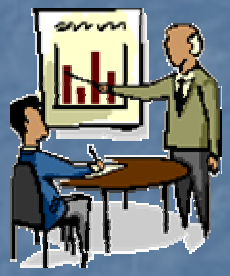
Technology Work Group

- Work Group Members
  - Dale Arnold
  - Bonne Beavers
  - Pat Blau
  - Len Bramble
  - Kathy Cupps
  - Rick Fink
  - Sid Fredrickson
  - Lars Hendron
  - Doug Krapas
  - Joel Massman
  - Mike Petersen
  - Dave Ragsdale (EPA Advisor)
  - Bruce Rawls
  - Terry Werner

Technology Work Group Activity

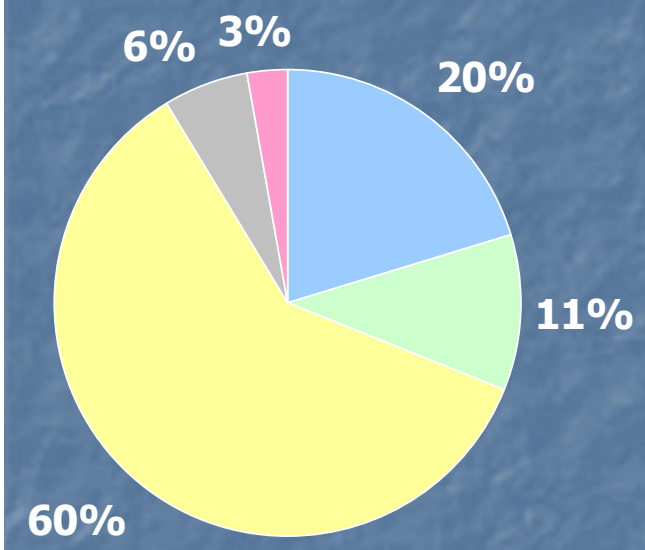
- **Data Collection**
  - Continuing to call facilities
  - Collecting DMR Data
- **Data Organization**
  - Sorted and placed category 7 facilities
  - Organizing chart
    - ≤50 µg/L
    - >50 but <100 µg/L
    - ≥100 µg/L
    - Not measured
    - Waiting for data
    - Special Circumstance
    - Presently on hold
  - Creating Visual Tools
    - Box and Whisker Plots
    - Pie Charts
    - Line Graphs
- **Data Sharing**
  - Posting scanned materials to website
    - Questionnaires
    - Most recent version of the Master Matrix

Technology Work Group Activity

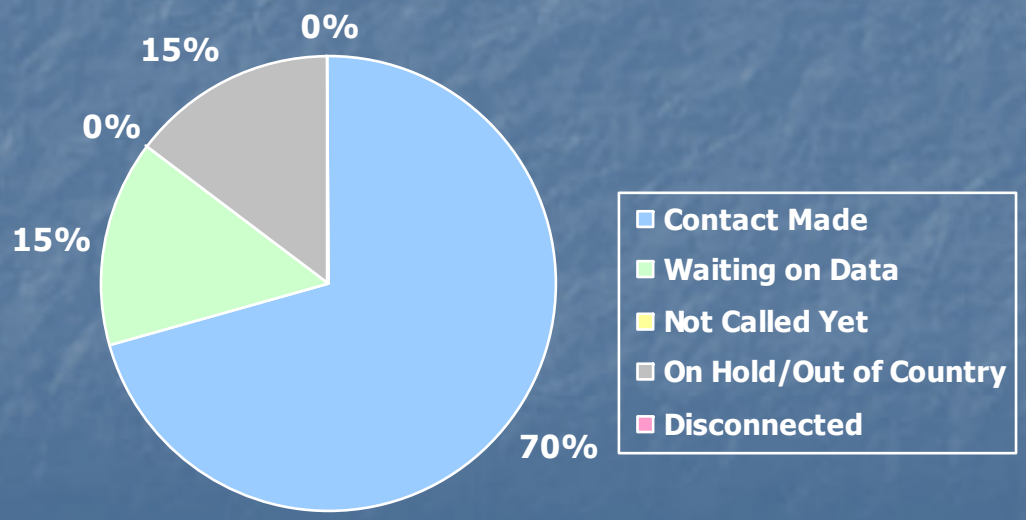


- Presentation by Kruger's Actiflo
- Pilot Programs at the City Plant
  - Zenon
  - US Filter
  - Parkson

