0.865205	A-D 5% Critical Value	0.681211
		K-S Test Statistic	0.204096
Gamma Statistics		K-S 5% Critical Value	0.358442
k hat	4.054641	Data follow gamma distribution	
k star (bias corrected)	1.75519	at 5% significance level	
Theta hat	0.308289		
Theta star	0.712174	95% UCLs (Assuming Gamma Distribution)	
nu hat	40.54641	Approximate Gamma UCL	2.41989
nu star	17.5519	Adjusted Gamma UCL	3.338603
Approx.Chi Square Value (.05)	9.066477		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	6.571573	Shapiro-Wilk Test Statisitic	0.971683
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.733969		
Maximum of log data	0.832909	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.094789	95% H-UCL	3.321776
Standard Deviation of log data	0.581561	95% Chebyshev (MVUE) UCL	2.660007
Variance of log data	0.338213	97.5% Chebyshev (MVUE) UCL	3.267945
		99% Chebyshev (MVUE) UCL	4.46212
		95% Non-parametric UCLs	
		CLT UCL	1.756818
		Adj-CLT UCL (Adjusted for skewness)	1.884209
		Mod-t UCL (Adjusted for skewness)	1.926742
		Jackknife UCL	1.906872
		Standard Bootstrap UCL	1.706855
		Bootstrap-t UCL	2.393351
RECOMMENDATION		Hall's Bootstrap UCL	6.098874
Data are normal (0.05)		Percentile Bootstrap UCL	1.774
		BCA Bootstrap UCL	1.774
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	2.593079
		97.5% Chebyshev (Mean, Sd) UCL	3.17423
		99% Chebyshev (Mean, Sd) UCL	4.315789

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Barium T SW846 3005/602

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.750979
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.762
Minimum	16.8	Data not normal at 5% significance level	
Maximum	20.7		
Mean	17.92	95% UCL (Assuming Normal Distribution)	
Median	17.1	Student's-t UCL	19.45197
Standard Deviation	1.60686		
Variance	2.582	Gamma Distribution Test	
Coefficient of Variation	0.089669	A-D Test Statistic	0.707902
Skewness	1.905848	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.316329
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	165.5453	Data follow approximate gamma distibution	
k star (bias corrected)	66.35145	at 5% significance level	
Theta hat	0.108248		
Theta star	0.270077	95% UCLs (Assuming Gamma Distribution)	
nu hat	1655.453	Approximate Gamma UCL	19.6616
nu star	663.5145	Adjusted Gamma UCL	20.50601
Approx.Chi Square Value (.05)	604.7412		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	579.8388	Shapiro-Wilk Test Statisitic	0.765398
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.821379		
Maximum of log data	3.030134	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.882894	95% H-UCL	N/A
Standard Deviation of log data	0.085596	95% Chebyshev (MVUE) UCL	20.90739
Variance of log data	0.007327	97.5% Chebyshev (MVUE) UCL	22.20077
		99% Chebyshev (MVUE) UCL	24.74136
		95% Non-parametric UCLs	
		CLT UCL	19.10201
		Adj-CLT UCL (Adjusted for skewness)	19.75646
		Mod-t UCL (Adjusted for skewness)	19.55405
		Jackknife UCL	19.45197
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	21.05235
		97.5% Chebyshev (Mean, Sd) UCL	22.40772
		99% Chebyshev (Mean, Sd) UCL	25.07008

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Cadmium T SW846 3005/6

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.765146
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.762
Minimum	0.0065	Data are normal at 5% significance level	
Maximum	0.022		
Mean	0.0117	95% UCL (Assuming Normal Distribution)	
Median	0.0065	Student's-t UCL	0.018695
Standard Deviation	0.007337		
Variance	5.38E-005	Gamma Distribution Test	
Coefficient of Variation	0.627056	A-D Test Statistic	0.76987
Skewness	0.864988	A-D 5% Critical Value	0.681998
		K-S Test Statistic	0.390263
Gamma Statistics		K-S 5% Critical Value	0.358979
k hat	3.454699	Data do not follow gamma distribution	
k star (bias corrected)	1.515213	at 5% significance level	
Theta hat	0.003387		
Theta star	0.007722	95% UCLs (Assuming Gamma Distribution)	
nu hat	34.54699	Approximate Gamma UCL	0.024066
nu star	15.15213	Adjusted Gamma UCL	0.03429
Approx.Chi Square Value (.05)	7.366288		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	5.170006	Shapiro-Wilk Test Statisitic	0.744193
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-5.035953		
Maximum of log data	-3.816713	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.599823	95% H-UCL	0.032711
Standard Deviation of log data	0.604113	95% Chebyshev (MVUE) UCL	0.025063
Variance of log data	0.364953	97.5% Chebyshev (MVUE) UCL	0.030891
		99% Chebyshev (MVUE) UCL	0.042338
		95% Non-parametric UCLs	
		CLT UCL	0.017097
		Adj-CLT UCL (Adjusted for skewness)	0.018453
		Mod-t UCL (Adjusted for skewness)	0.018906
		Jackknife UCL	0.018695
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.026002
		97.5% Chebyshev (Mean, Sd) UCL	0.03219
		99% Chebyshev (Mean, Sd) UCL	0.044346

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Calcium T SW846 3005/60

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.81714
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.762
Minimum	20200	Data are normal at 5% significance level	
Maximum	21000		
Mean	20600	95% UCL (Assuming Normal Distribution)	
Median	20800	Student's-t UCL	20956.73
Standard Deviation	374.1657		
Variance	140000	Gamma Distribution Test	
Coefficient of Variation	0.018163	A-D Test Statistic	0.61843
Skewness	-0.381802	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.32583
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	3777.977	Data follow gamma distribution	
k star (bias corrected)	1511.324	at 5% significance level	
Theta hat	5.452654		
Theta star	13.63043	95% UCLs (Assuming Gamma Distribution)	
nu hat	37779.77	Approximate Gamma UCL	20995.78
nu star	15113.24	Adjusted Gamma UCL	21176.09
Approx.Chi Square Value (.05)	14828.35		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	14702.09	Shapiro-Wilk Test Statisitic	0.815442
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	9.913438		
Maximum of log data	9.952278	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.932914	95% H-UCL	N/A
Standard Deviation of log data	0.018203	95% Chebyshev (MVUE) UCL	21330.98
Variance of log data	0.000331	97.5% Chebyshev (MVUE) UCL	21647.28
		99% Chebyshev (MVUE) UCL	22268.58
		95% Non-parametric UCLs	
		CLT UCL	20875.24
		Adj-CLT UCL (Adjusted for skewness)	20844.71
		Mod-t UCL (Adjusted for skewness)	20951.96
		Jackknife UCL	20956.73
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	21329.38
		97.5% Chebyshev (Mean, Sd) UCL	21644.99
		99% Chebyshev (Mean, Sd) UCL	22264.93

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Cobalt T SW846 3005/602

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.790905
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	0.41	Data are normal at 5% significance level	
Maximum	0.81		
Mean	0.528	95% UCL (Assuming Normal Distribution)	
Median	0.46	Student's-t UCL	0.686016
Standard Deviation	0.165741		
Variance	0.02747	Gamma Distribution Test	
Coefficient of Variation	0.313903	A-D Test Statistic	0.525625
Skewness	1.758067	A-D 5% Critical Value	0.678786
		K-S Test Statistic	0.267686
Gamma Statistics		K-S 5% Critical Value	0.357378
k hat	14.9367	Data follow gamma distribution	
k star (bias corrected)	6.108015	at 5% significance level	
Theta hat	0.035349		
Theta star	0.086444	95% UCLs (Assuming Gamma Distribution)	
nu hat	149.367	Approximate Gamma UCL	0.731252
nu star	61.08015	Adjusted Gamma UCL	0.85131
Approx.Chi Square Value (.05)	44.10291		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	37.88316	Shapiro-Wilk Test Statisitic	0.840593
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.891598		
Maximum of log data	-0.210721	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.672507	95% H-UCL	0.738257
Standard Deviation of log data	0.279849	95% Chebyshev (MVUE) UCL	0.813079
Variance of log data	0.078316	97.5% Chebyshev (MVUE) UCL	0.937046
		99% Chebyshev (MVUE) UCL	1.180554
		95% Non-parametric UCLs	
		CLT UCL	0.649919
		Adj-CLT UCL (Adjusted for skewness)	0.712189
		Mod-t UCL (Adjusted for skewness)	0.695728
		Jackknife UCL	0.686016
		Standard Bootstrap UCL	0.640175
		Bootstrap-t UCL	1.174909
RECOMMENDATION		Hall's Bootstrap UCL	1.404955
Data are normal (0.05)		Percentile Bootstrap UCL	0.652
		BCA Bootstrap UCL	0.678
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.851088
		97.5% Chebyshev (Mean, Sd) UCL	0.990889
		99% Chebyshev (Mean, Sd) UCL	1.2655

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Copper T SW846 3005/602

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.801097
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	3.3	Data are normal at 5% significance level	
Maximum	7.1		
Mean	4.44	95% UCL (Assuming Normal Distribution)	
Median	3.8	Student's-t UCL	5.93928
Standard Deviation	1.572578		
Variance	2.473	Gamma Distribution Test	
Coefficient of Variation	0.354184	A-D Test Statistic	0.492485
Skewness	1.709598	A-D 5% Critical Value	0.678845
		K-S Test Statistic	0.26398
Gamma Statistics		K-S 5% Critical Value	0.357512
k hat	11.8235	Data follow gamma distribution	
k star (bias corrected)	4.862731	at 5% significance level	
Theta hat	0.375523		
Theta star	0.913067	95% UCLs (Assuming Gamma Distribution)	
nu hat	118.235	Approximate Gamma UCL	6.422457
nu star	48.62731	Adjusted Gamma UCL	7.637572
Approx.Chi Square Value (.05)	33.61724		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	28.26884	Shapiro-Wilk Test Statisitic	0.855913
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.193922		
Maximum of log data	1.960095	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.44777	95% H-UCL	6.556126
Standard Deviation of log data	0.314617	95% Chebyshev (MVUE) UCL	7.128404
Variance of log data	0.098984	97.5% Chebyshev (MVUE) UCL	8.298484
		99% Chebyshev (MVUE) UCL	10.59688
		95% Non-parametric UCLs	
		CLT UCL	5.596789
		Adj-CLT UCL (Adjusted for skewness)	6.171324
		Mod-t UCL (Adjusted for skewness)	6.028896
		Jackknife UCL	5.93928
		Standard Bootstrap UCL	5.477502
		Bootstrap-t UCL	10.3168
RECOMMENDATION		Hall's Bootstrap UCL	10.91299
Data are normal (0.05)		Percentile Bootstrap UCL	5.68
		BCA Bootstrap UCL	5.86
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	7.505518
		97.5% Chebyshev (Mean, Sd) UCL	8.83197
		99% Chebyshev (Mean, Sd) UCL	11.43753

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Iron T SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.793879
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	482	Data are normal at 5% significance level	
Maximum	975		
Mean	630.8	95% UCL (Assuming Normal Distribution)	
Median	529	Student's-t UCL	825.2021
Standard Deviation	203.9061		
Variance	41577.7	Gamma Distribution Test	
Coefficient of Variation	0.32325	A-D Test Statistic	0.537966
Skewness	1.704733	A-D 5% Critical Value	0.678803
		K-S Test Statistic	0.309101
Gamma Statistics		K-S 5% Critical Value	0.357416
k hat	14.05672	Data follow gamma distribution	
k star (bias corrected)	5.75602	at 5% significance level	
Theta hat	44.87535		
Theta star	109.5896	95% UCLs (Assuming Gamma Distribution)	
nu hat	140.5672	Approximate Gamma UCL	883.0716
nu star	57.5602	Adjusted Gamma UCL	1033.454
Approx.Chi Square Value (.05)	41.11668		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	35.1336	Shapiro-Wilk Test Statisitic	0.84136
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	6.177944		
Maximum of log data	6.882437	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.410997	95% H-UCL	894.1183
Standard Deviation of log data	0.288735	95% Chebyshev (MVUE) UCL	982.0465
Variance of log data	0.083368	97.5% Chebyshev (MVUE) UCL	1134.802
		99% Chebyshev (MVUE) UCL	1434.86
		95% Non-parametric UCLs	
		CLT UCL	780.7935
		Adj-CLT UCL (Adjusted for skewness)	855.0778
		Mod-t UCL (Adjusted for skewness)	836.789
		Jackknife UCL	825.2021
		Standard Bootstrap UCL	762.9682
		Bootstrap-t UCL	1887.603
RECOMMENDATION		Hall's Bootstrap UCL	1797.197
Data are normal (0.05)		Percentile Bootstrap UCL	787.2
		BCA Bootstrap UCL	813
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	1028.286
		97.5% Chebyshev (Mean, Sd) UCL	1200.279
		99% Chebyshev (Mean, Sd) UCL	1538.125

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Lead T SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.725719
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	1.2	Data not normal at 5% significance level	
Maximum	4.8		
Mean	2.16	95% UCL (Assuming Normal Distribution)	
Median	1.4	Student's-t UCL	3.606831
Standard Deviation	1.517564		
Variance	2.303	Gamma Distribution Test	
Coefficient of Variation	0.702576	A-D Test Statistic	0.63066
Skewness	1.959942	A-D 5% Critical Value	0.682001
		K-S Test Statistic	0.314063
Gamma Statistics		K-S 5% Critical Value	0.358981
k hat	3.452311	Data follow gamma distribution	
k star (bias corrected)	1.514258	at 5% significance level	
Theta hat	0.625668		
Theta star	1.426441	95% UCLs (Assuming Gamma Distribution)	
nu hat	34.52311	Approximate Gamma UCL	4.44424
nu star	15.14258	Adjusted Gamma UCL	6.333133
Approx.Chi Square Value (.05)	7.359632		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	5.16458	Shapiro-Wilk Test Statisitic	0.818114
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.182322		
Maximum of log data	1.568616	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.618342	95% H-UCL	5.460631
Standard Deviation of log data	0.573276	95% Chebyshev (MVUE) UCL	4.440932
Variance of log data	0.328645	97.5% Chebyshev (MVUE) UCL	5.449207
		99% Chebyshev (MVUE) UCL	7.429767
		95% Non-parametric UCLs	
		CLT UCL	3.276321
		Adj-CLT UCL (Adjusted for skewness)	3.911946
		Mod-t UCL (Adjusted for skewness)	3.705976
		Jackknife UCL	3.606831
		Standard Bootstrap UCL	3.158217
		Bootstrap-t UCL	17.39622
RECOMMENDATION		Hall's Bootstrap UCL	11.66275
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	3.4
		BCA Bootstrap UCL	3.72
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	5.118277
		97.5% Chebyshev (Mean, Sd) UCL	6.398325
		99% Chebyshev (Mean, Sd) UCL	8.912733