Technology Collection Summary



Where we were last month…



Where we are today…

Master Matrix

Technology Description	Tech. #	ID #	Vendor	Product	Entities to be surveyed	8/23/2005 19:48		NPDES #	Flow (MGD)	Mean P µg/L	Lowest Estimate P µg/L	Comments
						City	ST					
Tertiary clarification and granular media filtration with chemical precip.	1	6b	US Filter	Trident	Stonegate Village WWTP (Effl P Pipe 2A)	Parker	CO	CO0040291	0.65	26.5	19	contact made
	1	2	US Filter	Trident	Pinery WWTP	Denver	CO	CO0041092	0.5837	29.4	22	contact made
	1	13	US Filter	Trident	Ely Water Treatment Plant	Ely	MN	MN0042137	1	29.4	22	contact made
	1	4	US Filter	Trident	South Water Reclamaition Facilty	Parker	CO	CO0046507	1.7	34.2	16	contact made
	1	6a	US Filter	Trident	Stonegate Village WWTP (Effl P Pipe 1A)	Parker	CO	CO0040291	0.65	44.2	19	contact made
	1	5	US Filter	Trident	Frisco Sanitation WWTP	Frisco	CO	CO0020451	0.66	62.071	50	contact made
	1	7	Kruger	Actiflo	South Lyon	South Lyon	MI	MI0020273	1.2	300	80	contact made
	1	8	US Filter	Trident	Emerald Green WWTP	Rock Hill	NY	NY0035645	0.25	306.2	100	contact made
	1	10	Kruger	Actiflo	City of Port Clinton WWTP	Port Clinton	OH	OH0052876	1-1.5	308.8	168.3	contact made
	1	11	US Filter	Trident	El Dorado Hills WWTP	El Dorado Hills	CA	CA0078671	2.5	2000	1000	contact made
	1	1	Kruger	Actiflo	Danbury	Lakeside/Marbleh	OH	2PG00053*FD	.7-.8	2356.5	1000	contact made
	1	3	Kruger	Actiflo	West Palm Beach	Palm Beach	FL	FL0041360	39		10	contact made
	1	109	Kruger	Actiflo	Metropolitan Syracuse WWTP	Syracuse	NY	NY0027081	70		100	contact made
	1	12	Kruger	Actiflo	Delta Diablo	Antioch	CA	CA0038547	7.2		na	contact made
	1	14	Kruger	Actiflo	Greenfield	Greenfield	CA	CO0020451	3		na	contact made
	1	16	US Filter	Trident	Rock Springs WWTP	Rock Springs	WY	WYG650007	1		na	contact made
	1	17	US Filter	Trident	Somerset WWTP	Somerset	MA	MA4273000	4.5-5		na	contact made
	1	18	US Filter	Trident	Trabuco Canyon WWTP	Trabuco Canyon	CA		2		na	contact made
	1	9			East Plum Creek WWTP (Effl. P Pipe 1B)	Castle Rock	CO	CO0038547orC	na	412	200	tech. not used
	1	9			East Plum Creek WWTP (Effl. P Pipe 5A)	Castle Rock	CO	CO0038547orC	na	579.6	0	tech. not used
	1	9			East Plum Creek WWTP (Effl. P Pipe 1A)	Castle Rock	CO	CO0038547orC	na	596	500	tech. not used
	1	15	US Filter	Trident	Marysville WWTP	Marysville	CA	CAU000441	na	na	na	tech. not used
	1	19	US Filter	Trident	Wayne Hill WWTP	Gwinnett Co	GA	GAG960001				Left Message
	1	20	Kruger	Actiflo	Acheres I	Paris	FR					Hold
	1	21	Kruger	Actiflo	Colombier		SZ					Hold
	1	22	Kruger	Actiflo	Herford		GM					Hold
	1	23	Kruger	Actiflo	Lindsay	Ontario	CN					Hold
Sequecing Batch Reactor/Membrane Bioreactor with enhanced biological phosphorus removal and chemicals	2	25	Zenon	ZeeWee	Lone Tree Creek WWTP (Effl. P Pipe 3T)	Denver	CO	CO0040681	1.6	24.3	0	contact made
	2	25			Lone Tree Creek WWTP (Effl. P Pipe 1A)					28.4	15	contact made
	2	81			Rock Hall WWTP (Ortho P)					213.1	30	contact made
	2	81	Parkson	DynaSan	Rock Hall WWTP (Total P)	Rock Hall	MD	MD0140006	0.35	284.6	100	contact made
	2	29	Aqua Aerobics	SBR	Pocona County Place WWTP	Tobyhanna	PA	PA0060097	0.6-0.7	326	326	contact made
	2	35	multimedia	oxidation	McMinville WWTP	McMinnville	OR	OR0034002	3	35000	20	contact made
	2	24	Clean Wtr		Durham WWTP	Hillsboro	OR	OR101141-144	18-19	65 (median)		contact made
	2	26	Clean Wtr	NA	Rock Creek WWTP	Hillsboro	OR	OR0029777 (O	45	80 (median)	40	contact made
	2	27	SBR/sand		Rose Creek WWTP	Woodstock	GA	GAU020015	4		200	or GA004645
	2	31	Clean Wtr		Hilsboro Westside WWTP	Hillsboro	OR	OR0023345			NA	contact made
	2	34	NA	NA	Cherry Creek Reservoir	Denver	CO	COG600318	NA		NA	contact made
	2	30	NA	NA	Village of Port Henry	Village of Port He	NY	NY0022969			NA	under construction
	2	32				Chehalis	WA	WA0021105			NA	under construction
	2	33	Zenon	ZeeWee	Bell-Carter Olive Food Packing Facility	Lafayette	CA	CA0081639				call back
	2	36	Zenon	ZeeWee	Brescia WWTP	Brescia	IT					Hold
	2	37	Zenon	Cycle-Let	Fern Resort WWTP upgrade	Orillia, Ont.	CN					Hold
	2	38	Zenon	ZeeWee	Landgraaf Landfill (?)	Netherlands	NL					Hold
Post secondary microfiltration with chemical precip	3	40	Zenon	ZeeWee	City of Ashland WWTP	Ashland	OR		2.2	50	50	contact made
	3	69	Zenon		Aqueonics/Mahopac	Mahopac	NY	NY0026590	0.16	107.4	104	contact made
	3	41	Zenon	ZeeWee	Fowler WRF	Cumming	GA	GAU020195	0.4	2000	1100	contact made
	3	39	Zenon	ZeeWee	Traverse City WWTP	Traverse	MI	MI0027481, MI(	7.5		10	contact made
	3	114	US Filter	sand	Grand Gorge STP	Roxbury	NY	NY0026565	0.14		49	contact made
	3	115	US Filter	sand	Pine Hill STP	Shandaken	NY	NY0026557	0.14		49	contact made
	3	113	US Filter	sand	Tannersville WWTP	Village of Tanners	NY	NY0026573	0.16		200	contact made
	3	110	US Filter	moving	Margaretville Wastewater Treatment Plant	Village of Margare	NY	NY0026531	0.21		250	contact made
	3	111	US Filter	moving	Grahamsville Wastewater Treatment	Township of Neve	NY	NY0026549	0.05		500	contact made
	3	45	Zenon		Cauley Creek WRF	Atlanta	GA	GA003844	4.8		NA	contact made
	3	46	Zenon		Lehigh Acres WWTP	Lehigh	FL		3.75		NA	contact made
	3	43	Zenon		Johns Creek MBR & Env. Campus	Fulton County	GA	GA0024333		485.4	270	under construction
	3	42	Zenon	Zee	Linwood WWTP	Gainesville	GA	GA0020168	5		4100	not constructed
	3	44	Zenon			Key Colony	FL	NA			NA	in construction
	3	47	Zenon		Manor WRF	Fulton County	GA	GAU090999	2.5			Left Message
	3	48	Kubota		Pumpkinvine Creek WRF	Paulding County	GA	GAU020296				Left Message
	3	49	Kubota		Upper Sweetwater WRF	Paulding County	GA	GAU020004				Left Message
	3	50	Zenon		Utilities INC. of PA Broad Run WRF	Chester	VA	PA0043982	0.4			call back
	3	51	Kubota		Waterscape Utility Hamptons WRF	Cumming	GA	GAU020293				will call back
	3	52	Zenon			Epping	NH	NH0100691				call back
	3	53	Zenon		Creemore	Ontario	CN					on hold
	3	54	Zenon			South Shore	CN					on hold
	3	55	Zenon			Port McNicoll	CN					on hold
Two stage sand filtration with chemical precipitation	4	57	Parkson	DynaSan	Village of Stamford	Village of Stamfor	NY	NY0021555	0.5	10.5	4.9	contact made
	4	58	Parkson	DynaSan	Village of Walton	Village of Walton	NY	NY0027154	1.17	10.8	6.9	contact made
	4	67			PWCSA Mooney WWTP (Ortho P)					22.1	0	contact made
	4	59	Parkson	DynaSan	Village of Delhi	Village of Delhi	NY	NY0020265	0.815	32.8	19	contact made
	4	64	Deleware Eng.	Dual	Highlands Pollution Control	Hunter	NY		0.005	49	49	contact made
	4	66		Sand	Noman M Cole Jr. Pollution Cont.	Fairfax Co	VA	VA0025364	40	52.4	29	contact made
	4	60			Clark County WRD (Effl Ortho P pipe 2A)					80.833	10	contact made
	4	60			Clark County WRD (Effl Ortho P pipe 1A)					81.667	10	contact made
	4	61	Parkson	DynaSan	Flat Creek WWTP	Gainesville	GA		8	90	40	pilot Dyna Sand
	4	72			Blue Plains AWT (Effl. P Pipe 2A)					113.6	100	contact made
	4	68	Parkson	DynaSan	Edgewater WWTP	Edgewater	FL	FLR10C088	1.2	114	76	contact made
	4	67			PWCSA Mooney WWTP (Total P)	Woodbridge	VA	VA0025101	24	116.4	50	contact made
	4	66			Las Vegas WWTP (Ortho P)	Las Vegas	NV	NV0020133	60	118.333	70	contact made
	4	74	Parkson	DynaSan	Watchtower Ed Ctr and Hotel	Patterson	NY	NY0165778	0.165	124	300	contact made
	4	70	Parkson	DynaSan	Trappe WWTP	Town of Trappe	MD	MD0020486	0.2	136.2	82	contact made
	4	60			Clark County WRD (Effl P pipe 2A)					138.333	70	contact made
	4	60		Sand	Clark County WRD (Effl P pipe 1A)	Las Vegas	NV	NV0021261	95	142.5	60	contact made
	4	65		Sand	Las Vegas WWTP (Total P)	Las Vegas	NV	NV0020133	60	166.667	120	contact made
	4	71	Parkson	DynaSan	Villa Julie College	Stevenson	MD	MD0066001	0.05	166.9	60	contact made
	4	108		gravity	Truckee Meadows WRF	Sparks	NV	NV0020150	31	289.167	230	contact made
	4	63	Parkson	DynaSan	Hunter WWTP	Hunter	NY	NY0241075	0.04	357.5	50	contact made
	4	72		Leopold/	Blue Plains AWT (Effl. P Pipe 1A)	Washington	DC	DC0021199	330	2106.4	0	contact made
	4	56	NA	multi	Upper Occoquan Sewer Auth	Centreville	VA	VA0024988	30		3.5	contact made
	4	73	Parkson	DynaSan	Ilderton Senior	Ilderton	CN		0.1-0.13		240	contact made
	4	28	NA	SBR	Rock Hall WWTP	Rock Hall	MD	MD0020303	0.25		250	contact made
	4	75	Parkson	DynaSan	Mount Pocono Muni. Auth. WWT	Mount Pocono	PA	PA0044997	0.27		760	contact made
	4	76	NA	high	Oceanside Water Pollution Cont.Plant	City of Oceanside	CA	CA0037681	16 ADWF		2500	contact made
	4	105	Parkson	DynaSan	Yelm WWTP	Yelm	WA	WA0040762	1		NA	contact made
	4	77	NA	Bio tower	Central Marin Sanitation Agency	San Rafael	CA	CA0038628	10 ADWF		NA	call back
	4	78	Parkson	DynaSan	Glenmore STP	Glenmore	VA	VA0086584			NA	contact made
	4	79	NA	Deep	Las Gallinas WWTP	San Rafael	CA	CA0037851	2.8		NA	contact made
	4	80	Parkson	DynaSan	Oceanside WWTP	City of Oceanside	CA	CA0107433	10		NA	contact made
	4	84	Deleware Eng.	Dual	City of Glens Falls	City of Glens Falls	NY	NY0029050	4.5		NA	contact made
	4	103	Parkson	DynaSan	Iowa Hill Water Reclaimation, Breckenridge Sanit. Dist.	Breckenridge	CO					contact made
	4	83			Arlington County Water Pollution	Arlington Co	VA	VA0025143	NA	55.7	50	under construction
	4	88	Pilot	DynaSan	Hartland TWP WWTP	Hartland	MI	MI0055841	0.38			inconsistant results
	4	82	Parkson	DynaSan	Windham WWTP	Windham	NY	NY0262935	0.375		NA	not online yet
	4	62	Parkson	DynaSan	Fleischmanns WWTP	Fleischmanns	NY	NY0261521			50	call back
	4	91			Village of Trumansburg WWTF	Trumansburg	NY	NY0024902	0.25		100	call back
	4	87		traveling	Fred Hervey WRF	El Paso	TX		7			contact made
	4	89	Parkson	DynaSan	Pine Crest Develop.	Pocono Pines	PA	PA0061719				call back
	4	90		pilot	Salem Township		MI	MI0054798				call back
	4	92			Village of Wilmingon	Village of Wilming	NY					Left Message
	4	93				Lanai City	HI					call back
	4	85	Parkson	DynaSan	Eastern Correctional	Somerset County	MD	MD0065595	0.0937			no contact
	4	86	Parkson	DynaSan	Elkton WWTP	Elkton	OH					no contact
	4	94	Parkson	DynaSan		New York	NY					no contact
	4	95	Parkson	DynaSan								no contact
	4	96	Parkson	DynaSan	Casino Rama	Chippewas Natior	CN					on hold
	4	97	Parkson	DynaSan	City of Innisfil	Innisfil	CN					on hold
	4	98	Parkson	DynaSan	City of Mitchell	Mitchell ON	CN					on hold
	4	99	Parkson	DynaSan	Elmvale WWTP	Vill of Elmvale	CN					on hold
	4	100	Parkson	DynaSan	Penetanguishene	Penetanguishene	CN					on hold
	4	101	Parkson	DynaSan	Town of Wasaga Beach	Wasaga-Ontario	CN					on hold
	4	102	Parkson	DynaSan	West Gwillimbury WWP	Bradford ON	CN					on hold
Post Lime	5	112		trickling	Port Jervis Wastewater Treatment Plant	Port Jervis	NY	NY0026522	9.47		NA	contact made
Dir filtr. w/	6	104		traveling	Medical Lake WWT&WRF	Medical Lake	WA	WA0021148	0.175	400	200	contact made

Key

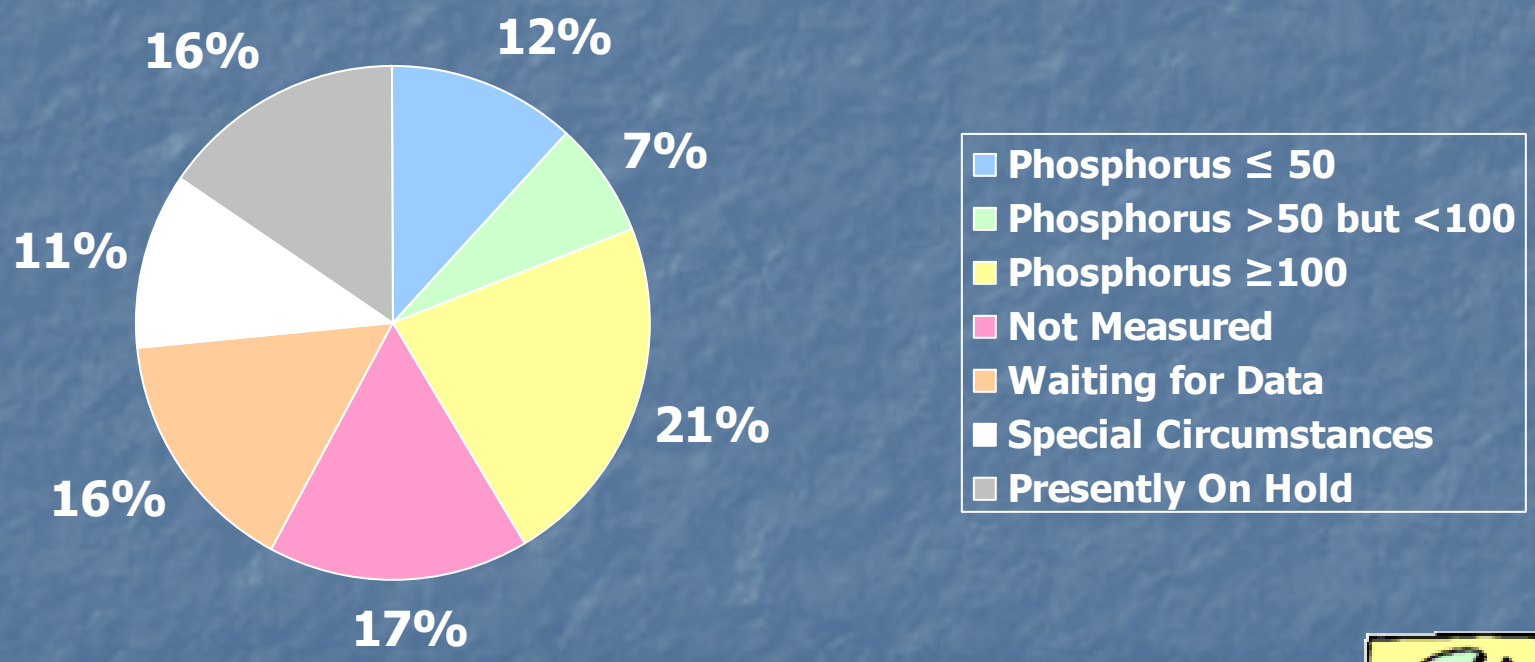
- 123 — Estimate
- Phosphorus ≤ 50
- Phosphorus > 50 or < 100
- Phosphorus ≥ 100
- Not measured
- Waiting for data
- Special circumstance, see comments
- Presently on hold