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Magnesium T SW846 3005

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.890605
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	4780	Data are normal at 5% significance level	
Maximum	5160		
Mean	5020	95% UCL (Assuming Normal Distribution)	
Median	5080	Student's-t UCL	5171.945
Standard Deviation	159.3738		
Variance	25400	Gamma Distribution Test	
Coefficient of Variation	0.031748	A-D Test Statistic	0.387262
Skewness	-0.99306	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.264949
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	1223.935	Data follow gamma distribution	
k star (bias corrected)	489.7073	at 5% significance level	
Theta hat	4.101525		
Theta star	10.25102	95% UCLs (Assuming Gamma Distribution)	
nu hat	12239.35	Approximate Gamma UCL	5191.39
nu star	4897.073	Adjusted Gamma UCL	5270.438
Approx.Chi Square Value (.05)	4735.4		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	4664.377	Shapiro-Wilk Test Statisitic	0.887444
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.472196		
Maximum of log data	8.548692	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.520777	95% H-UCL	N/A
Standard Deviation of log data	0.032066	95% Chebyshev (MVUE) UCL	5333.799
Variance of log data	0.001028	97.5% Chebyshev (MVUE) UCL	5469.574
		99% Chebyshev (MVUE) UCL	5736.278
		95% Non-parametric UCLs	
		CLT UCL	5137.235
		Adj-CLT UCL (Adjusted for skewness)	5103.413
		Mod-t UCL (Adjusted for skewness)	5166.67
		Jackknife UCL	5171.945
		Standard Bootstrap UCL	5126.592
		Bootstrap-t UCL	5136.39
RECOMMENDATION		Hall's Bootstrap UCL	5091.559
Data are normal (0.05)		Percentile Bootstrap UCL	5124
		BCA Bootstrap UCL	5104
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	5330.677
		97.5% Chebyshev (Mean, Sd) UCL	5465.107
		99% Chebyshev (Mean, Sd) UCL	5729.169

Recommended UCL exceeds the maximum observation

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Manganese T SW846 3005

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.82381
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	62.6	Data are normal at 5% significance level	
Maximum	151		
Mean	91.44	95% UCL (Assuming Normal Distribution)	
Median	72.5	Student's-t UCL	125.7304
Standard Deviation	35.96683		
Variance	1293.613	Gamma Distribution Test	
Coefficient of Variation	0.393338	A-D Test Statistic	0.470669
Skewness	1.554682	A-D 5% Critical Value	0.679066
		K-S Test Statistic	0.31838
Gamma Statistics		K-S 5% Critical Value	0.357663
k hat	9.492394	Data follow gamma distribution	
k star (bias corrected)	3.930291	at 5% significance level	
Theta hat	9.632976		
Theta star	23.26545	95% UCLs (Assuming Gamma Distribution)	
nu hat	94.92394	Approximate Gamma UCL	138.5484
nu star	39.30291	Adjusted Gamma UCL	168.5848
Approx.Chi Square Value (.05)	25.93936		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	21.3178	Shapiro-Wilk Test Statisitic	0.880241
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.136765		
Maximum of log data	5.01728	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.462085	95% H-UCL	144.104
Standard Deviation of log data	0.352946	95% Chebyshev (MVUE) UCL	153.4373
Variance of log data	0.124571	97.5% Chebyshev (MVUE) UCL	180.4285
		99% Chebyshev (MVUE) UCL	233.4475
		95% Non-parametric UCLs	
		CLT UCL	117.8972
		Adj-CLT UCL (Adjusted for skewness)	129.8469
		Mod-t UCL (Adjusted for skewness)	127.5943
		Jackknife UCL	125.7304
		Standard Bootstrap UCL	115.5074
		Bootstrap-t UCL	261.3285
RECOMMENDATION		Hall's Bootstrap UCL	376.5747
Data are normal (0.05)		Percentile Bootstrap UCL	117.62
		BCA Bootstrap UCL	124.92
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	161.5523
		97.5% Chebyshev (Mean, Sd) UCL	191.8899
		99% Chebyshev (Mean, Sd) UCL	251.4823

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Molybdenum T SW846 300

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.770772
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.762
Minimum	1.8	Data are normal at 5% significance level	
Maximum	2		
Mean	1.94	95% UCL (Assuming Normal Distribution)	
Median	2	Student's-t UCL	2.025274
Standard Deviation	0.089443		
Variance	0.008	Gamma Distribution Test	
Coefficient of Variation	0.046104	A-D Test Statistic	0.691301
Skewness	-1.257788	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.372547
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	573.8542	Data do not follow gamma distribution	
k star (bias corrected)	229.675	at 5% significance level	
Theta hat	0.003381		
Theta star	0.008447	95% UCLs (Assuming Gamma Distribution)	
nu hat	5738.542	Approximate Gamma UCL	2.037919
nu star	2296.75	Adjusted Gamma UCL	2.083682
Approx.Chi Square Value (.05)	2186.395		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	2138.376	Shapiro-Wilk Test Statisitic	0.76948
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.587787		
Maximum of log data	0.693147	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.661816	95% H-UCL	N/A
Standard Deviation of log data	0.046967	95% Chebyshev (MVUE) UCL	2.117629
Variance of log data	0.002206	97.5% Chebyshev (MVUE) UCL	2.19448
		99% Chebyshev (MVUE) UCL	2.345439
		95% Non-parametric UCLs	
		CLT UCL	2.005794
		Adj-CLT UCL (Adjusted for skewness)	1.981753
		Mod-t UCL (Adjusted for skewness)	2.021524
		Jackknife UCL	2.025274
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	2.114356
		97.5% Chebyshev (Mean, Sd) UCL	2.1898
		99% Chebyshev (Mean, Sd) UCL	2.337995
Recommended UCL exceeds the maximum observation			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Nickel T SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.858394
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.762
Minimum	3.7	Data are normal at 5% significance level	
Maximum	4.2		
Mean	3.88	95% UCL (Assuming Normal Distribution)	
Median	3.8	Student's-t UCL	4.063388
Standard Deviation	0.192354		
Variance	0.037	Gamma Distribution Test	
Coefficient of Variation	0.049576	A-D Test Statistic	0.471839
Skewness	1.517474	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.277353
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	523.208	Data follow gamma distribution	
k star (bias corrected)	209.4165	at 5% significance level	
Theta hat	0.007416		
Theta star	0.018528	95% UCLs (Assuming Gamma Distribution)	
nu hat	5232.08	Approximate Gamma UCL	4.085475
nu star	2094.165	Adjusted Gamma UCL	4.181695
Approx.Chi Square Value (.05)	1988.841		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	1943.078	Shapiro-Wilk Test Statisitic	0.868951
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.308333		
Maximum of log data	1.435085	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.354879	95% H-UCL	N/A
Standard Deviation of log data	0.048546	95% Chebyshev (MVUE) UCL	4.247094
Variance of log data	0.002357	97.5% Chebyshev (MVUE) UCL	4.405958
		99% Chebyshev (MVUE) UCL	4.718016
		95% Non-parametric UCLs	
		CLT UCL	4.021496
		Adj-CLT UCL (Adjusted for skewness)	4.083874
		Mod-t UCL (Adjusted for skewness)	4.073118
		Jackknife UCL	4.063388
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	4.254967
		97.5% Chebyshev (Mean, Sd) UCL	4.417215
		99% Chebyshev (Mean, Sd) UCL	4.735921

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Potassium T SW846 3005/

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.76175
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	7430	Data not normal at 5% significance level	
Maximum	7980		
Mean	7590	95% UCL (Assuming Normal Distribution)	
Median	7530	Student's-t UCL	7804.142
Standard Deviation	224.6108		
Variance	50450	Gamma Distribution Test	
Coefficient of Variation	0.029593	A-D Test Statistic	0.692358
Skewness	1.920733	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.359542
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	1459.235	Data do not follow gamma distribution	
k star (bias corrected)	583.8272	at 5% significance level	
Theta hat	5.201356		
Theta star	13.00042	95% UCLs (Assuming Gamma Distribution)	
nu hat	14592.35	Approximate Gamma UCL	7826.795
nu star	5838.272	Adjusted Gamma UCL	7935.746
Approx.Chi Square Value (.05)	5661.639		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	5583.909	Shapiro-Wilk Test Statisitic	0.767335
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.913281		
Maximum of log data	8.984694	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.934244	95% H-UCL	N/A
Standard Deviation of log data	0.029109	95% Chebyshev (MVUE) UCL	8020.643
Variance of log data	0.000847	97.5% Chebyshev (MVUE) UCL	8206.995
		99% Chebyshev (MVUE) UCL	8573.048
		95% Non-parametric UCLs	
		CLT UCL	7755.224
		Adj-CLT UCL (Adjusted for skewness)	7847.419
		Mod-t UCL (Adjusted for skewness)	7818.522
		Jackknife UCL	7804.142
		Standard Bootstrap UCL	7735.822
		Bootstrap-t UCL	8112.281
RECOMMENDATION		Hall's Bootstrap UCL	8498.669
Data are lognormal (0.05)		Percentile Bootstrap UCL	7764
		BCA Bootstrap UCL	7800
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	8027.847
Use Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	8217.304
		99% Chebyshev (Mean, Sd) UCL	8589.455

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Selenium T SW846 3005/6

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.552116
Number of Unique Samples	2	Shapiro-Wilk 5% Critical Value	0.762
Minimum	0.75	Data not normal at 5% significance level	
Maximum	1.7		
Mean	0.94	95% UCL (Assuming Normal Distribution)	
Median	0.75	Student's-t UCL	1.345051
Standard Deviation	0.424853		
Variance	0.1805	Gamma Distribution Test	
Coefficient of Variation	0.451971	A-D Test Statistic	1.335323
Skewness	2.236068	A-D 5% Critical Value	0.679536
		K-S Test Statistic	0.493142
Gamma Statistics		K-S 5% Critical Value	0.357848
k hat	8.208865	Data do not follow gamma distribution	
k star (bias corrected)	3.416879	at 5% significance level	
Theta hat	0.11451		
Theta star	0.275105	95% UCLs (Assuming Gamma Distribution)	
nu hat	82.08865	Approximate Gamma UCL	1.473526
nu star	34.16879	Adjusted Gamma UCL	1.823684
Approx.Chi Square Value (.05)	21.79716		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	17.61197	Shapiro-Wilk Test Statisitic	0.552116
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.287682		
Maximum of log data	0.530628	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.12402	95% H-UCL	1.509213
Standard Deviation of log data	0.36596	95% Chebyshev (MVUE) UCL	1.592974
Variance of log data	0.133926	97.5% Chebyshev (MVUE) UCL	1.879178
		99% Chebyshev (MVUE) UCL	2.441371
		95% Non-parametric UCLs	
		CLT UCL	1.252522
		Adj-CLT UCL (Adjusted for skewness)	1.45554
		Mod-t UCL (Adjusted for skewness)	1.376717
		Jackknife UCL	1.345051
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/A
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	1.768191
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	2.12655
		99% Chebyshev (Mean, Sd) UCL	2.830476

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Sodium T SW846 3005/60	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.855034
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	60800	Data are normal at 5% significance level	
Maximum	66500		
Mean	64560	95% UCL (Assuming Normal Distribution)	
Median	65600	Student's-t UCL	66749.27
Standard Deviation	2296.301		
Variance	5273000	Gamma Distribution Test	
Coefficient of Variation	0.035568	A-D Test Statistic	0.48078
Skewness	-1.462506	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.294603
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	966.85	Data follow gamma distribution	
k star (bias corrected)	386.8733	at 5% significance level	
Theta hat	66.77355		
Theta star	166.8763	95% UCLs (Assuming Gamma Distribution)	
nu hat	9668.5	Approximate Gamma UCL	67048.2
nu star	3868.733	Adjusted Gamma UCL	68199.91
Approx.Chi Square Value (.05)	3725.162		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	3662.254	Shapiro-Wilk Test Statisitic	0.84863
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	11.01535		
Maximum of log data	11.10496	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	11.07483	95% H-UCL	N/A
Standard Deviation of log data	0.036157	95% Chebyshev (MVUE) UCL	69110.51
Variance of log data	0.001307	97.5% Chebyshev (MVUE) UCL	71079.36
		99% Chebyshev (MVUE) UCL	74946.79
		95% Non-parametric UCLs	
		CLT UCL	66249.16
		Adj-CLT UCL (Adjusted for skewness)	65531.47
		Mod-t UCL (Adjusted for skewness)	66637.33
		Jackknife UCL	66749.27
		Standard Bootstrap UCL	66070.46
		Bootstrap-t UCL	66185.98
RECOMMENDATION		Hall's Bootstrap UCL	65562.64
Data are normal (0.05)		Percentile Bootstrap UCL	65960
		BCA Bootstrap UCL	65700
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	69036.32
		97.5% Chebyshev (Mean, Sd) UCL	70973.22
		99% Chebyshev (Mean, Sd) UCL	74777.9
Recommended UCL exceeds the maximum observation			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Titanium T SW846 3005/6(	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.552116
Number of Unique Samples	2	Shapiro-Wilk 5% Critical Value	0.762
Minimum	3.5	Data not normal at 5% significance level	
Maximum	8.2		
Mean	4.44	95% UCL (Assuming Normal Distribution)	
Median	3.5	Student's-t UCL	6.443935
Standard Deviation	2.101904		
Variance	4.418	Gamma Distribution Test	
Coefficient of Variation	0.473402	A-D Test Statistic	1.335578
Skewness	2.236068	A-D 5% Critical Value	0.679774
		K-S Test Statistic	0.493282
Gamma Statistics		K-S 5% Critical Value	0.357942
k hat	7.557365	Data do not follow gamma distribution	
k star (bias corrected)	3.156279	at 5% significance level	
Theta hat	0.587506		
Theta star	1.40672	95% UCLs (Assuming Gamma Distribution)	
nu hat	75.57365	Approximate Gamma UCL	7.105142
nu star	31.56279	Adjusted Gamma UCL	8.885277
Approx.Chi Square Value (.05)	19.72358		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	15.77202	Shapiro-Wilk Test Statisitic	0.552116
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	1.252763		
Maximum of log data	2.104134	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.423037	95% H-UCL	7.318491
Standard Deviation of log data	0.380745	95% Chebyshev (MVUE) UCL	7.640477
Variance of log data	0.144967	97.5% Chebyshev (MVUE) UCL	9.044785
		99% Chebyshev (MVUE) UCL	11.80328
		95% Non-parametric UCLs	
		CLT UCL	5.986162
		Adj-CLT UCL (Adjusted for skewness)	6.990566
		Mod-t UCL (Adjusted for skewness)	6.600602
		Jackknife UCL	6.443935
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/A
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	8.537365
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	10.3103
		99% Chebyshev (Mean, Sd) UCL	13.79288