Contact Rank

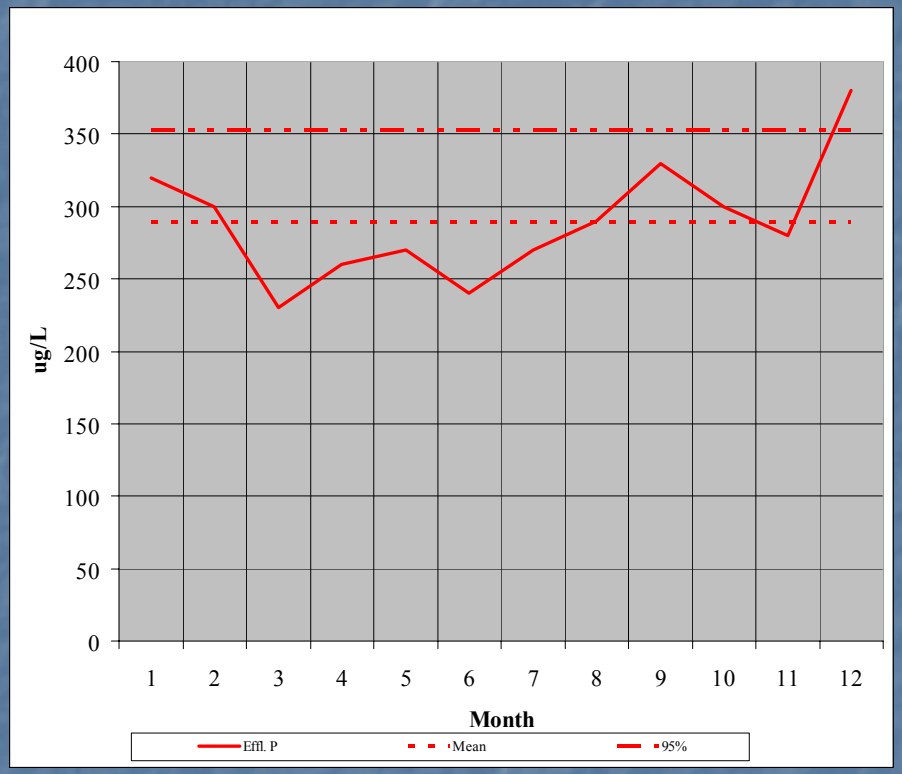
1. Contact has been made
2. Awaiting call back or message left
3. Wrong number or disconnected
4. No contact at this time
5. Presently on hold

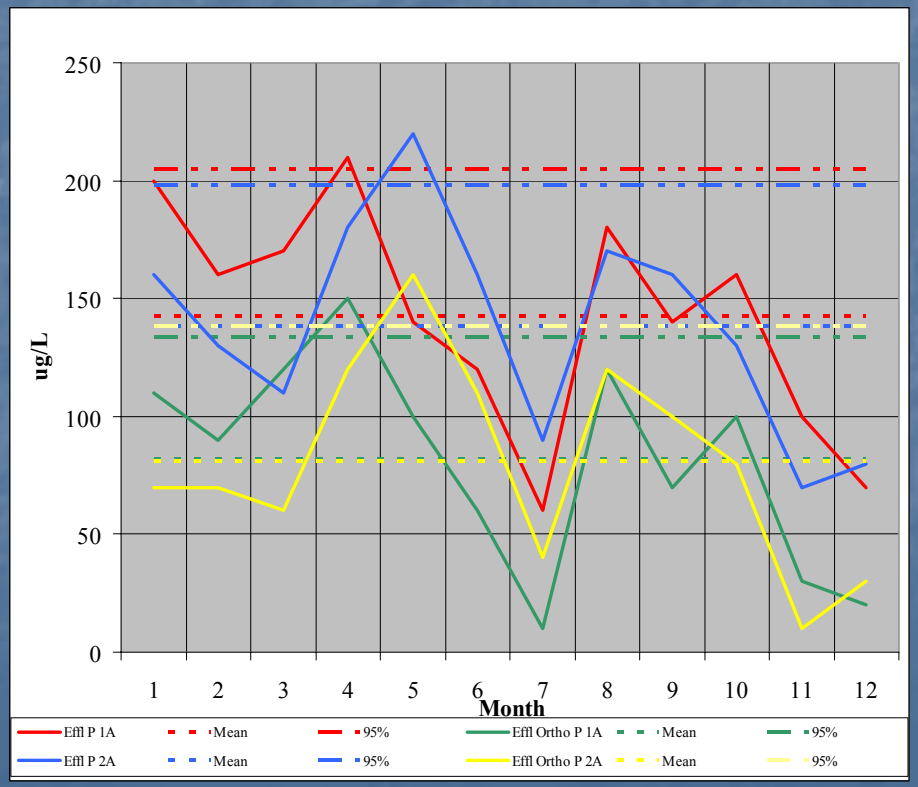
Preliminary Results

(mean in µg/L)



Organizing Data





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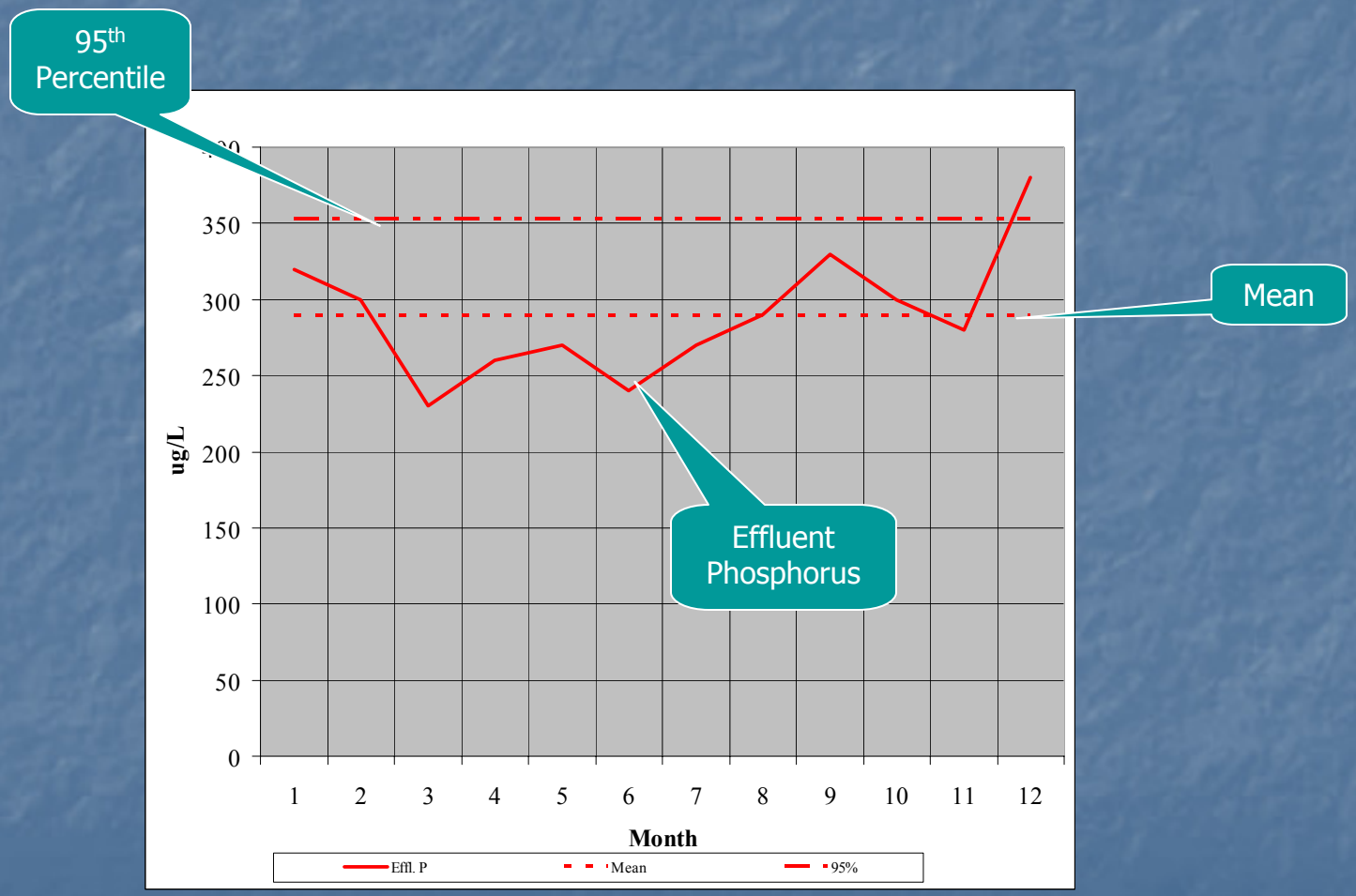
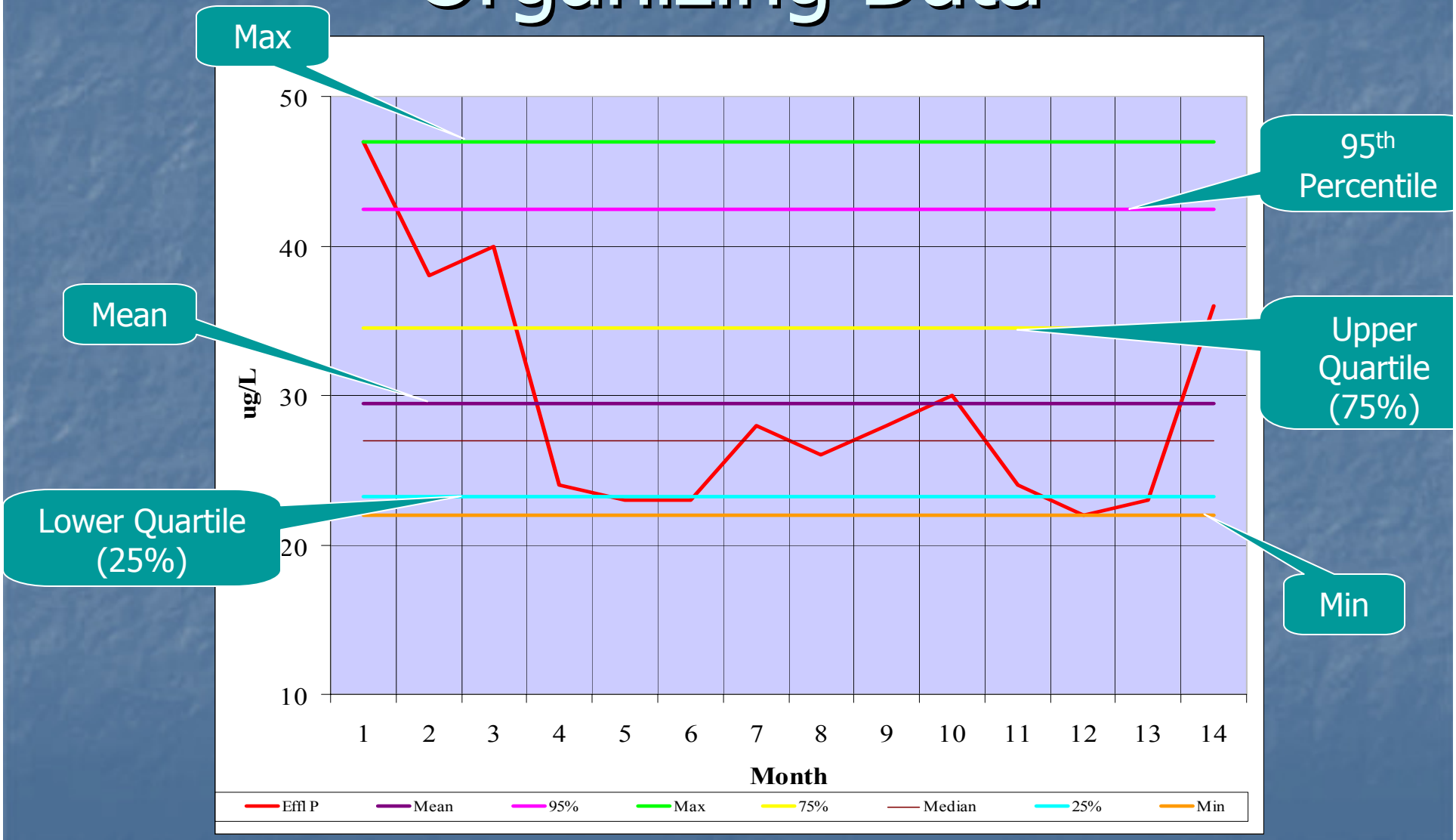
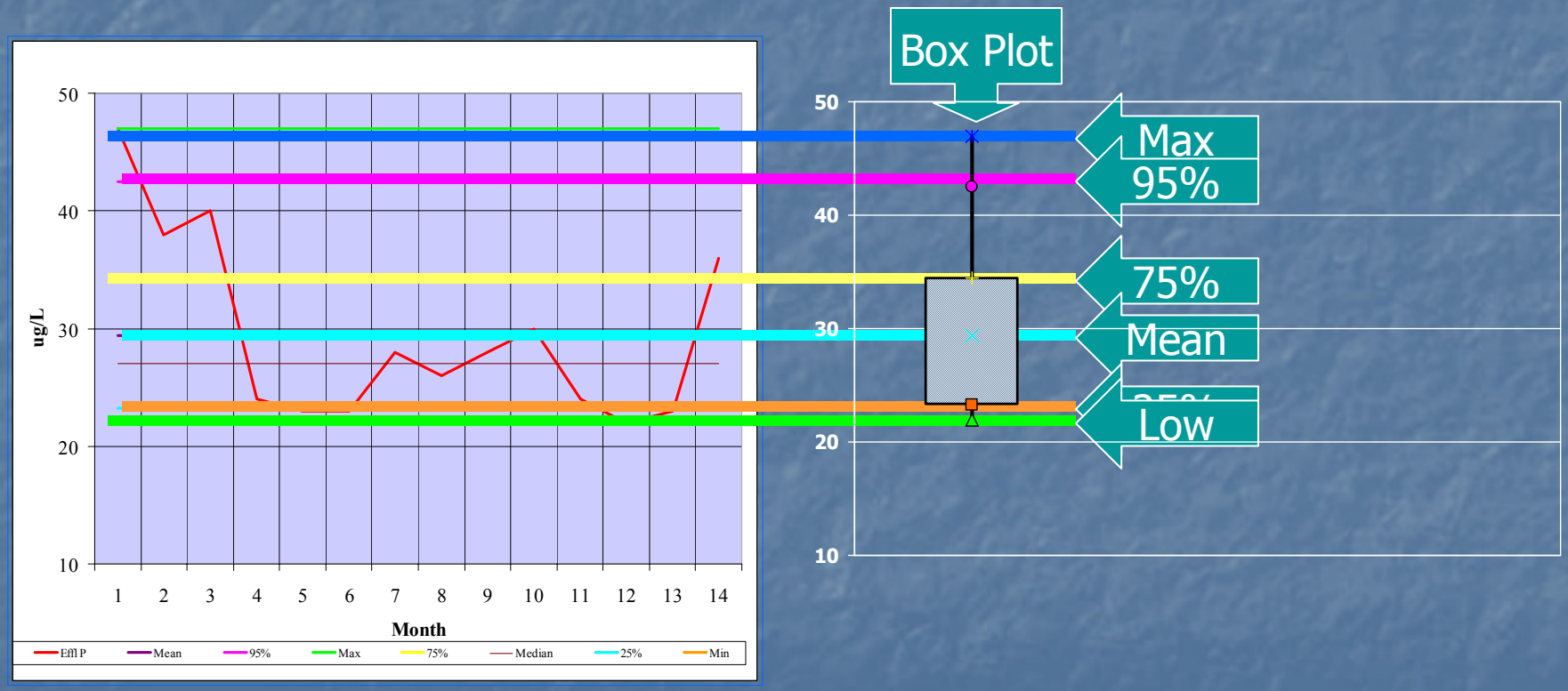