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Uranium T SW846 3005/6(

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.622125
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	0.0185	Data not normal at 5% significance level	
Maximum	0.067		
Mean	0.0296	95% UCL (Assuming Normal Distribution)	
Median	0.021	Student's-t UCL	0.049591
Standard Deviation	0.020968		
Variance	0.00044	Gamma Distribution Test	
Coefficient of Variation	0.708393	A-D Test Statistic	0.988829
Skewness	2.203757	A-D 5% Critical Value	0.681713
		K-S Test Statistic	0.426617
Gamma Statistics		K-S 5% Critical Value	0.35878
k hat	3.660042	Data do not follow gamma distribution	
k star (bias corrected)	1.59735	at 5% significance level	
Theta hat	0.008087		
Theta star	0.018531	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.60042	Approximate Gamma UCL	0.059532
nu star	15.9735	Adjusted Gamma UCL	0.08381
Approx.Chi Square Value (.05)	7.942229		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	5.641486	Shapiro-Wilk Test Statisitic	0.682853
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-3.989985		
Maximum of log data	-2.703063	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.662767	95% H-UCL	0.068603
Standard Deviation of log data	0.542196	95% Chebyshev (MVUE) UCL	0.058911
Variance of log data	0.293976	97.5% Chebyshev (MVUE) UCL	0.071941
		99% Chebyshev (MVUE) UCL	0.097535
		95% Non-parametric UCLs	
		CLT UCL	0.045024
		Adj-CLT UCL (Adjusted for skewness)	0.054899
		Mod-t UCL (Adjusted for skewness)	0.051131
		Jackknife UCL	0.049591
		Standard Bootstrap UCL	0.043311
		Bootstrap-t UCL	0.217186
RECOMMENDATION		Hall's Bootstrap UCL	0.183163
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	0.0478
		BCA Bootstrap UCL	0.0485
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	0.070475
		97.5% Chebyshev (Mean, Sd) UCL	0.088162
		99% Chebyshev (Mean, Sd) UCL	0.122904
Recommended UCL exceeds the maximum observation			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Zinc T SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.904281
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	7.3	Data are normal at 5% significance level	
Maximum	12.3		
Mean	9.24	95% UCL (Assuming Normal Distribution)	
Median	9.2	Student's-t UCL	11.05094
Standard Deviation	1.899474		
Variance	3.608	Gamma Distribution Test	
Coefficient of Variation	0.205571	A-D Test Statistic	0.319977
Skewness	1.208046	A-D 5% Critical Value	0.678522
		K-S Test Statistic	0.261888
Gamma Statistics		K-S 5% Critical Value	0.357043
k hat	31.74983	Data follow gamma distribution	
k star (bias corrected)	12.83327	at 5% significance level	
Theta hat	0.291025		
Theta star	0.720004	95% UCLs (Assuming Gamma Distribution)	
nu hat	317.4983	Approximate Gamma UCL	11.49461
nu star	128.3327	Adjusted Gamma UCL	12.71039
Approx.Chi Square Value (.05)	103.1609		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	93.29327	Shapiro-Wilk Test Statisitic	0.940993
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.987874		
Maximum of log data	2.509599	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.207711	95% H-UCL	11.48988
Standard Deviation of log data	0.195905	95% Chebyshev (MVUE) UCL	12.75746
Variance of log data	0.038379	97.5% Chebyshev (MVUE) UCL	14.28154
		99% Chebyshev (MVUE) UCL	17.27529
		95% Non-parametric UCLs	
		CLT UCL	10.63725
		Adj-CLT UCL (Adjusted for skewness)	11.12763
		Mod-t UCL (Adjusted for skewness)	11.12743
		Jackknife UCL	11.05094
		Standard Bootstrap UCL	10.47533
		Bootstrap-t UCL	12.23111
RECOMMENDATION		Hall's Bootstrap UCL	17.10623
Data are normal (0.05)		Percentile Bootstrap UCL	10.48
		BCA Bootstrap UCL	10.7
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	12.94276
		97.5% Chebyshev (Mean, Sd) UCL	14.54494
		99% Chebyshev (Mean, Sd) UCL	17.69212

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Aluminum D	SW846 3005/

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.988069
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	67300	Data are normal at 5% significance level	
Maximum	73100		
Mean	70400	95% UCL (Assuming Normal Distribution)	
Median	70300	Student's-t UCL	72514.72
Standard Deviation	2218.107		
Variance	4920000	Gamma Distribution Test	
Coefficient of Variation	0.031507	A-D Test Statistic	0.182898
Skewness	-0.309033	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.160794
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	1253.497	Data follow gamma distribution	
k star (bias corrected)	501.5323	at 5% significance level	
Theta hat	56.16286		
Theta star	140.3698	95% UCLs (Assuming Gamma Distribution)	
nu hat	12534.97	Approximate Gamma UCL	72774.3
nu star	5015.323	Adjusted Gamma UCL	73868.99
Approx.Chi Square Value (.05)	4851.695		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	4779.796	Shapiro-Wilk Test Statisitic	0.986153
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	11.11692		
Maximum of log data	11.19958	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	11.16155	95% H-UCL	N/A
Standard Deviation of log data	0.031618	95% Chebyshev (MVUE) UCL	74739.07
Variance of log data	0.001	97.5% Chebyshev (MVUE) UCL	76616.56
		99% Chebyshev (MVUE) UCL	80304.53
		95% Non-parametric UCLs	
		CLT UCL	72031.64
		Adj-CLT UCL (Adjusted for skewness)	71885.16
		Mod-t UCL (Adjusted for skewness)	72491.87
		Jackknife UCL	72514.72
		Standard Bootstrap UCL	71886.47
		Bootstrap-t UCL	72526.09
RECOMMENDATION		Hall's Bootstrap UCL	72585.66
Data are normal (0.05)		Percentile Bootstrap UCL	71760
		BCA Bootstrap UCL	71720
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	74723.89
		97.5% Chebyshev (Mean, Sd) UCL	76594.84
		99% Chebyshev (Mean, Sd) UCL	80269.95

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Arsenic D SW846 3005/60	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.916149
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	0.48	Data are normal at 5% significance level	
Maximum	2.2		
Mean	1.312	95% UCL (Assuming Normal Distribution)	
Median	1	Student's-t UCL	1.991868
Standard Deviation	0.713106		
Variance	0.50852	Gamma Distribution Test	
Coefficient of Variation	0.543526	A-D Test Statistic	0.325589
Skewness	0.299467	A-D 5% Critical Value	0.681481
		K-S Test Statistic	0.230559
Gamma Statistics		K-S 5% Critical Value	0.358618
k hat	3.826407	Data follow gamma distribution	
k star (bias corrected)	1.663896	at 5% significance level	
Theta hat	0.34288		
Theta star	0.788511	95% UCLs (Assuming Gamma Distribution)	
nu hat	38.26407	Approximate Gamma UCL	2.594665
nu star	16.63896	Adjusted Gamma UCL	3.62033
Approx.Chi Square Value (.05)	8.413542		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	6.029925	Shapiro-Wilk Test Statisitic	0.926568
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.733969		
Maximum of log data	0.788457	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.135228	95% H-UCL	3.780599
Standard Deviation of log data	0.608549	95% Chebyshev (MVUE) UCL	2.870701
Variance of log data	0.370332	97.5% Chebyshev (MVUE) UCL	3.540409
		99% Chebyshev (MVUE) UCL	4.855919
		95% Non-parametric UCLs	
		CLT UCL	1.836561
		Adj-CLT UCL (Adjusted for skewness)	1.882198
		Mod-t UCL (Adjusted for skewness)	1.998987
		Jackknife UCL	1.991868
		Standard Bootstrap UCL	1.778326
		Bootstrap-t UCL	2.640441
RECOMMENDATION		Hall's Bootstrap UCL	4.296466
Data are normal (0.05)		Percentile Bootstrap UCL	1.796
		BCA Bootstrap UCL	1.796
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	2.702099
		97.5% Chebyshev (Mean, Sd) UCL	3.303596
		99% Chebyshev (Mean, Sd) UCL	4.485121

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Barium D SW846 3005/602

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.802814
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.762
Minimum	17.2	Data are normal at 5% significance level	
Maximum	17.8		
Mean	17.48	95% UCL (Assuming Normal Distribution)	
Median	17.4	Student's-t UCL	17.76918
Standard Deviation	0.303315		
Variance	0.092	Gamma Distribution Test	
Coefficient of Variation	0.017352	A-D Test Statistic	0.627839
Skewness	0.315356	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.28076
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	4160.159	Data follow gamma distribution	
k star (bias corrected)	1664.197	at 5% significance level	
Theta hat	0.004202		
Theta star	0.010504	95% UCLs (Assuming Gamma Distribution)	
nu hat	41601.59	Approximate Gamma UCL	17.79981
nu star	16641.97	Adjusted Gamma UCL	17.94541
Approx.Chi Square Value (.05)	16342.96		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	16210.37	Shapiro-Wilk Test Statisitic	0.803607
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.844909		
Maximum of log data	2.879198	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.860937	95% H-UCL	N/A
Standard Deviation of log data	0.017325	95% Chebyshev (MVUE) UCL	18.07035
Variance of log data	0.0003	97.5% Chebyshev (MVUE) UCL	18.3258
		99% Chebyshev (MVUE) UCL	18.82758
		95% Non-parametric UCLs	
		CLT UCL	17.70312
		Adj-CLT UCL (Adjusted for skewness)	17.72356
		Mod-t UCL (Adjusted for skewness)	17.77237
		Jackknife UCL	17.76918
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	18.07127
		97.5% Chebyshev (Mean, Sd) UCL	18.32711
		99% Chebyshev (Mean, Sd) UCL	18.82967

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Calcium D SW846 3005/60

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.845479
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	19900	Data are normal at 5% significance level	
Maximum	21400		
Mean	20440	95% UCL (Assuming Normal Distribution)	
Median	20300	Student's-t UCL	20981.84
Standard Deviation	568.3309		
Variance	323000	Gamma Distribution Test	
Coefficient of Variation	0.027805	A-D Test Statistic	0.526972
Skewness	1.613001	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.333966
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	1645.14	Data follow gamma distribution	
k star (bias corrected)	658.1893	at 5% significance level	
Theta hat	12.42448		
Theta star	31.0549	95% UCLs (Assuming Gamma Distribution)	
nu hat	16451.4	Approximate Gamma UCL	21039.74
nu star	6581.893	Adjusted Gamma UCL	21315.26
Approx.Chi Square Value (.05)	6394.276		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	6311.623	Shapiro-Wilk Test Statisitic	0.852134
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	9.898475		
Maximum of log data	9.971146	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.924945	95% H-UCL	N/A
Standard Deviation of log data	0.027448	95% Chebyshev (MVUE) UCL	21533.57
Variance of log data	0.000753	97.5% Chebyshev (MVUE) UCL	22006.78
		99% Chebyshev (MVUE) UCL	22936.31
		95% Non-parametric UCLs	
		CLT UCL	20858.06
		Adj-CLT UCL (Adjusted for skewness)	21053.97
		Mod-t UCL (Adjusted for skewness)	21012.4
		Jackknife UCL	20981.84
		Standard Bootstrap UCL	20812.21
		Bootstrap-t UCL	21489.29
RECOMMENDATION		Hall's Bootstrap UCL	22937.65
Data are normal (0.05)		Percentile Bootstrap UCL	20880
		BCA Bootstrap UCL	20940
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	21547.88
		97.5% Chebyshev (Mean, Sd) UCL	22027.26
		99% Chebyshev (Mean, Sd) UCL	22968.91

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Cobalt D SW846 3005/602
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.854696
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.762
Minimum	0.38	Data are normal at 5% significance level	
Maximum	0.49		
Mean	0.426	95% UCL (Assuming Normal Distribution)	
Median	0.41	Student's-t UCL	0.474893
Standard Deviation	0.051284		
Variance	0.00263	Gamma Distribution Test	
Coefficient of Variation	0.120384	A-D Test Statistic	0.467004
Skewness	0.458941	A-D 5% Critical Value	0.678124
		K-S Test Statistic	0.244755
Gamma Statistics		K-S 5% Critical Value	0.35683
k hat	87.70449	Data follow gamma distribution	
k star (bias corrected)	35.21513	at 5% significance level	
Theta hat	0.004857		
Theta star	0.012097	95% UCLs (Assuming Gamma Distribution)	
nu hat	877.0449	Approximate Gamma UCL	0.484461
nu star	352.1513	Adjusted Gamma UCL	0.513678
Approx.Chi Square Value (.05)	309.6565		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	292.0439	Shapiro-Wilk Test Statisitic	0.856066
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-0.967584		
Maximum of log data	-0.71335	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.859028	95% H-UCL	0.482306
Standard Deviation of log data	0.119026	95% Chebyshev (MVUE) UCL	0.524769
Variance of log data	0.014167	97.5% Chebyshev (MVUE) UCL	0.567516
		99% Chebyshev (MVUE) UCL	0.651484
		95% Non-parametric UCLs	
		CLT UCL	0.463724
		Adj-CLT UCL (Adjusted for skewness)	0.468754
		Mod-t UCL (Adjusted for skewness)	0.475678
		Jackknife UCL	0.474893
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.52597
		97.5% Chebyshev (Mean, Sd) UCL	0.569227
		99% Chebyshev (Mean, Sd) UCL	0.654197

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Copper D SW846 3005/60	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.94258
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	2.3	Data are normal at 5% significance level	
Maximum	2.9		
Mean	2.54	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	2.759487
Standard Deviation	0.230217		
Variance	0.053	Gamma Distribution Test	
Coefficient of Variation	0.090637	A-D Test Statistic	0.24938
Skewness	1.032659	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.174359
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	157.1067	Data follow gamma distribution	
k star (bias corrected)	62.97602	at 5% significance level	
Theta hat	0.016167		
Theta star	0.040333	95% UCLs (Assuming Gamma Distribution)	
nu hat	1571.067	Approximate Gamma UCL	2.79389
nu star	629.7602	Adjusted Gamma UCL	2.91725
Approx.Chi Square Value (.05)	572.5319		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	548.3215	Shapiro-Wilk Test Statisitic	0.957815
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.832909		
Maximum of log data	1.064711	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.928978	95% H-UCL	N/A
Standard Deviation of log data	0.088573	95% Chebyshev (MVUE) UCL	2.978296
Variance of log data	0.007845	97.5% Chebyshev (MVUE) UCL	3.168002
		99% Chebyshev (MVUE) UCL	3.540642
		95% Non-parametric UCLs	
		CLT UCL	2.709348
		Adj-CLT UCL (Adjusted for skewness)	2.760153
		Mod-t UCL (Adjusted for skewness)	2.767412
		Jackknife UCL	2.759487
		Standard Bootstrap UCL	2.691599
		Bootstrap-t UCL	2.870195
RECOMMENDATION		Hall's Bootstrap UCL	3.724238
Data are normal (0.05)		Percentile Bootstrap UCL	2.7
		BCA Bootstrap UCL	2.72
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	2.988776
		97.5% Chebyshev (Mean, Sd) UCL	3.182962
		99% Chebyshev (Mean, Sd) UCL	3.564402

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Iron D SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.983503
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	171	Data are normal at 5% significance level	
Maximum	392		
Mean	271.4	95% UCL (Assuming Normal Distribution)	
Median	262	Student's-t UCL	349.6553
Standard Deviation	82.08106		
Variance	6737.3	Gamma Distribution Test	
Coefficient of Variation	0.302436	A-D Test Statistic	0.171543
Skewness	0.53162	A-D 5% Critical Value	0.67881
		K-S Test Statistic	0.137612
Gamma Statistics		K-S 5% Critical Value	0.357433
k hat	13.66227	Data follow gamma distribution	
k star (bias corrected)	5.59824	at 5% significance level	
Theta hat	19.86493		
Theta star	48.47952	95% UCLs (Assuming Gamma Distribution)	
nu hat	136.6227	Approximate Gamma UCL	381.9081
nu star	55.9824	Adjusted Gamma UCL	448.0736
Approx.Chi Square Value (.05)	39.78345		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	33.90876	Shapiro-Wilk Test Statisitic	0.995682
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	5.141664		
Maximum of log data	5.971262	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.56655	95% H-UCL	396.9322
Standard Deviation of log data	0.306429	95% Chebyshev (MVUE) UCL	433.1159
Variance of log data	0.093898	97.5% Chebyshev (MVUE) UCL	503.0572
		99% Chebyshev (MVUE) UCL	640.4433
		95% Non-parametric UCLs	
		CLT UCL	331.7789
		Adj-CLT UCL (Adjusted for skewness)	341.104
		Mod-t UCL (Adjusted for skewness)	351.1098
		Jackknife UCL	349.6553
		Standard Bootstrap UCL	326.8965
		Bootstrap-t UCL	367.5997
RECOMMENDATION		Hall's Bootstrap UCL	434.5232
Data are normal (0.05)		Percentile Bootstrap UCL	323
		BCA Bootstrap UCL	328.4
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	431.4054
		97.5% Chebyshev (Mean, Sd) UCL	500.6399
		99% Chebyshev (Mean, Sd) UCL	636.6376