Organizing Data



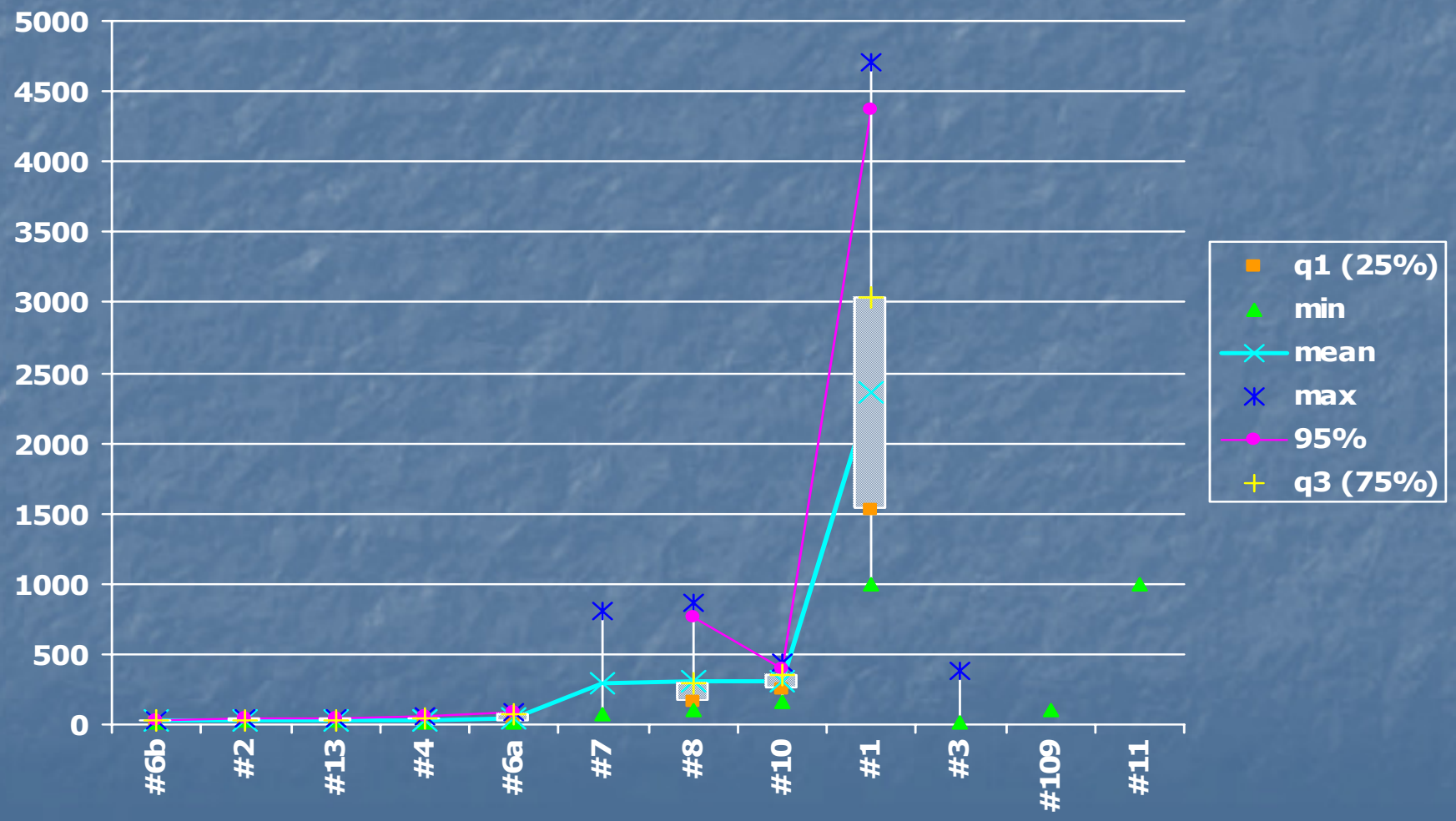
Organizing Data

Box Plots



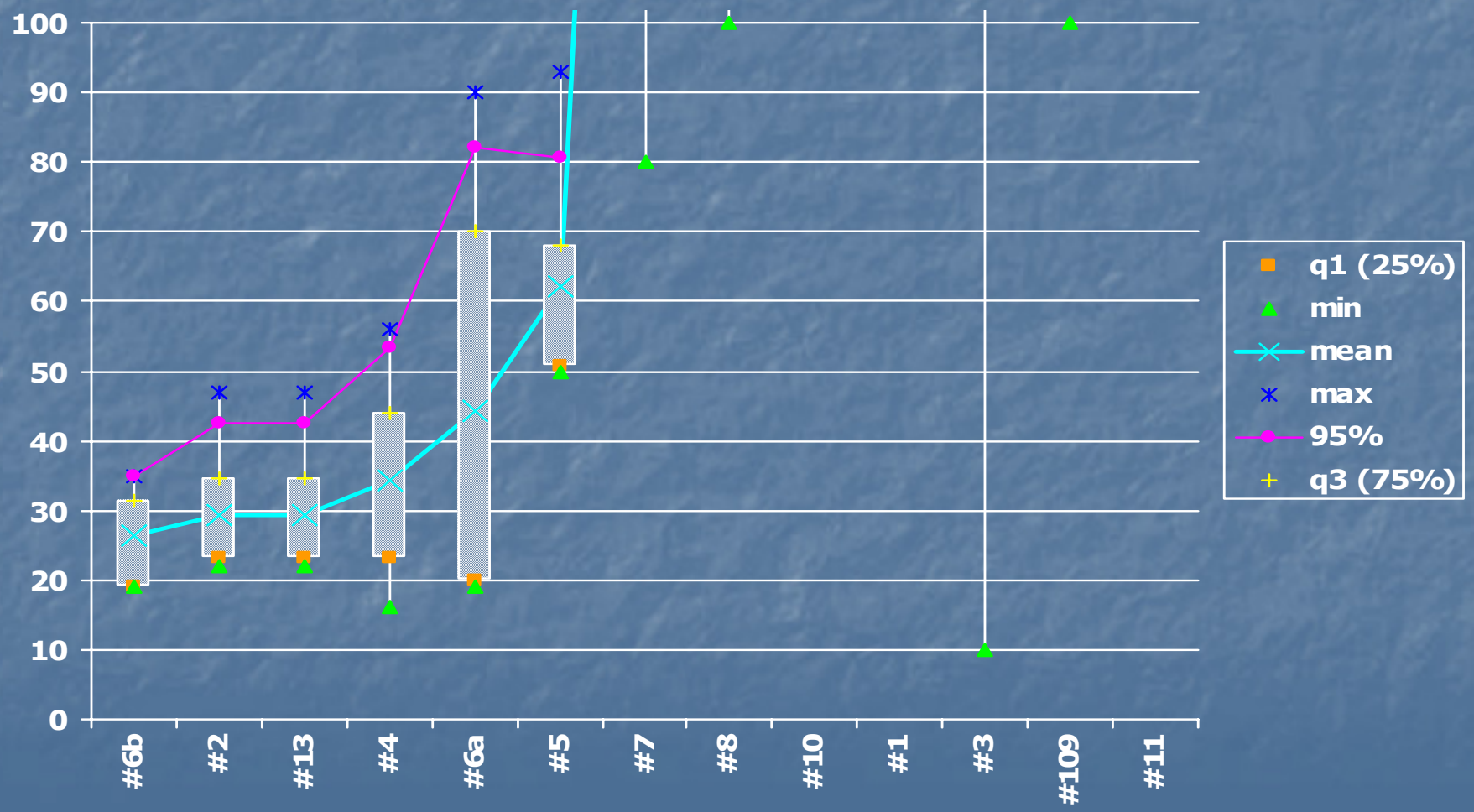
Technology 1

Tertiary Clarification and Granular Media Filtration with Chemical Precipitation



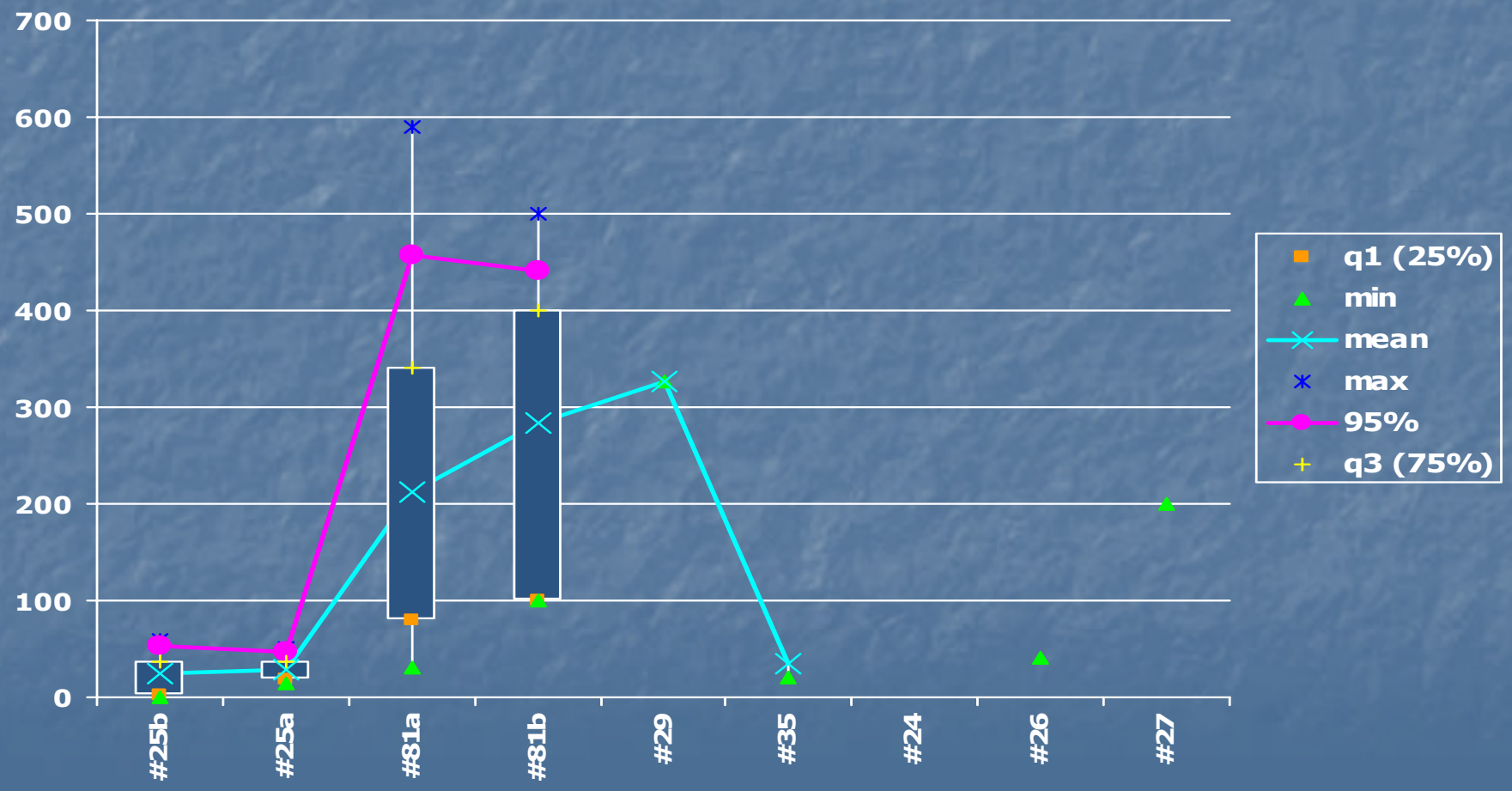
Technology 1

Tertiary Clarification and Granular Median Filtration with Chemical Precipitation (≤100µg/L)



Technology 2

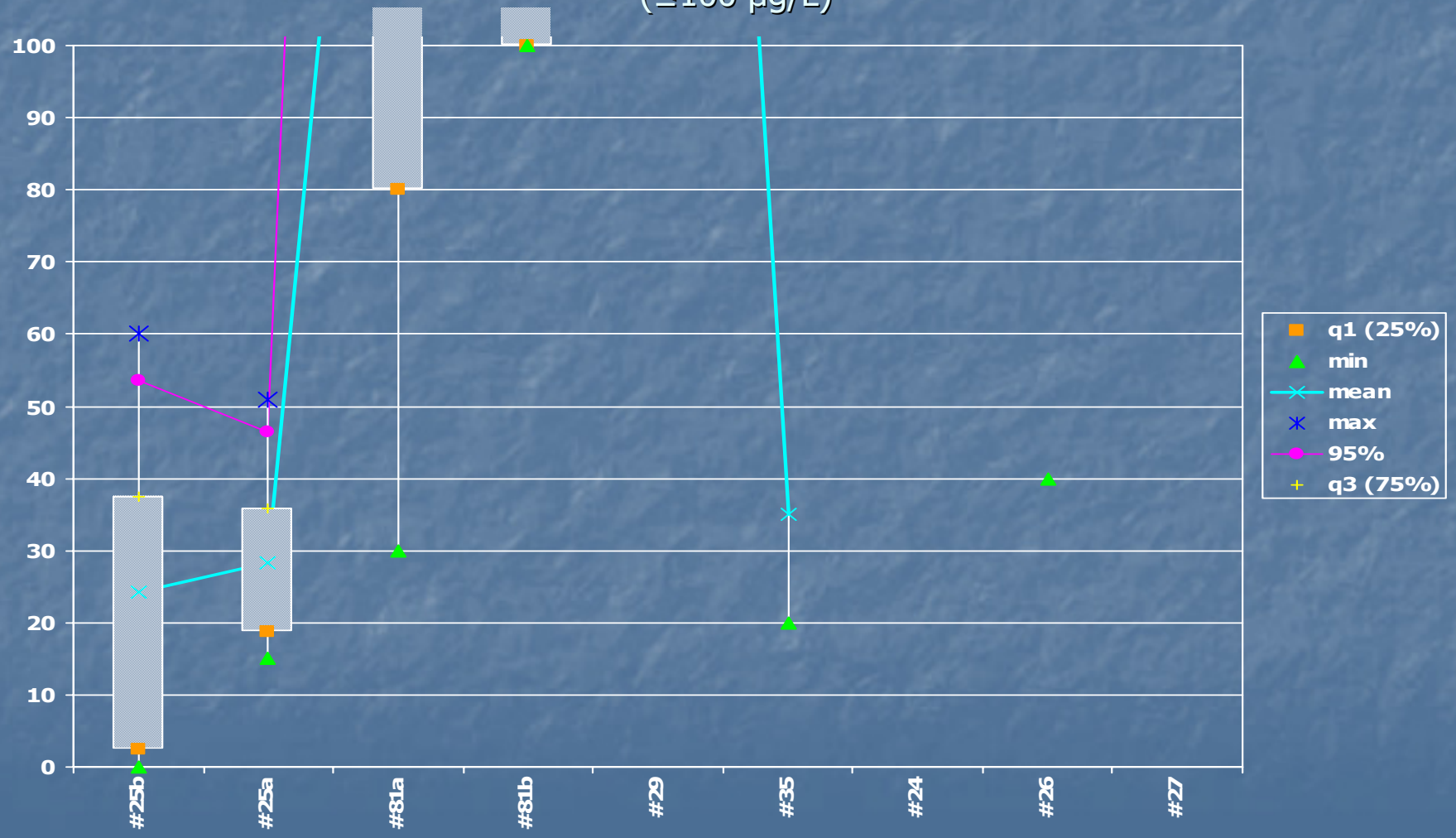
Sequencing Batch Reactor/Membrane Bioreactor with Enhanced Biological Phosphorus Removal and Chemicals