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Lead D SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.872653
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	0.23	Data are normal at 5% significance level	
Maximum	0.44		
Mean	0.35	95% UCL (Assuming Normal Distribution)	
Median	0.39	Student's-t UCL	0.43969
Standard Deviation	0.094074		
Variance	0.00885	Gamma Distribution Test	
Coefficient of Variation	0.268784	A-D Test Statistic	0.469641
Skewness	-0.552514	A-D 5% Critical Value	0.67877
		K-S Test Statistic	0.298871
Gamma Statistics		K-S 5% Critical Value	0.357341
k hat	15.791	Data follow gamma distribution	
k star (bias corrected)	6.449734	at 5% significance level	
Theta hat	0.022165		
Theta star	0.054266	95% UCLs (Assuming Gamma Distribution)	
nu hat	157.91	Approximate Gamma UCL	0.48013
nu star	64.49734	Adjusted Gamma UCL	0.556376
Approx.Chi Square Value (.05)	47.01657		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	40.5734	Shapiro-Wilk Test Statisitic	0.861051
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-1.469676		
Maximum of log data	-0.820981	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.08182	95% H-UCL	0.498998
Standard Deviation of log data	0.289752	95% Chebyshev (MVUE) UCL	0.547886
Variance of log data	0.083956	97.5% Chebyshev (MVUE) UCL	0.633299
		99% Chebyshev (MVUE) UCL	0.801078
		95% Non-parametric UCLs	
		CLT UCL	0.419201
		Adj-CLT UCL (Adjusted for skewness)	0.408094
		Mod-t UCL (Adjusted for skewness)	0.437957
		Jackknife UCL	0.43969
		Standard Bootstrap UCL	0.412548
		Bootstrap-t UCL	0.428981
RECOMMENDATION		Hall's Bootstrap UCL	0.38745
Data are normal (0.05)		Percentile Bootstrap UCL	0.412
		BCA Bootstrap UCL	0.398
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.533385
		97.5% Chebyshev (Mean, Sd) UCL	0.612736
		99% Chebyshev (Mean, Sd) UCL	0.768605

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Magnesium D	SW846 300
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.963316
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	4470	Data are normal at 5% significance level	
Maximum	4660		
Mean	4550	95% UCL (Assuming Normal Distribution)	
Median	4540	Student's-t UCL	4620.705
Standard Deviation	74.16198		
Variance	5500	Gamma Distribution Test	
Coefficient of Variation	0.016299	A-D Test Statistic	0.270288
Skewness	0.735491	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.211797
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	4726.948	Data follow gamma distribution	
k star (bias corrected)	1890.913	at 5% significance level	
Theta hat	0.962566		
Theta star	2.406245	95% UCLs (Assuming Gamma Distribution)	
nu hat	47269.48	Approximate Gamma UCL	4628.027
nu star	18909.13	Adjusted Gamma UCL	4663.515
Approx.Chi Square Value (.05)	18590.33		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	18448.86	Shapiro-Wilk Test Statisitic	0.965261
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.405144		
Maximum of log data	8.446771	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.422777	95% H-UCL	N/A
Standard Deviation of log data	0.016243	95% Chebyshev (MVUE) UCL	4694.069
Variance of log data	0.000264	97.5% Chebyshev (MVUE) UCL	4756.409
		99% Chebyshev (MVUE) UCL	4878.862
		95% Non-parametric UCLs	
		CLT UCL	4604.554
		Adj-CLT UCL (Adjusted for skewness)	4616.21
		Mod-t UCL (Adjusted for skewness)	4622.524
		Jackknife UCL	4620.705
		Standard Bootstrap UCL	4598.363
		Bootstrap-t UCL	4648.883
RECOMMENDATION		Hall's Bootstrap UCL	4722.61
Data are normal (0.05)		Percentile Bootstrap UCL	4604
		BCA Bootstrap UCL	4604
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	4694.568
		97.5% Chebyshev (Mean, Sd) UCL	4757.123
		99% Chebyshev (Mean, Sd) UCL	4880

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Manganese D	SW846 300
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.902788
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	55.5	Data are normal at 5% significance level	
Maximum	106		
Mean	76.74	95% UCL (Assuming Normal Distribution)	
Median	66.6	Student's-t UCL	96.89543
Standard Deviation	21.14079		
Variance	446.933	Gamma Distribution Test	
Coefficient of Variation	0.275486	A-D Test Statistic	0.362079
Skewness	0.688918	A-D 5% Critical Value	0.678743
		K-S Test Statistic	0.28888
Gamma Statistics		K-S 5% Critical Value	0.357281
k hat	17.19436	Data follow gamma distribution	
k star (bias corrected)	7.011077	at 5% significance level	
Theta hat	4.463092		
Theta star	10.94554	95% UCLs (Assuming Gamma Distribution)	
nu hat	171.9436	Approximate Gamma UCL	103.8043
nu star	70.11077	Adjusted Gamma UCL	119.4739
Approx.Chi Square Value (.05)	51.83117		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	45.03327	Shapiro-Wilk Test Statisitic	0.922727
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.016383		
Maximum of log data	4.663439	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.311062	95% H-UCL	105.6809
Standard Deviation of log data	0.268539	95% Chebyshev (MVUE) UCL	116.7364
Variance of log data	0.072113	97.5% Chebyshev (MVUE) UCL	134.0646
		99% Chebyshev (MVUE) UCL	168.1024
		95% Non-parametric UCLs	
		CLT UCL	92.29118
		Adj-CLT UCL (Adjusted for skewness)	95.40361
		Mod-t UCL (Adjusted for skewness)	97.3809
		Jackknife UCL	96.89543
		Standard Bootstrap UCL	90.94484
		Bootstrap-t UCL	139.279
RECOMMENDATION		Hall's Bootstrap UCL	285.7567
Data are normal (0.05)		Percentile Bootstrap UCL	91.82
		BCA Bootstrap UCL	91.82
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	117.951
		97.5% Chebyshev (Mean, Sd) UCL	135.783
		99% Chebyshev (Mean, Sd) UCL	170.8106

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable: Molybdenum D	SW846 30(

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.552116
Number of Unique Samples	2	Shapiro-Wilk 5% Critical Value	0.762
Minimum	2	Data not normal at 5% significance level	
Maximum	2.1		
Mean	2.02	95% UCL (Assuming Normal Distribution)	
Median	2	Student's-t UCL	2.062637
Standard Deviation	0.044721		
Variance	0.002	Gamma Distribution Test	
Coefficient of Variation	0.022139	A-D Test Statistic	1.356012
Skewness	2.236068	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.498197
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	2600.297	Data do not follow gamma distribution	
k star (bias corrected)	1040.252	at 5% significance level	
Theta hat	0.000777		
Theta star	0.001942	95% UCLs (Assuming Gamma Distribution)	
nu hat	26002.97	Approximate Gamma UCL	2.066924
nu star	10402.52	Adjusted Gamma UCL	2.088373
Approx.Chi Square Value (.05)	10166.36		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	10061.94	Shapiro-Wilk Test Statisitic	0.552116
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.693147		
Maximum of log data	0.741937	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.702905	95% H-UCL	N/A
Standard Deviation of log data	0.02182	95% Chebyshev (MVUE) UCL	2.105914
Variance of log data	0.000476	97.5% Chebyshev (MVUE) UCL	2.143091
		99% Chebyshev (MVUE) UCL	2.216117
		95% Non-parametric UCLs	
		CLT UCL	2.052897
		Adj-CLT UCL (Adjusted for skewness)	2.074267
		Mod-t UCL (Adjusted for skewness)	2.06597
		Jackknife UCL	2.062637
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/A
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	2.107178
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	2.1449
		99% Chebyshev (Mean, Sd) UCL	2.218997

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Nickel D SW846 3005/602(

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.880882
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.762
Minimum	3.7	Data are normal at 5% significance level	
Maximum	3.9		
Mean	3.78	95% UCL (Assuming Normal Distribution)	
Median	3.8	Student's-t UCL	3.859766
Standard Deviation	0.083666		
Variance	0.007	Gamma Distribution Test	
Coefficient of Variation	0.022134	A-D Test Statistic	0.428413
Skewness	0.512241	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.259324
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	2562.371	Data follow gamma distribution	
k star (bias corrected)	1025.082	at 5% significance level	
Theta hat	0.001475		
Theta star	0.003688	95% UCLs (Assuming Gamma Distribution)	
nu hat	25623.71	Approximate Gamma UCL	3.868467
nu star	10250.82	Adjusted Gamma UCL	3.908912
Approx.Chi Square Value (.05)	10016.39		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	9912.755	Shapiro-Wilk Test Statisitic	0.88107
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.308333		
Maximum of log data	1.360977	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.329529	95% H-UCL	N/A
Standard Deviation of log data	0.022065	95% Chebyshev (MVUE) UCL	3.942581
Variance of log data	0.000487	97.5% Chebyshev (MVUE) UCL	4.01293
		99% Chebyshev (MVUE) UCL	4.151118
		95% Non-parametric UCLs	
		CLT UCL	3.841545
		Adj-CLT UCL (Adjusted for skewness)	3.850703
		Mod-t UCL (Adjusted for skewness)	3.861195
		Jackknife UCL	3.859766
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	3.943095
		97.5% Chebyshev (Mean, Sd) UCL	4.013666
		99% Chebyshev (Mean, Sd) UCL	4.15229

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Potassium D SW846 3005/

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.913514
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	7570	Data are normal at 5% significance level	
Maximum	8340		
Mean	7942	95% UCL (Assuming Normal Distribution)	
Median	7970	Student's-t UCL	8265.83
Standard Deviation	339.6616		
Variance	115370	Gamma Distribution Test	
Coefficient of Variation	0.042768	A-D Test Statistic	0.337453
Skewness	-0.017118	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.247885
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	682.6883	Data follow gamma distribution	
k star (bias corrected)	273.2087	at 5% significance level	
Theta hat	11.63342		
Theta star	29.06936	95% UCLs (Assuming Gamma Distribution)	
nu hat	6826.883	Approximate Gamma UCL	8308.339
nu star	2732.087	Adjusted Gamma UCL	8478.951
Approx.Chi Square Value (.05)	2611.621		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	2559.07	Shapiro-Wilk Test Statisitic	0.912037
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.931948		
Maximum of log data	9.028818	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.979188	95% H-UCL	N/A
Standard Deviation of log data	0.042808	95% Chebyshev (MVUE) UCL	8604.715
Variance of log data	0.001833	97.5% Chebyshev (MVUE) UCL	8891.471
		99% Chebyshev (MVUE) UCL	9454.747
		95% Non-parametric UCLs	
		CLT UCL	8191.855
		Adj-CLT UCL (Adjusted for skewness)	8190.613
		Mod-t UCL (Adjusted for skewness)	8265.636
		Jackknife UCL	8265.83
		Standard Bootstrap UCL	8169.245
		Bootstrap-t UCL	8263.378
RECOMMENDATION		Hall's Bootstrap UCL	8090.677
Data are normal (0.05)		Percentile Bootstrap UCL	8170
		BCA Bootstrap UCL	8142
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	8604.122
		97.5% Chebyshev (Mean, Sd) UCL	8890.623
		99% Chebyshev (Mean, Sd) UCL	9453.399

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Selenium D SW846 3005/6
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.70224
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.762
Minimum	0.75	Data not normal at 5% significance level	
Maximum	2.6		
Mean	2.07	95% UCL (Assuming Normal Distribution)	
Median	2.3	Student's-t UCL	2.783134
Standard Deviation	0.747997		
Variance	0.5595	Gamma Distribution Test	
Coefficient of Variation	0.361351	A-D Test Statistic	1.018623
Skewness	-2.081638	A-D 5% Critical Value	0.680346
		K-S Test Statistic	0.454693
Gamma Statistics		K-S 5% Critical Value	0.358167
k hat	5.994306	Data do not follow gamma distribution	
k star (bias corrected)	2.531056	at 5% significance level	
Theta hat	0.345328		
Theta star	0.817841	95% UCLs (Assuming Gamma Distribution)	
nu hat	59.94306	Approximate Gamma UCL	3.528669
nu star	25.31056	Adjusted Gamma UCL	4.556788
Approx.Chi Square Value (.05)	14.84777		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	11.49776	Shapiro-Wilk Test Statisitic	0.641951
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.287682		
Maximum of log data	0.955511	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.641823	95% H-UCL	4.786564
Standard Deviation of log data	0.522015	95% Chebyshev (MVUE) UCL	4.245272
Variance of log data	0.2725	97.5% Chebyshev (MVUE) UCL	5.167173
		99% Chebyshev (MVUE) UCL	6.978069
		95% Non-parametric UCLs	
		CLT UCL	2.620228
		Adj-CLT UCL (Adjusted for skewness)	2.287479
		Mod-t UCL (Adjusted for skewness)	2.731232
		Jackknife UCL	2.783134
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3.528115
		97.5% Chebyshev (Mean, Sd) UCL	4.159043
		99% Chebyshev (Mean, Sd) UCL	5.398378
Recommended UCL exceeds the maximum observation			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Sodium D SW846 3005/60
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.988069
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	67300	Data are normal at 5% significance level	
Maximum	73100		
Mean	70400	95% UCL (Assuming Normal Distribution)	
Median	70300	Student's-t UCL	72514.72
Standard Deviation	2218.107		
Variance	4920000	Gamma Distribution Test	
Coefficient of Variation	0.031507	A-D Test Statistic	0.182898
Skewness	-0.309033	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.160794
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	1253.497	Data follow gamma distribution	
k star (bias corrected)	501.5323	at 5% significance level	
Theta hat	56.16286		
Theta star	140.3698	95% UCLs (Assuming Gamma Distribution)	
nu hat	12534.97	Approximate Gamma UCL	72774.3
nu star	5015.323	Adjusted Gamma UCL	73868.99
Approx.Chi Square Value (.05)	4851.695		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	4779.796	Shapiro-Wilk Test Statisitic	0.986153
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	11.11692		
Maximum of log data	11.19958	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	11.16155	95% H-UCL	N/A
Standard Deviation of log data	0.031618	95% Chebyshev (MVUE) UCL	74739.07
Variance of log data	0.001	97.5% Chebyshev (MVUE) UCL	76616.56
		99% Chebyshev (MVUE) UCL	80304.53
		95% Non-parametric UCLs	
		CLT UCL	72031.64
		Adj-CLT UCL (Adjusted for skewness)	71885.16
		Mod-t UCL (Adjusted for skewness)	72491.87
		Jackknife UCL	72514.72
		Standard Bootstrap UCL	71860.97
		Bootstrap-t UCL	72526.09
RECOMMENDATION		Hall's Bootstrap UCL	72300.97
Data are normal (0.05)		Percentile Bootstrap UCL	71860
		BCA Bootstrap UCL	71720
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	74723.89
		97.5% Chebyshev (Mean, Sd) UCL	76594.84
		99% Chebyshev (Mean, Sd) UCL	80269.95