Technology 2

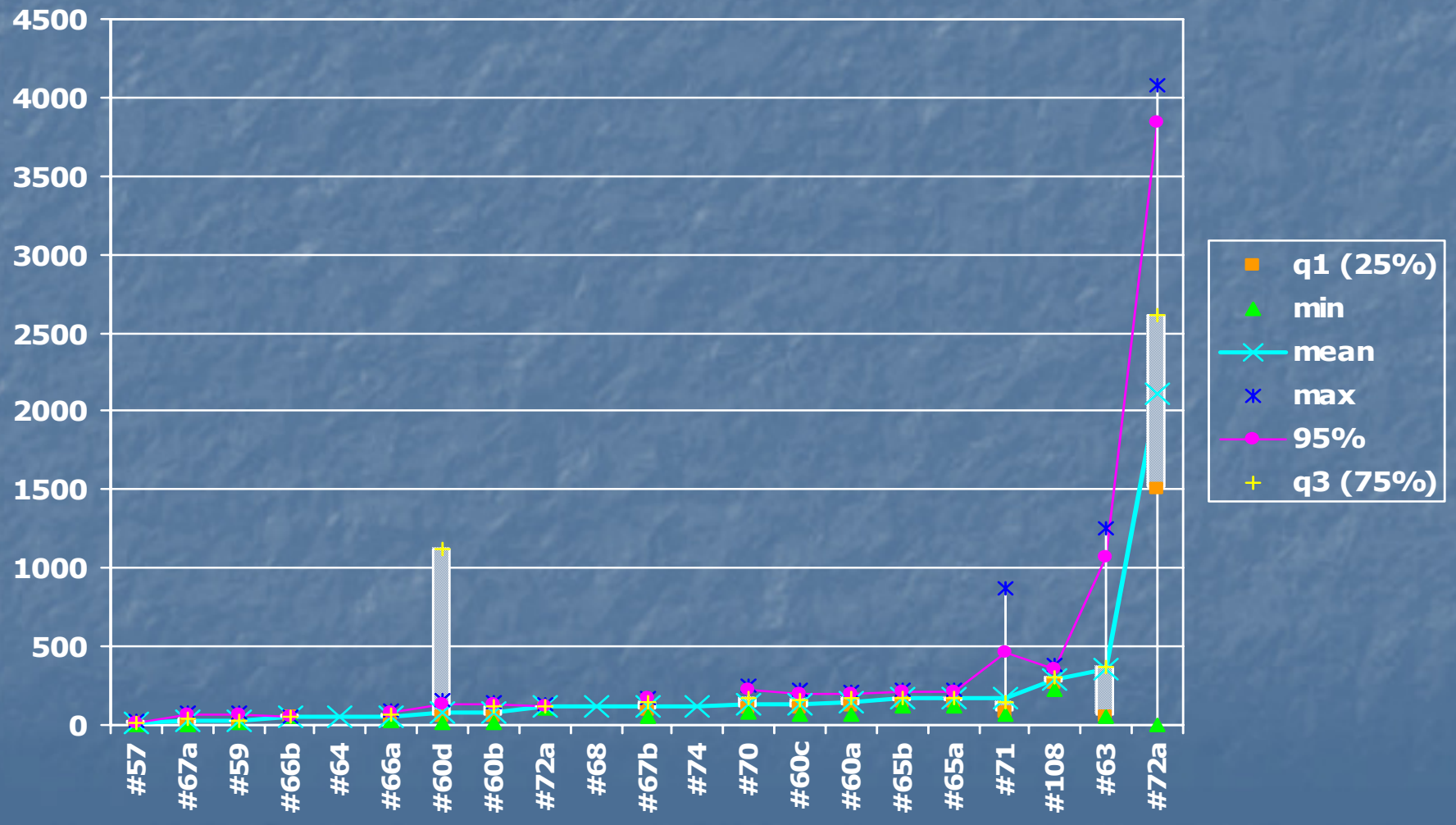
Sequencing Batch Reactor/Membrane Bioreactor with Enhanced Biological Phosphorus Removal and Chemicals

(≤100 µg/L)



Technology 4

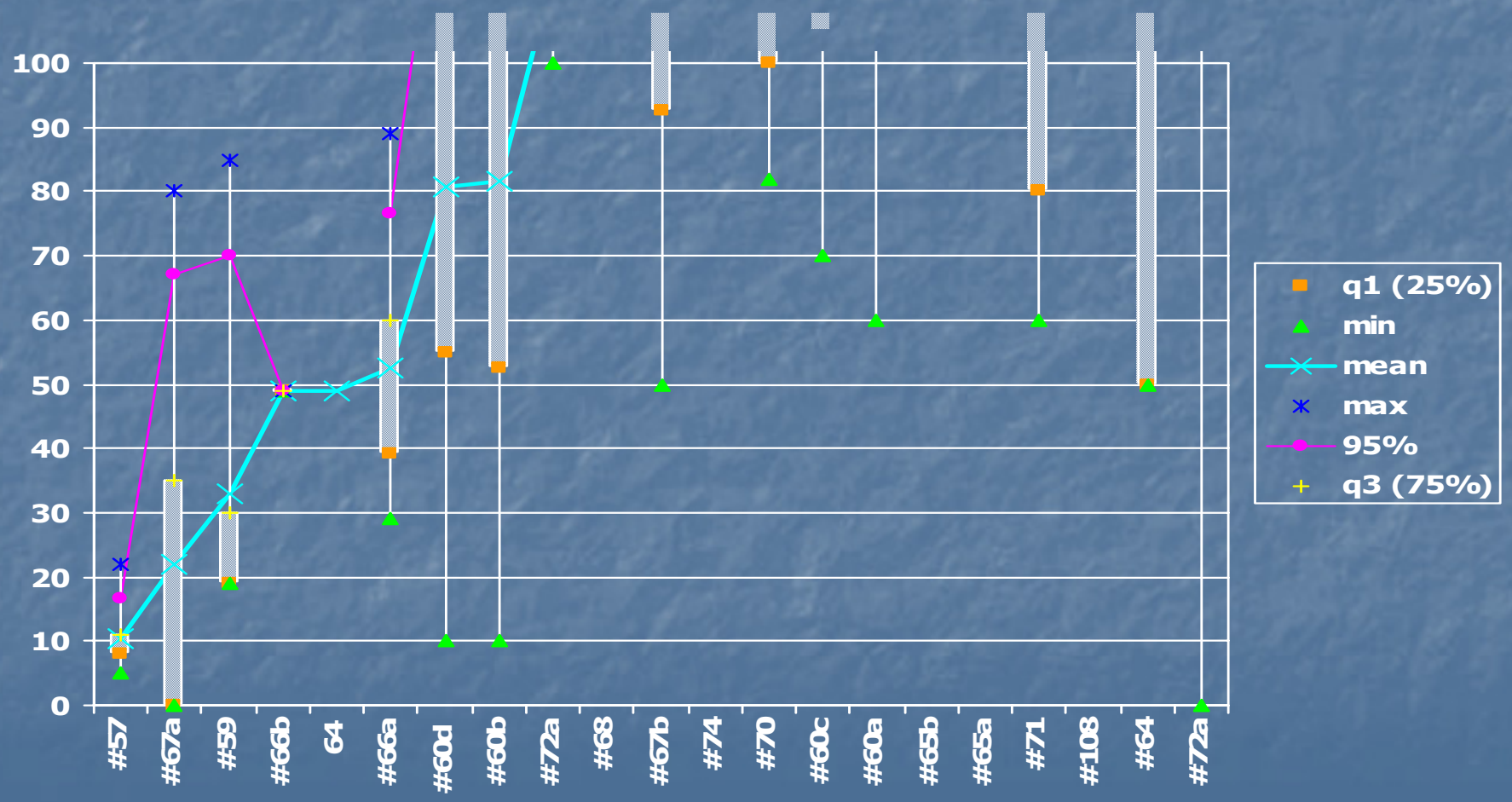
Two Stage Sand Filtration with Chemical Precipitation



Technology 4

Two Stage Sand Filtration with Chemical Precipitation

(≤ 100 µg/L)



Observations

- We are finding examples of treatment facilities that are achieving ≤ 50 µg/L

Next Steps

- Take a closer look at the facilities
  - Input from treatment experts
  - Obtain additional information
  - Follow up with facilities of interest
- Continue to collect facility data
- Insert values into summary matrix
- Continue to compile information to respond to Fundamental Questions
- Monitor the success of the Pilot Program at Riverside Park Water Reclamation Facility

Questions?