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Uranium D SW846 3005/6(

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.88508
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.762
Minimum	0.0135	Data are normal at 5% significance level	
Maximum	0.0175		
Mean	0.015	95% UCL (Assuming Normal Distribution)	
Median	0.015	Student's-t UCL	0.016469
Standard Deviation	0.001541		
Variance	2.38E-006	Gamma Distribution Test	
Coefficient of Variation	0.10274	A-D Test Statistic	0.387638
Skewness	1.280695	A-D 5% Critical Value	0.67808
		K-S Test Statistic	0.288053
Gamma Statistics		K-S 5% Critical Value	0.35682
k hat	123.9122	Data follow gamma distribution	
k star (bias corrected)	49.69823	at 5% significance level	
Theta hat	0.000121		
Theta star	0.000302	95% UCLs (Assuming Gamma Distribution)	
nu hat	1239.122	Approximate Gamma UCL	0.016704
nu star	496.9823	Adjusted Gamma UCL	0.017541
Approx.Chi Square Value (.05)	446.2758		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	424.9866	Shapiro-Wilk Test Statisitic	0.904516
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-4.305066		
Maximum of log data	-4.045554	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-4.203746	95% H-UCL	N/A
Standard Deviation of log data	0.099425	95% Chebyshev (MVUE) UCL	0.017905
Variance of log data	0.009885	97.5% Chebyshev (MVUE) UCL	0.019162
		99% Chebyshev (MVUE) UCL	0.021632
		95% Non-parametric UCLs	
		CLT UCL	0.016134
		Adj-CLT UCL (Adjusted for skewness)	0.016555
		Mod-t UCL (Adjusted for skewness)	0.016535
		Jackknife UCL	0.016469
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are normal (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.018004
		97.5% Chebyshev (Mean, Sd) UCL	0.019304
		99% Chebyshev (Mean, Sd) UCL	0.021857

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Zinc D SW846 3005/6020
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.746798
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	3.95	Data not normal at 5% significance level	
Maximum	11		
Mean	6.92	95% UCL (Assuming Normal Distribution)	
Median	4.75	Student's-t UCL	10.39638
Standard Deviation	3.646334		
Variance	13.29575	Gamma Distribution Test	
Coefficient of Variation	0.526927	A-D Test Statistic	0.716562
Skewness	0.580009	A-D 5% Critical Value	0.680874
		K-S Test Statistic	0.328386
Gamma Statistics		K-S 5% Critical Value	0.358353
k hat	4.690963	Data follow approximate gamma distibution	
k star (bias corrected)	2.009719	at 5% significance level	
Theta hat	1.475177		
Theta star	3.443268	95% UCLs (Assuming Gamma Distribution)	
nu hat	46.90963	Approximate Gamma UCL	12.73404
nu star	20.09719	Adjusted Gamma UCL	17.10734
Approx.Chi Square Value (.05)	10.92132		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	8.129407	Shapiro-Wilk Test Statisitic	0.772731
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.373716		
Maximum of log data	2.397895	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.824058	95% H-UCL	15.52607
Standard Deviation of log data	0.520097	95% Chebyshev (MVUE) UCL	13.81095
Variance of log data	0.270501	97.5% Chebyshev (MVUE) UCL	16.80474
		99% Chebyshev (MVUE) UCL	22.68548
		95% Non-parametric UCLs	
		CLT UCL	9.602246
		Adj-CLT UCL (Adjusted for skewness)	10.05421
		Mod-t UCL (Adjusted for skewness)	10.46688
		Jackknife UCL	10.39638
		Standard Bootstrap UCL	9.278889
		Bootstrap-t UCL	31.24358
RECOMMENDATION		Hall's Bootstrap UCL	66.3484
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	9.54
		BCA Bootstrap UCL	9.58
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	14.02801
		97.5% Chebyshev (Mean, Sd) UCL	17.10366
		99% Chebyshev (Mean, Sd) UCL	23.14516
Recommended UCL exceeds the maximum observation			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Zirconium D SW846 3005/

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	5	Shapiro-Wilk Test Statisitic	0.656568
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.762
Minimum	0.075	Data not normal at 5% significance level	
Maximum	1.4		
Mean	0.404	95% UCL (Assuming Normal Distribution)	
Median	0.15	Student's-t UCL	0.938382
Standard Deviation	0.560506		
Variance	0.314167	Gamma Distribution Test	
Coefficient of Variation	1.387392	A-D Test Statistic	0.631937
Skewness	2.163493	A-D 5% Critical Value	0.691891
		K-S Test Statistic	0.328868
Gamma Statistics		K-S 5% Critical Value	0.36459
k hat	0.980056	Data follow gamma distribution	
k star (bias corrected)	0.525356	at 5% significance level	
Theta hat	0.412221		
Theta star	0.769003	95% UCLs (Assuming Gamma Distribution)	
nu hat	9.800561	Approximate Gamma UCL	1.670315
nu star	5.253558	Adjusted Gamma UCL	3.506459
Approx.Chi Square Value (.05)	1.270681		
Adjusted Level of Significance	0.0086	Lognormal Distribution Test	
Adjusted Chi Square Value	0.605294	Shapiro-Wilk Test Statisitic	0.881554
		Shapiro-Wilk 5% Critical Value	0.762
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-2.590267		
Maximum of log data	0.336472	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.496704	95% H-UCL	8.368476
Standard Deviation of log data	1.112885	95% Chebyshev (MVUE) UCL	1.083795
Variance of log data	1.238512	97.5% Chebyshev (MVUE) UCL	1.399286
		99% Chebyshev (MVUE) UCL	2.019007
		95% Non-parametric UCLs	
		CLT UCL	0.816309
		Adj-CLT UCL (Adjusted for skewness)	1.075456
		Mod-t UCL (Adjusted for skewness)	0.978803
		Jackknife UCL	0.938382
		Standard Bootstrap UCL	0.760752
		Bootstrap-t UCL	4.785772
RECOMMENDATION		Hall's Bootstrap UCL	4.04621
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	0.883
		BCA Bootstrap UCL	0.921
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	1.496628
		97.5% Chebyshev (Mean, Sd) UCL	1.969409
		99% Chebyshev (Mean, Sd) UCL	2.898096
Recommended UCL exceeds the maximum observation			

Table 6
Summary Statistics
Assabet River Sediments, Upstream

Parameter	Frequency of Detection	Percent Detected	Range of NonDetects	Range of Detected Concentrations	Mean	Std Dev	CV	Skewness	Distribution	95% UCL on the mean	Method	95th Percentile	95/95 UTL	Maximum Detected	Mean + 3 SD	Recommended UL
VOCs (UG/KG)																
1,1,1-Trichloroethane	2 / 10	20%	0.894 : 1.43	6.5 - 28.8	3.96	8.93	2.255	2.932328	Non-parametric	21.58997	97.5% Chebyshev (Mean, Sd) UCL	28.8	*	28.8		28.8
1,1-Dichloroethane	1 / 10	10%	0.894 : 1.43	2.1 - 2.1	0.71	0.50	0.711		Poisson				3	2.10		2.1
1,1-Dichloroethene	1 / 10	10%	0.894 : 5.2	23.4 - 23.4	3.12	7.16	2.292		Poisson				7.5	23.4		7.5
Carbon disulfide	1 / 10	10%	4.47 : 7.17	3.2 - 3.2	2.80	0.56	0.200		Poisson				7	3.20		3.2
Cis-1,2-Dichloroethene	1 / 10	10%	0.894 : 1.43	0.89 - 0.89	0.58	0.15	0.260		Poisson				3	0.89		0.89
Tetrachloroethene	2 / 10	20%	0.894 : 1.43	3.8 - 5.2	1.33	1.71	1.283	1.925618	Non-parametric	3.681321	95% Chebyshev (Mean, Sd) UCL	5.2	*	5.20		5.2
Trichloroethene	4 / 10	40%	0.894 : 1.43	0.9 - 46.4	7.08	14.93	2.108	2.514369	Non-parametric	36.56896	97.5% Chebyshev (Mean, Sd) UCL	46.4	*	46.4		46.4
Trichlorofluoromethane	1 / 10	10%	0.894 : 1.43	3.6 - 3.6	0.87	0.96	1.102		Poisson				3.5	3.60		3.5
Metals (MG/KG)																
Aluminum	10 / 10	100%	:	2650 - 16700	7862	4960	0.631	0.955	Normal	10736.98	Student's-t UCL	16954	22299	16700	22742	16700
Arsenic	10 / 10	100%	:	2.7 - 109	24.76	39.9	1.611	1.801	Non-parametric	103.5272	97.5% Chebyshev (Mean, Sd) UCL	109	*	109		109
Barium	10 / 10	100%	:	17.4 - 82.3	41.26	21.71	0.526	0.853	Normal	53.84492	Student's-t UCL	81.1	104.5	82.3	106.4	81.1
Beryllium	10 / 10	100%	:	0.097 - 50.8	5.35	15.97	2.983	3.161	Non-parametric	36.8909	97.5% Chebyshev (Mean, Sd) UCL	50.8	*	50.8		50.8
Cadmium	10 / 10	100%	:	0.12 - 2.5	0.507	0.72	1.420	2.859	G/NP	0.987812	Approximate Gamma UCL	2.5	*	2.50		2.5
Calcium	10 / 10	100%	:	655 - 6380	2147.4	1998.2	0.931	1.463	G/NP	3709.501	Approximate Gamma UCL	6380	*	6380		6380
Chromium	10 / 10	100%	:	11.3 - 40.6	23.7	9.59	0.405	0.721	Normal	29.26038	Student's-t UCL	41.3	51.6	40.6	52.5	40.6
Cobalt	10 / 10	100%	:	2.2 - 30.6	9.3	9.89	1.063	1.713	G/NP	16.89027	Approximate Gamma UCL	30.6		30.6		30.6
Copper	10 / 10	100%	:	9.1 - 46.7	25.02	12.58	0.503	0.308	Normal	32.31323	Student's-t UCL	48.1	61.6	46.7	62.8	46.7
Iron	10 / 10	100%	:	5620 - 64200	19607	17912	0.914	1.988	G/NP	32754.63	Approximate Gamma UCL	64200	*	64200		64200
Lead	10 / 10	100%	:	8.2 - 88.1	30.77	24.6	0.799	1.576	G/NP	49.47006	Approximate Gamma UCL	88.1	*	88.1		88.1
Magnesium	10 / 10	100%	:	932 - 7610	2969.4	1867.1	0.629	1.760	G/NP	4351.065	Approximate Gamma UCL	7610	*	7610		7610
Manganese	10 / 10	100%	:	69 - 3010	489.1	892	1.824	3.081	Lognormal	969.4473	95% Chebyshev (MVUE) UCL			3010		
Mananese (Log transform)	10 / 10	100%	:		5.481	1.0466						1635	5053	3010	5546	1635
Mercury	10 / 10	100%	:	0.0066 - 0.13	0.0597	0.041	0.687	0.456	Normal	0.083419	Student's-t UCL	0.13	0.18	0.13	0.18	0.13
Molybdenum	10 / 10	100%	:	0.35 - 6.1	1.822	2.074	1.138	1.333	Non-parametric	5.917974	97.5% Chebyshev (Mean, Sd) UCL	6.1	*	6.1		6.1
Nickel	10 / 10	100%	:	4.3 - 29.8	15.85	8.42	0.531	0.544	Normal	20.73029	Student's-t UCL	31.3	40.4	29.8	41.1	29.8
Potassium	10 / 10	100%	:	315 - 4960	1490.5	1549.4	1.040	1.705	G/NP	2720.932	Approximate Gamma UCL	4960	*	4960		4960
Silver	10 / 10	100%	:	0.033 - 0.34	0.146	0.095	0.651	0.982	Normal	0.201594	Student's-t UCL	0.3	0.42	0.34	0.4	0.3
Sodium	10 / 10	100%	:	53.4 - 892	201.51	251.7	1.249	2.770	G/NP	366.1391	Approximate Gamma UCL	892	*	892		892
Thallium	10 / 10	100%	:	0.046 - 0.43	0.17	0.14	0.824	1.100	G/NP	0.275705	Approximate Gamma UCL	0.43	*	0.43		0.43
Thorium	10 / 10	100%	:	2.3 - 13.8	5.40	3.41	0.631	1.871	G/NP	7.704586	Approximate Gamma UCL	13.8	*	13.8		13.8
Titanium	10 / 10	100%	:	186 - 648	378	165.4	0.438	0.470	Normal	473.8617	Student's-t UCL	2013	859	648	874	648
Tungsten	9 / 10	90%	0.9 : 0.9	0.27 - 1.3	0.7	0.32	0.457	0.410	Normal	0.885216	Student's-t UCL	1.29	1.63	1.30	1.66	1.29
Uranium	10 / 10	100%	:	0.62 - 6.1	1.797	1.578	0.878	2.700	Lognormal	2.879782	95% H-UCL			6.1		
Uranium (log-transform)	10 / 10	100%			0.375	0.617	1.645					4.5	8.8	6.1	9.3	4.5
Uranium (no 17004)	9 / 9	100%		0.62 - 2.2	1.32	0.481	0.364		Normal	1.617101	Student's-t UCL	2.21	2.78	2.20	2.76	2.2
Vanadium	10 / 10	100%	:	7.3 - 53.9	19.54	15.14	0.775	1.750	G/NP	30.03314	Approximate Gamma UCL	53.9	*	53.9		53.9
Zinc	10 / 10	100%	:	17.8 - 55.6	41.79	11.41	0.273	-0.940	Normal	48.40257	Student's-t UCL	63.01	75	55.6	76.02	55.6
Zirconium	9 / 10	90%	0.9 : 0.9	0.75 - 3.4	2.15	0.988	0.460	-0.503	Normal	2.722878	Student's-t UCL	3.96	5.03	3.40	5.11	3.4

Notes: 1. For 10 samples, the non-parametric 95th percentile is the 10th ordered sample, i.e., the same as the maximum.
2. For 10 samples, the non-parametric one-sided 95% UCL on the mean is the 8th ordered sample.
3. The Student-t value for 10-1 = 9 degrees of freedom and 95% level of confidence is 1.833, for 8 df is 1.860.
4. The factor for a one-sided 95% coverage, 95% tolerance limit for 10 samples is 2.911, and for 9 samples 3.023.
5. * - To determine a one-sided 95/95 UTL for a non-parametric distribution requires more samples than available.
6. G/NP - PROUCL recommended a gamma distribution for determining the 95% UCL on the mean, other statistics generated assuming a non-parametric distribution.
7. The mean and standard deviation are computed with NDs replaced with DL/2.

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	1,1,1-Trichloroethane T UG
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.469436
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.447	Data not normal at 5% significance level	
Maximum	28.8		
Mean	3.9593	95% UCL (Assuming Normal Distribution)	
Median	0.53375	Student's-t UCL	9.134482
Standard Deviation	8.927635		
Variance	79.70267	Gamma Distribution Test	
Coefficient of Variation	2.254852	A-D Test Statistic	2.09909
Skewness	2.932328	A-D 5% Critical Value	0.782537
		K-S Test Statistic	0.454997
Gamma Statistics		K-S 5% Critical Value	0.281909
k hat	0.469712	Data do not follow gamma distribution	
k star (bias corrected)	0.395465	at 5% significance level	
Theta hat	8.429202		
Theta star	10.01175	95% UCLs (Assuming Gamma Distribution)	
nu hat	9.394246	Approximate Gamma UCL	11.67637
nu star	7.909305	Adjusted Gamma UCL	14.34792
Approx.Chi Square Value (.05)	2.681939		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	2.182568	Shapiro-Wilk Test Statisitic	0.637827
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.805197		
Maximum of log data	3.360375	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.01053	95% H-UCL	19.20086
Standard Deviation of log data	1.428447	95% Chebyshev (MVUE) UCL	7.309769
Variance of log data	2.04046	97.5% Chebyshev (MVUE) UCL	9.446275
		99% Chebyshev (MVUE) UCL	13.64303
		95% Non-parametric UCLs	
		CLT UCL	8.602995
		Adj-CLT UCL (Adjusted for skewness)	11.40023
		Mod-t UCL (Adjusted for skewness)	9.570795
		Jackknife UCL	9.134482
		Standard Bootstrap UCL	8.258789
		Bootstrap-t UCL	290.333
RECOMMENDATION		Hall's Bootstrap UCL	128.6579
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	9.57675
		BCA Bootstrap UCL	12.4224
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	16.2652
		97.5% Chebyshev (Mean, Sd) UCL	21.58997
		99% Chebyshev (Mean, Sd) UCL	32.04945
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Tetrachloroethene T UG/K
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.585755
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.447	Data not normal at 5% significance level	
Maximum	5.2		
Mean	1.3293	95% UCL (Assuming Normal Distribution)	
Median	0.53375	Student's-t UCL	2.318431
Standard Deviation	1.706336		
Variance	2.911581	Gamma Distribution Test	
Coefficient of Variation	1.283635	A-D Test Statistic	1.835567
Skewness	1.925618	A-D 5% Critical Value	0.745742
		K-S Test Statistic	0.407229
Gamma Statistics		K-S 5% Critical Value	0.273014
k hat	1.139833	Data do not follow gamma distribution	
k star (bias corrected)	0.86455	at 5% significance level	
Theta hat	1.166223		
Theta star	1.537563	95% UCLs (Assuming Gamma Distribution)	
nu hat	22.79667	Approximate Gamma UCL	2.588637
nu star	17.291	Adjusted Gamma UCL	2.926931
Approx.Chi Square Value (.05)	8.879161		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	7.85291	Shapiro-Wilk Test Statisitic	0.673169
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.805197		
Maximum of log data	1.648659	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.214322	95% H-UCL	3.033898
Standard Deviation of log data	0.919568	95% Chebyshev (MVUE) UCL	2.710737
Variance of log data	0.845605	97.5% Chebyshev (MVUE) UCL	3.378947
		99% Chebyshev (MVUE) UCL	4.691516
		95% Non-parametric UCLs	
		CLT UCL	2.216848
		Adj-CLT UCL (Adjusted for skewness)	2.567935
		Mod-t UCL (Adjusted for skewness)	2.373193
		Jackknife UCL	2.318431
		Standard Bootstrap UCL	2.155335
		Bootstrap-t UCL	13.73771
RECOMMENDATION		Hall's Bootstrap UCL	10.47359
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.24505
		BCA Bootstrap UCL	2.4737
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3.681321
		97.5% Chebyshev (Mean, Sd) UCL	4.699043
		99% Chebyshev (Mean, Sd) UCL	6.69816

Data File	P:\W2-mfg\Nuclear Metals RI FS EECA\Back	Variable:	Trichloroethene T UG/KG
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.533035
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.447	Data not normal at 5% significance level	
Maximum	46.4		
Mean	7.08355	95% UCL (Assuming Normal Distribution)	
Median	0.6575	Student's-t UCL	15.73849
Standard Deviation	14.93052		
Variance	222.9204	Gamma Distribution Test	
Coefficient of Variation	2.107773	A-D Test Statistic	1.752302
Skewness	2.514369	A-D 5% Critical Value	0.79504
		K-S Test Statistic	0.371224
Gamma Statistics		K-S 5% Critical Value	0.284294
k hat	0.401447	Data do not follow gamma distribution	
k star (bias corrected)	0.347679	at 5% significance level	
Theta hat	17.64506		
Theta star	20.3738	95% UCLs (Assuming Gamma Distribution)	
nu hat	8.028934	Approximate Gamma UCL	22.96836
nu star	6.953587	Adjusted Gamma UCL	28.77791
Approx.Chi Square Value (.05)	2.144519		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	1.711593	Shapiro-Wilk Test Statisitic	0.713372
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.805197		
Maximum of log data	3.837299	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.319563	95% H-UCL	75.66701
Standard Deviation of log data	1.680815	95% Chebyshev (MVUE) UCL	14.97186
Variance of log data	2.825137	97.5% Chebyshev (MVUE) UCL	19.56267
		99% Chebyshev (MVUE) UCL	28.58043
		95% Non-parametric UCLs	
		CLT UCL	14.84963
		Adj-CLT UCL (Adjusted for skewness)	18.86093
		Mod-t UCL (Adjusted for skewness)	16.36417
		Jackknife UCL	15.73849
		Standard Bootstrap UCL	14.55403
		Bootstrap-t UCL	252.973
RECOMMENDATION		Hall's Bootstrap UCL	208.7102
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	15.3151
		BCA Bootstrap UCL	19.92645
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	27.66385
		97.5% Chebyshev (Mean, Sd) UCL	36.56896
		99% Chebyshev (Mean, Sd) UCL	54.06133
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Aluminum T MG/KG

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.855841
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	2650	Data are normal at 5% significance level	
Maximum	16700		
Mean	7862	95% UCL (Assuming Normal Distribution)	
Median	5705	Student's-t UCL	10736.98
Standard Deviation	4959.587		
Variance	24597507	Gamma Distribution Test	
Coefficient of Variation	0.63083	A-D Test Statistic	0.426072
Skewness	0.954598	A-D 5% Critical Value	0.732006
		K-S Test Statistic	0.191208
Gamma Statistics		K-S 5% Critical Value	0.268411
k hat	3.062399	Data follow gamma distribution	
k star (bias corrected)	2.210346	at 5% significance level	
Theta hat	2567.268		
Theta star	3556.909	95% UCLs (Assuming Gamma Distribution)	
nu hat	61.24798	Approximate Gamma UCL	11602.39
nu star	44.20692	Adjusted Gamma UCL	12443.86
Approx.Chi Square Value (.05)	29.95545		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	27.92983	Shapiro-Wilk Test Statisitic	0.942978
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	7.882315		
Maximum of log data	9.723164	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	8.79773	95% H-UCL	13072.09
Standard Deviation of log data	0.615643	95% Chebyshev (MVUE) UCL	14643.42
Variance of log data	0.379017	97.5% Chebyshev (MVUE) UCL	17591.55
		99% Chebyshev (MVUE) UCL	23382.57
		95% Non-parametric UCLs	
		CLT UCL	10441.72
		Adj-CLT UCL (Adjusted for skewness)	10947.6
		Mod-t UCL (Adjusted for skewness)	10815.89
		Jackknife UCL	10736.98
		Standard Bootstrap UCL	10296.65
		Bootstrap-t UCL	11949.13
RECOMMENDATION		Hall's Bootstrap UCL	10737.66
Data are normal (0.05)		Percentile Bootstrap UCL	10332
		BCA Bootstrap UCL	10732
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	14698.32
		97.5% Chebyshev (Mean, Sd) UCL	17656.4
		99% Chebyshev (Mean, Sd) UCL	23466.98

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Arsenic T MG/KG
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.599595
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	2.7	Data not normal at 5% significance level	
Maximum	109		
Mean	24.76	95% UCL (Assuming Normal Distribution)	
Median	5.6	Student's-t UCL	47.88077
Standard Deviation	39.88531		
Variance	1590.838	Gamma Distribution Test	
Coefficient of Variation	1.610877	A-D Test Statistic	1.296906
Skewness	1.800552	A-D 5% Critical Value	0.766626
		K-S Test Statistic	0.291976
Gamma Statistics		K-S 5% Critical Value	0.278329
k hat	0.629426	Data do not follow gamma distribution	
k star (bias corrected)	0.507265	at 5% significance level	
Theta hat	39.3374		
Theta star	48.81076	95% UCLs (Assuming Gamma Distribution)	
nu hat	12.58853	Approximate Gamma UCL	62.30211
nu star	10.1453	Adjusted Gamma UCL	74.12301
Approx.Chi Square Value (.05)	4.031929		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	3.388931	Shapiro-Wilk Test Statisitic	0.812792
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.993252		
Maximum of log data	4.691348	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.234436	95% H-UCL	128.9037
Standard Deviation of log data	1.343228	95% Chebyshev (MVUE) UCL	59.09744
Variance of log data	1.804262	97.5% Chebyshev (MVUE) UCL	76.02386
		99% Chebyshev (MVUE) UCL	109.2725
		95% Non-parametric UCLs	
		CLT UCL	45.50628
		Adj-CLT UCL (Adjusted for skewness)	53.17988
		Mod-t UCL (Adjusted for skewness)	49.07769
		Jackknife UCL	47.88077
		Standard Bootstrap UCL	44.18204
		Bootstrap-t UCL	237.2974
RECOMMENDATION		Hall's Bootstrap UCL	222.1348
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	45.5
		BCA Bootstrap UCL	52.28
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	79.73811
		97.5% Chebyshev (Mean, Sd) UCL	103.5272
		99% Chebyshev (Mean, Sd) UCL	150.2562
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Barium T MG/KG
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.914542
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	17.4	Data are normal at 5% significance level	
Maximum	82.3		
Mean	41.26	95% UCL (Assuming Normal Distribution)	
Median	35.45	Student's-t UCL	53.84492
Standard Deviation	21.71007		
Variance	471.3271	Gamma Distribution Test	
Coefficient of Variation	0.526177	A-D Test Statistic	0.227424
Skewness	0.853235	A-D 5% Critical Value	0.729404
		K-S Test Statistic	0.14352
Gamma Statistics		K-S 5% Critical Value	0.267727
k hat	4.238183	Data follow gamma distribution	
k star (bias corrected)	3.033395	at 5% significance level	
Theta hat	9.735305		
Theta star	13.60192	95% UCLs (Assuming Gamma Distribution)	
nu hat	84.76365	Approximate Gamma UCL	57.21196
nu star	60.66789	Adjusted Gamma UCL	60.65849
Approx.Chi Square Value (.05)	43.75234		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	41.26639	Shapiro-Wilk Test Statisitic	0.963783
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.85647		
Maximum of log data	4.410371	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.597304	95% H-UCL	62.00672
Standard Deviation of log data	0.523316	95% Chebyshev (MVUE) UCL	71.54919
Variance of log data	0.27386	97.5% Chebyshev (MVUE) UCL	84.66782
		99% Chebyshev (MVUE) UCL	110.4368
		95% Non-parametric UCLs	
		CLT UCL	52.55246
		Adj-CLT UCL (Adjusted for skewness)	54.53175
		Mod-t UCL (Adjusted for skewness)	54.15365
		Jackknife UCL	53.84492
		Standard Bootstrap UCL	51.94023
		Bootstrap-t UCL	57.79041
RECOMMENDATION		Hall's Bootstrap UCL	57.40931
Data are normal (0.05)		Percentile Bootstrap UCL	52.93
		BCA Bootstrap UCL	54.24
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	71.18527
		97.5% Chebyshev (Mean, Sd) UCL	84.13395
		99% Chebyshev (Mean, Sd) UCL	109.5691

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Beryllium T MG/KG

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	9	Shapiro-Wilk Test Statisitic	0.760722
Number of Unique Samples	8	Shapiro-Wilk 5% Critical Value	0.829
Minimum	0.097	Data not normal at 5% significance level	
Maximum	0.83		
Mean	0.304111	95% UCL (Assuming Normal Distribution)	
Median	0.25	Student's-t UCL	0.43692
Standard Deviation	0.214259		
Variance	0.045907	Gamma Distribution Test	
Coefficient of Variation	0.704543	A-D Test Statistic	0.44812
Skewness	2.155297	A-D 5% Critical Value	0.72663
		K-S Test Statistic	0.222352
Gamma Statistics		K-S 5% Critical Value	0.281256
k hat	3.092662	Data follow gamma distribution	
k star (bias corrected)	2.135849	at 5% significance level	
Theta hat	0.098333		
Theta star	0.142384	95% UCLs (Assuming Gamma Distribution)	
nu hat	55.66791	Approximate Gamma UCL	0.46317
nu star	38.44528	Adjusted Gamma UCL	0.508108
Approx.Chi Square Value (.05)	25.24265		
Adjusted Level of Significance	0.02308	Lognormal Distribution Test	
Adjusted Chi Square Value	23.01013	Shapiro-Wilk Test Statisitic	0.951898
		Shapiro-Wilk 5% Critical Value	0.829
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-2.333044		
Maximum of log data	-0.18633	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.360661	95% H-UCL	0.516811
Standard Deviation of log data	0.598208	95% Chebyshev (MVUE) UCL	0.565696
Variance of log data	0.357852	97.5% Chebyshev (MVUE) UCL	0.680673
		99% Chebyshev (MVUE) UCL	0.906525
		95% Non-parametric UCLs	
		CLT UCL	0.421586
		Adj-CLT UCL (Adjusted for skewness)	0.476412
		Mod-t UCL (Adjusted for skewness)	0.445471
		Jackknife UCL	0.43692
		Standard Bootstrap UCL	0.414647
		Bootstrap-t UCL	0.579348
RECOMMENDATION		Hall's Bootstrap UCL	0.949058
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	0.430444
		BCA Bootstrap UCL	0.47
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	0.615423
		97.5% Chebyshev (Mean, Sd) UCL	0.750128
		99% Chebyshev (Mean, Sd) UCL	1.014729

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Cadmium T MG/KG

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.566085
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.12	Data not normal at 5% significance level	
Maximum	2.5		
Mean	0.507	95% UCL (Assuming Normal Distribution)	
Median	0.23	Student's-t UCL	0.924505
Standard Deviation	0.720232		
Variance	0.518734	Gamma Distribution Test	
Coefficient of Variation	1.420576	A-D Test Statistic	0.915461
Skewness	2.858719	A-D 5% Critical Value	0.74577
		K-S Test Statistic	0.247814
Gamma Statistics		K-S 5% Critical Value	0.273023
k hat	1.138269	Data follow approximate gamma distibution	
k star (bias corrected)	0.863455	at 5% significance level	
Theta hat	0.445413		
Theta star	0.587176	95% UCLs (Assuming Gamma Distribution)	
nu hat	22.76538	Approximate Gamma UCL	0.987812
nu star	17.2691	Adjusted Gamma UCL	1.117013
Approx.Chi Square Value (.05)	8.863461		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	7.838257	Shapiro-Wilk Test Statisitic	0.878179
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-2.120264		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-1.178979	95% H-UCL	1.157253
Standard Deviation of log data	0.91991	95% Chebyshev (MVUE) UCL	1.033603
Variance of log data	0.846235	97.5% Chebyshev (MVUE) UCL	1.288434
		99% Chebyshev (MVUE) UCL	1.789001
		95% Non-parametric UCLs	
		CLT UCL	0.881628
		Adj-CLT UCL (Adjusted for skewness)	1.101628
		Mod-t UCL (Adjusted for skewness)	0.958821
		Jackknife UCL	0.924505
		Standard Bootstrap UCL	0.854562
		Bootstrap-t UCL	2.03363
RECOMMENDATION		Hall's Bootstrap UCL	2.270221
Assuming gamma distribution (0.05)		Percentile Bootstrap UCL	0.923
		BCA Bootstrap UCL	1.162
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	1.499772
		97.5% Chebyshev (Mean, Sd) UCL	1.929345
		99% Chebyshev (Mean, Sd) UCL	2.773158

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Calcium T MG/KG
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.772424
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	655	Data not normal at 5% significance level	
Maximum	6380		
Mean	2147.4	95% UCL (Assuming Normal Distribution)	
Median	1290	Student's-t UCL	3305.733
Standard Deviation	1998.225		
Variance	3992903	Gamma Distribution Test	
Coefficient of Variation	0.930532	A-D Test Statistic	0.654865
Skewness	1.463178	A-D 5% Critical Value	0.738228
		K-S Test Statistic	0.208042
Gamma Statistics		K-S 5% Critical Value	0.27076
k hat	1.637264	Data follow gamma distribution	
k star (bias corrected)	1.212752	at 5% significance level	
Theta hat	1311.578		
Theta star	1770.684	95% UCLs (Assuming Gamma Distribution)	
nu hat	32.74529	Approximate Gamma UCL	3709.501
nu star	24.25503	Adjusted Gamma UCL	4098.385
Approx.Chi Square Value (.05)	14.04104		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	12.70873	Shapiro-Wilk Test Statisitic	0.886422
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	6.484635		
Maximum of log data	8.760923	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	7.336544	95% H-UCL	4657.762
Standard Deviation of log data	0.83	95% Chebyshev (MVUE) UCL	4544.975
Variance of log data	0.688901	97.5% Chebyshev (MVUE) UCL	5613.187
		99% Chebyshev (MVUE) UCL	7711.482
		95% Non-parametric UCLs	
		CLT UCL	3186.774
		Adj-CLT UCL (Adjusted for skewness)	3499.181
		Mod-t UCL (Adjusted for skewness)	3354.463
		Jackknife UCL	3305.733
		Standard Bootstrap UCL	3127.824
		Bootstrap-t UCL	4767.885
RECOMMENDATION		Hall's Bootstrap UCL	4063.429
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	3167.4
		BCA Bootstrap UCL	3557.5
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	4901.763
		97.5% Chebyshev (Mean, Sd) UCL	6093.578
		99% Chebyshev (Mean, Sd) UCL	8434.668

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Chromium T MG/KG

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.912988
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	11.3	Data are normal at 5% significance level	
Maximum	40.6		
Mean	23.7	95% UCL (Assuming Normal Distribution)	
Median	19.7	Student's-t UCL	29.26038
Standard Deviation	9.592126		
Variance	92.00889	Gamma Distribution Test	
Coefficient of Variation	0.404731	A-D Test Statistic	0.34556
Skewness	0.721171	A-D 5% Critical Value	0.727615
		K-S Test Statistic	0.213049
Gamma Statistics		K-S 5% Critical Value	0.267096
k hat	7.089998	Data follow gamma distribution	
k star (bias corrected)	5.029666	at 5% significance level	
Theta hat	3.342737		
Theta star	4.712043	95% UCLs (Assuming Gamma Distribution)	
nu hat	141.8	Approximate Gamma UCL	30.38979
nu star	100.5933	Adjusted Gamma UCL	31.76331
Approx.Chi Square Value (.05)	78.44943		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	75.05709	Shapiro-Wilk Test Statisitic	0.955104
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.424803		
Maximum of log data	3.703768	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.093299	95% H-UCL	31.57745
Standard Deviation of log data	0.400486	95% Chebyshev (MVUE) UCL	36.92346
Variance of log data	0.160389	97.5% Chebyshev (MVUE) UCL	42.65007
		99% Chebyshev (MVUE) UCL	53.89887
		95% Non-parametric UCLs	
		CLT UCL	28.68933
		Adj-CLT UCL (Adjusted for skewness)	29.42848
		Mod-t UCL (Adjusted for skewness)	29.37567
		Jackknife UCL	29.26038
		Standard Bootstrap UCL	28.46555
		Bootstrap-t UCL	31.12431
RECOMMENDATION		Hall's Bootstrap UCL	30.04908
Data are normal (0.05)		Percentile Bootstrap UCL	28.83
		BCA Bootstrap UCL	29.27
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	36.92183
		97.5% Chebyshev (Mean, Sd) UCL	42.64293
		99% Chebyshev (Mean, Sd) UCL	53.88092

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Cobalt T MG/KG
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.707178
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	2.2	Data not normal at 5% significance level	
Maximum	30.6		
Mean	9.3	95% UCL (Assuming Normal Distribution)	
Median	5.35	Student's-t UCL	15.03185
Standard Deviation	9.887928		
Variance	97.77111	Gamma Distribution Test	
Coefficient of Variation	1.063218	A-D Test Statistic	0.740997
Skewness	1.713483	A-D 5% Critical Value	0.741134
		K-S Test Statistic	0.254219
Gamma Statistics		K-S 5% Critical Value	0.271674
k hat	1.394677	Data follow gamma distribution	
k star (bias corrected)	1.042941	at 5% significance level	
Theta hat	6.668211		
Theta star	8.917095	95% UCLs (Assuming Gamma Distribution)	
nu hat	27.89354	Approximate Gamma UCL	16.89027
nu star	20.85881	Adjusted Gamma UCL	18.84114
Approx.Chi Square Value (.05)	11.48513		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	10.29592	Shapiro-Wilk Test Statisitic	0.903525
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	0.788457		
Maximum of log data	3.421	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	1.830495	95% H-UCL	21.69317
Standard Deviation of log data	0.888114	95% Chebyshev (MVUE) UCL	20.03273
Variance of log data	0.788746	97.5% Chebyshev (MVUE) UCL	24.89317
		99% Chebyshev (MVUE) UCL	34.44058
		95% Non-parametric UCLs	
		CLT UCL	14.44319
		Adj-CLT UCL (Adjusted for skewness)	16.25355
		Mod-t UCL (Adjusted for skewness)	15.31423
		Jackknife UCL	15.03185
		Standard Bootstrap UCL	14.20361
		Bootstrap-t UCL	30.84215
RECOMMENDATION		Hall's Bootstrap UCL	48.35443
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	14.64
		BCA Bootstrap UCL	15.49
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	22.92957
		97.5% Chebyshev (Mean, Sd) UCL	28.82709
		99% Chebyshev (Mean, Sd) UCL	40.41164

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Copper T MG/KG
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.948653
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	9.1	Data are normal at 5% significance level	
Maximum	46.7		
Mean	25.02	95% UCL (Assuming Normal Distribution)	
Median	25.6	Student's-t UCL	32.31323
Standard Deviation	12.58145		
Variance	158.2929	Gamma Distribution Test	
Coefficient of Variation	0.502856	A-D Test Statistic	0.280664
Skewness	0.307862	A-D 5% Critical Value	0.729593
		K-S Test Statistic	0.138173
Gamma Statistics		K-S 5% Critical Value	0.267866
k hat	3.927143	Data follow gamma distribution	
k star (bias corrected)	2.815667	at 5% significance level	
Theta hat	6.371044		
Theta star	8.885995	95% UCLs (Assuming Gamma Distribution)	
nu hat	78.54285	Approximate Gamma UCL	35.16877
nu star	56.31333	Adjusted Gamma UCL	37.38097
Approx.Chi Square Value (.05)	40.0628		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	37.6919	Shapiro-Wilk Test Statisitic	0.92716
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.208274		
Maximum of log data	3.843744	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.086987	95% H-UCL	40.02341
Standard Deviation of log data	0.569315	95% Chebyshev (MVUE) UCL	45.60474
Variance of log data	0.324119	97.5% Chebyshev (MVUE) UCL	54.38888
		99% Chebyshev (MVUE) UCL	71.64363
		95% Non-parametric UCLs	
		CLT UCL	31.56422
		Adj-CLT UCL (Adjusted for skewness)	31.97809
		Mod-t UCL (Adjusted for skewness)	32.37779
		Jackknife UCL	32.31323
		Standard Bootstrap UCL	31.11587
		Bootstrap-t UCL	32.91404
RECOMMENDATION		Hall's Bootstrap UCL	32.38516
Data are normal (0.05)		Percentile Bootstrap UCL	31.21
		BCA Bootstrap UCL	32.1
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	42.36233
		97.5% Chebyshev (Mean, Sd) UCL	49.86637
		99% Chebyshev (Mean, Sd) UCL	64.60661

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Iron T MG/KG
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.768056
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	5620	Data not normal at 5% significance level	
Maximum	64200		
Mean	19607	95% UCL (Assuming Normal Distribution)	
Median	12500	Student's-t UCL	29995.48
Standard Deviation	17921.02		
Variance	3.2E+008	Gamma Distribution Test	
Coefficient of Variation	0.914011	A-D Test Statistic	0.395289
Skewness	1.987544	A-D 5% Critical Value	0.736759
		K-S Test Statistic	0.19459
Gamma Statistics		K-S 5% Critical Value	0.270233
k hat	1.83843	Data follow gamma distribution	
k star (bias corrected)	1.353568	at 5% significance level	
Theta hat	10665.08		
Theta star	14485.42	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.76861	Approximate Gamma UCL	32754.63
nu star	27.07136	Adjusted Gamma UCL	35958.36
Approx.Chi Square Value (.05)	16.20498		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	14.76119	Shapiro-Wilk Test Statisitic	0.950885
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	8.634087		
Maximum of log data	11.06976	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	9.587663	95% H-UCL	39546.44
Standard Deviation of log data	0.779214	95% Chebyshev (MVUE) UCL	40235.39
Variance of log data	0.607174	97.5% Chebyshev (MVUE) UCL	49405.31
		99% Chebyshev (MVUE) UCL	67417.84
		95% Non-parametric UCLs	
		CLT UCL	28928.59
		Adj-CLT UCL (Adjusted for skewness)	32734.51
		Mod-t UCL (Adjusted for skewness)	30589.13
		Jackknife UCL	29995.48
		Standard Bootstrap UCL	28468.43
		Bootstrap-t UCL	40723.88
RECOMMENDATION		Hall's Bootstrap UCL	64581.73
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	29317
		BCA Bootstrap UCL	32284
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	44309.43
		97.5% Chebyshev (Mean, Sd) UCL	54998.18
		99% Chebyshev (Mean, Sd) UCL	75994.18

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Lead T MG/KG
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.829804
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	8.2	Data not normal at 5% significance level	
Maximum	88.1		
Mean	30.77	95% UCL (Assuming Normal Distribution)	
Median	19.85	Student's-t UCL	45.03003
Standard Deviation	24.59978		
Variance	605.149	Gamma Distribution Test	
Coefficient of Variation	0.799473	A-D Test Statistic	0.357623
Skewness	1.576393	A-D 5% Critical Value	0.735171
		K-S Test Statistic	0.219601
Gamma Statistics		K-S 5% Critical Value	0.269646
k hat	2.120373	Data follow gamma distribution	
k star (bias corrected)	1.550928	at 5% significance level	
Theta hat	14.5116		
Theta star	19.83974	95% UCLs (Assuming Gamma Distribution)	
nu hat	42.40745	Approximate Gamma UCL	49.47006
nu star	31.01855	Adjusted Gamma UCL	53.91602
Approx.Chi Square Value (.05)	19.2933		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	17.70236	Shapiro-Wilk Test Statisitic	0.963257
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	2.104134		
Maximum of log data	4.478473	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	3.172574	95% H-UCL	59.5956
Standard Deviation of log data	0.739755	95% Chebyshev (MVUE) UCL	62.38517
Variance of log data	0.547238	97.5% Chebyshev (MVUE) UCL	76.23653
		99% Chebyshev (MVUE) UCL	103.4448
		95% Non-parametric UCLs	
		CLT UCL	43.56553
		Adj-CLT UCL (Adjusted for skewness)	47.70912
		Mod-t UCL (Adjusted for skewness)	45.67634
		Jackknife UCL	45.03003
		Standard Bootstrap UCL	43.03827
		Bootstrap-t UCL	53.95886
RECOMMENDATION		Hall's Bootstrap UCL	53.39067
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	44.17
		BCA Bootstrap UCL	46.86
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	64.67845
		97.5% Chebyshev (Mean, Sd) UCL	79.35067
		99% Chebyshev (Mean, Sd) UCL	108.1714

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Magnesium	T	MG/KG

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.799215
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	932	Data not normal at 5% significance level	
Maximum	7610		
Mean	2969.4	95% UCL (Assuming Normal Distribution)	
Median	2865	Student's-t UCL	4051.735
Standard Deviation	1867.121		
Variance	3486140	Gamma Distribution Test	
Coefficient of Variation	0.628787	A-D Test Statistic	0.590736
Skewness	1.759976	A-D 5% Critical Value	0.731708
		K-S Test Statistic	0.221796
Gamma Statistics		K-S 5% Critical Value	0.268344
k hat	3.169021	Data follow gamma distribution	
k star (bias corrected)	2.284981	at 5% significance level	
Theta hat	937.0088		
Theta star	1299.529	95% UCLs (Assuming Gamma Distribution)	
nu hat	63.38041	Approximate Gamma UCL	4351.065
nu star	45.69962	Adjusted Gamma UCL	4660.468
Approx.Chi Square Value (.05)	31.18787		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	29.11735	Shapiro-Wilk Test Statisitic	0.890757
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	6.837333		
Maximum of log data	8.937218	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	7.830119	95% H-UCL	5022.809
Standard Deviation of log data	0.622013	95% Chebyshev (MVUE) UCL	5611.489
Variance of log data	0.3869	97.5% Chebyshev (MVUE) UCL	6747.705
		99% Chebyshev (MVUE) UCL	8979.582
		95% Non-parametric UCLs	
		CLT UCL	3940.58
		Adj-CLT UCL (Adjusted for skewness)	4291.703
		Mod-t UCL (Adjusted for skewness)	4106.503
		Jackknife UCL	4051.735
		Standard Bootstrap UCL	3899.482
		Bootstrap-t UCL	4481.859
RECOMMENDATION		Hall's Bootstrap UCL	9022.904
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	3995.4
		BCA Bootstrap UCL	4231
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	5543.049
		97.5% Chebyshev (Mean, Sd) UCL	6656.668
		99% Chebyshev (Mean, Sd) UCL	8844.159

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Manganese T MG/KG

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	9	Shapiro-Wilk Test Statisitic	0.955757
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.829
Minimum	69	Data are normal at 5% significance level	
Maximum	409		
Mean	209	95% UCL (Assuming Normal Distribution)	
Median	182	Student's-t UCL	278.3054
Standard Deviation	111.8101		
Variance	12501.5	Gamma Distribution Test	
Coefficient of Variation	0.534977	A-D Test Statistic	0.169033
Skewness	0.534075	A-D 5% Critical Value	0.725543
		K-S Test Statistic	0.143487
Gamma Statistics		K-S 5% Critical Value	0.280718
k hat	3.683049	Data follow gamma distribution	
k star (bias corrected)	2.52944	at 5% significance level	
Theta hat	56.74647		
Theta star	82.62699	95% UCLs (Assuming Gamma Distribution)	
nu hat	66.29487	Approximate Gamma UCL	306.4897
nu star	45.52992	Adjusted Gamma UCL	333.3396
Approx.Chi Square Value (.05)	31.04754		
Adjusted Level of Significance	0.02308	Lognormal Distribution Test	
Adjusted Chi Square Value	28.54672	Shapiro-Wilk Test Statisitic	0.9692
		Shapiro-Wilk 5% Critical Value	0.829
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	4.234107		
Maximum of log data	6.013715	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	5.200478	95% H-UCL	357.9225
Standard Deviation of log data	0.586875	95% Chebyshev (MVUE) UCL	394.0395
Variance of log data	0.344422	97.5% Chebyshev (MVUE) UCL	473.2929
		99% Chebyshev (MVUE) UCL	628.971
		95% Non-parametric UCLs	
		CLT UCL	270.3038
		Adj-CLT UCL (Adjusted for skewness)	277.3933
		Mod-t UCL (Adjusted for skewness)	279.4113
		Jackknife UCL	278.3054
		Standard Bootstrap UCL	266.5248
		Bootstrap-t UCL	295.3021
RECOMMENDATION		Hall's Bootstrap UCL	276.7311
Data are normal (0.05)		Percentile Bootstrap UCL	267.1111
		BCA Bootstrap UCL	274.3333
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	371.4563
		97.5% Chebyshev (Mean, Sd) UCL	441.7513
		99% Chebyshev (Mean, Sd) UCL	579.8322

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Mercury T MG/KG
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.946153
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.0066	Data are normal at 5% significance level	
Maximum	0.13		
Mean	0.05966	95% UCL (Assuming Normal Distribution)	
Median	0.05	Student's-t UCL	0.083419
Standard Deviation	0.040986		
Variance	0.00168	Gamma Distribution Test	
Coefficient of Variation	0.686987	A-D Test Statistic	0.228406
Skewness	0.455512	A-D 5% Critical Value	0.736921
		K-S Test Statistic	0.162333
Gamma Statistics		K-S 5% Critical Value	0.270291
k hat	1.816342	Data follow gamma distribution	
k star (bias corrected)	1.338106	at 5% significance level	
Theta hat	0.032846		
Theta star	0.044585	95% UCLs (Assuming Gamma Distribution)	
nu hat	36.32684	Approximate Gamma UCL	0.100004
nu star	26.76212	Adjusted Gamma UCL	0.109856
Approx.Chi Square Value (.05)	15.96564		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	14.5338	Shapiro-Wilk Test Statisitic	0.92546
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-5.020686		
Maximum of log data	-2.040221	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-3.118952	95% H-UCL	0.16757
Standard Deviation of log data	0.922924	95% Chebyshev (MVUE) UCL	0.149177
Variance of log data	0.85179	97.5% Chebyshev (MVUE) UCL	0.18601
		99% Chebyshev (MVUE) UCL	0.258362
		95% Non-parametric UCLs	
		CLT UCL	0.080979
		Adj-CLT UCL (Adjusted for skewness)	0.082973
		Mod-t UCL (Adjusted for skewness)	0.08373
		Jackknife UCL	0.083419
		Standard Bootstrap UCL	0.079905
		Bootstrap-t UCL	0.086186
RECOMMENDATION		Hall's Bootstrap UCL	0.084098
Data are normal (0.05)		Percentile Bootstrap UCL	0.0792
		BCA Bootstrap UCL	0.08196
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.116155
		97.5% Chebyshev (Mean, Sd) UCL	0.1406
		99% Chebyshev (Mean, Sd) UCL	0.188618

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Molybdenum T MG/KG
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.72194
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.35	Data not normal at 5% significance level	
Maximum	6.1		
Mean	1.822	95% UCL (Assuming Normal Distribution)	
Median	0.75	Student's-t UCL	3.024303
Standard Deviation	2.074077		
Variance	4.301796	Gamma Distribution Test	
Coefficient of Variation	1.138352	A-D Test Statistic	1.068762
Skewness	1.332618	A-D 5% Critical Value	0.74729
		K-S Test Statistic	0.358769
Gamma Statistics		K-S 5% Critical Value	0.273465
k hat	1.054216	Data do not follow gamma distribution	
k star (bias corrected)	0.804618	at 5% significance level	
Theta hat	1.728298		
Theta star	2.264428	95% UCLs (Assuming Gamma Distribution)	
nu hat	21.08433	Approximate Gamma UCL	3.653112
nu star	16.09236	Adjusted Gamma UCL	4.154116
Approx.Chi Square Value (.05)	8.026112		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	7.058128	Shapiro-Wilk Test Statisitic	0.833579
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-1.049822		
Maximum of log data	1.808289	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.055734	95% H-UCL	5.735167
Standard Deviation of log data	1.056091	95% Chebyshev (MVUE) UCL	4.327734
Variance of log data	1.115328	97.5% Chebyshev (MVUE) UCL	5.460187
		99% Chebyshev (MVUE) UCL	7.684671
		95% Non-parametric UCLs	
		CLT UCL	2.900828
		Adj-CLT UCL (Adjusted for skewness)	3.19616
		Mod-t UCL (Adjusted for skewness)	3.070369
		Jackknife UCL	3.024303
		Standard Bootstrap UCL	2.860432
		Bootstrap-t UCL	3.684819
RECOMMENDATION		Hall's Bootstrap UCL	2.59861
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2.906
		BCA Bootstrap UCL	3.169
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	4.680918
		97.5% Chebyshev (Mean, Sd) UCL	5.917974
		99% Chebyshev (Mean, Sd) UCL	8.347931
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Nickel T MG/KG

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.93593
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	4.3	Data are normal at 5% significance level	
Maximum	29.8		
Mean	15.85	95% UCL (Assuming Normal Distribution)	
Median	13.6	Student's-t UCL	20.73029
Standard Deviation	8.418927		
Variance	70.87833	Gamma Distribution Test	
Coefficient of Variation	0.531163	A-D Test Statistic	0.215766
Skewness	0.544343	A-D 5% Critical Value	0.730504
		K-S Test Statistic	0.137332
Gamma Statistics		K-S 5% Critical Value	0.268071
k hat	3.600877	Data follow gamma distribution	
k star (bias corrected)	2.58728	at 5% significance level	
Theta hat	4.401706		
Theta star	6.126124	95% UCLs (Assuming Gamma Distribution)	
nu hat	72.01754	Approximate Gamma UCL	22.64335
nu star	51.74561	Adjusted Gamma UCL	24.13981
Approx.Chi Square Value (.05)	36.22114		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	33.97574	Shapiro-Wilk Test Statisitic	0.952993
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	1.458615		
Maximum of log data	3.394508	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.617935	95% H-UCL	26.31439
Standard Deviation of log data	0.599166	95% Chebyshev (MVUE) UCL	29.67143
Variance of log data	0.358999	97.5% Chebyshev (MVUE) UCL	35.55515
		99% Chebyshev (MVUE) UCL	47.11258
		95% Non-parametric UCLs	
		CLT UCL	20.22909
		Adj-CLT UCL (Adjusted for skewness)	20.71877
		Mod-t UCL (Adjusted for skewness)	20.80667
		Jackknife UCL	20.73029
		Standard Bootstrap UCL	20.04745
		Bootstrap-t UCL	21.95684
RECOMMENDATION		Hall's Bootstrap UCL	22.52005
Data are normal (0.05)		Percentile Bootstrap UCL	20.12
		BCA Bootstrap UCL	20.53
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	27.45469
		97.5% Chebyshev (Mean, Sd) UCL	32.47605
		99% Chebyshev (Mean, Sd) UCL	42.33954

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Potassium T MG/KG
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.751244
Number of Unique Samples	10	Shapiro-Wilk 5% Critical Value	0.842
Minimum	315	Data not normal at 5% significance level	
Maximum	4960		
Mean	1490.5	95% UCL (Assuming Normal Distribution)	
Median	917.5	Student's-t UCL	2388.648
Standard Deviation	1549.383		
Variance	2400589	Gamma Distribution Test	
Coefficient of Variation	1.039506	A-D Test Statistic	0.514679
Skewness	1.704664	A-D 5% Critical Value	0.741526
		K-S Test Statistic	0.192901
Gamma Statistics		K-S 5% Critical Value	0.271788
k hat	1.372995	Data follow gamma distribution	
k star (bias corrected)	1.027763	at 5% significance level	
Theta hat	1085.583		
Theta star	1450.237	95% UCLs (Assuming Gamma Distribution)	
nu hat	27.4599	Approximate Gamma UCL	2720.932
nu star	20.55527	Adjusted Gamma UCL	3038.215
Approx.Chi Square Value (.05)	11.25997		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	10.08409	Shapiro-Wilk Test Statisitic	0.937179
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	5.752573		
Maximum of log data	8.509161	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	6.900431	95% H-UCL	3722.506
Standard Deviation of log data	0.918591	95% Chebyshev (MVUE) UCL	3329.512
Variance of log data	0.843809	97.5% Chebyshev (MVUE) UCL	4149.86
		99% Chebyshev (MVUE) UCL	5761.274
		95% Non-parametric UCLs	
		CLT UCL	2296.409
		Adj-CLT UCL (Adjusted for skewness)	2578.623
		Mod-t UCL (Adjusted for skewness)	2432.668
		Jackknife UCL	2388.648
		Standard Bootstrap UCL	2255.156
		Bootstrap-t UCL	4044.211
RECOMMENDATION		Hall's Bootstrap UCL	7021.354
Data follow gamma distribution (0.05)		Percentile Bootstrap UCL	2330.7
		BCA Bootstrap UCL	2479.4
Use Approximate Gamma UCL		95% Chebyshev (Mean, Sd) UCL	3626.177
		97.5% Chebyshev (Mean, Sd) UCL	4550.287
		99% Chebyshev (Mean, Sd) UCL	6365.521

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Silver T MG/KG
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statisitic	0.926935
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.033	Data are normal at 5% significance level	
Maximum	0.34		
Mean	0.1463	95% UCL (Assuming Normal Distribution)	
Median	0.13	Student's-t UCL	0.201594
Standard Deviation	0.095387		
Variance	0.009099	Gamma Distribution Test	
Coefficient of Variation	0.651996	A-D Test Statistic	0.125455
Skewness	0.98203	A-D 5% Critical Value	0.733583
		K-S Test Statistic	0.101789
Gamma Statistics		K-S 5% Critical Value	0.269011
k hat	2.587283	Data follow gamma distribution	
k star (bias corrected)	1.877764	at 5% significance level	
Theta hat	0.056546		
Theta star	0.077912	95% UCLs (Assuming Gamma Distribution)	
nu hat	51.74565	Approximate Gamma UCL	0.224061
nu star	37.55529	Adjusted Gamma UCL	0.24198
Approx.Chi Square Value (.05)	24.52159		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	22.7058	Shapiro-Wilk Test Statisitic	0.985082
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	-3.411248		
Maximum of log data	-1.07881	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-2.127623	95% H-UCL	0.277883
Standard Deviation of log data	0.705778	95% Chebyshev (MVUE) UCL	0.297298
Variance of log data	0.498122	97.5% Chebyshev (MVUE) UCL	0.361726
		99% Chebyshev (MVUE) UCL	0.488282
		95% Non-parametric UCLs	
		CLT UCL	0.195915
		Adj-CLT UCL (Adjusted for skewness)	0.205924
		Mod-t UCL (Adjusted for skewness)	0.203155
		Jackknife UCL	0.201594
		Standard Bootstrap UCL	0.193791
		Bootstrap-t UCL	0.234166
RECOMMENDATION		Hall's Bootstrap UCL	0.244818
Data are normal (0.05)		Percentile Bootstrap UCL	0.1945
		BCA Bootstrap UCL	0.2
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	0.277782
		97.5% Chebyshev (Mean, Sd) UCL	0.334674
		99% Chebyshev (Mean, Sd) UCL	0.446428

Data File	W:\W2-mfg\Nuclear Metals RI FS EECA\Bacl	Variable:	Sodium T MG/KG

Raw Statistics		Normal Distribution Test	
Number of Valid Samples	9	Shapiro-Wilk Test Statisitic	0.830018
Number of Unique Samples	9	Shapiro-Wilk 5% Critical Value	0.829
Minimum	53.4	Data are normal at 5% significance level	
Maximum	252		
Mean	124.7889	95% UCL (Assuming Normal Distribution)	
Median	91	Student's-t UCL	168.9583
Standard Deviation	71.25827		
Variance	5077.741	Gamma Distribution Test	
Coefficient of Variation	0.571031	A-D Test Statistic	0.562048
Skewness	1.08332	A-D 5% Critical Value	0.724986
		K-S Test Statistic	0.253359
Gamma Statistics		K-S 5% Critical Value	0.280443
k hat	3.985819	Data follow gamma distribution	
k star (bias corrected)	2.731287	at 5% significance level	
Theta hat	31.30822		
Theta star	45.68868	95% UCLs (Assuming Gamma Distribution)	
nu hat	71.74474	Approximate Gamma UCL	180.1051
nu star	49.16316	Adjusted Gamma UCL	195.1769
Approx.Chi Square Value (.05)	34.06354		
Adjusted Level of Significance	0.02308	Lognormal Distribution Test	
Adjusted Chi Square Value	31.4331	Shapiro-Wilk Test Statisitic	0.913065
		Shapiro-Wilk 5% Critical Value	0.829
Log-transformed Statistics		Data are lognormal at 5% significance level	
Minimum of log data	3.977811		
Maximum of log data	5.529429	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	4.695965	95% H-UCL	195.3539
Standard Deviation of log data	0.528828	95% Chebyshev (MVUE) UCL	220.4365
Variance of log data	0.279659	97.5% Chebyshev (MVUE) UCL	262.2465
		99% Chebyshev (MVUE) UCL	344.3742
		95% Non-parametric UCLs	
		CLT UCL	163.8587
		Adj-CLT UCL (Adjusted for skewness)	173.0236
		Mod-t UCL (Adjusted for skewness)	170.3878
		Jackknife UCL	168.9583
		Standard Bootstrap UCL	161.7118
		Bootstrap-t UCL	208.1598
RECOMMENDATION		Hall's Bootstrap UCL	179.6679
Data are normal (0.05)		Percentile Bootstrap UCL	162.8333
		BCA Bootstrap UCL	166.9778
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	228.3248
		97.5% Chebyshev (Mean, Sd) UCL	273.1248
		99% Chebyshev (Mean, Sd) UCL	361.1258