

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:)	
)	
WATER QUALITY STANDARDS AND)	
EFFLUENT LIMITATIONS FOR THE)	R08-9
CHICAGO AREA WATERWAY SYSTEM)	(Rulemaking-Water)
AND THE LOWER DES PLAINES RIVER:)	
Adm. Code Parts 301, 302, 303 and 304)	(Subdocket C)

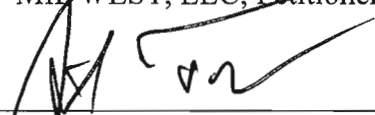
NOTICE OF FILING

To: John Therriault, Clerk	Marie Tipsord, Hearing Officer
Illinois Pollution Control Board	Illinois Pollution Control Board
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Please take notice that on October 8, 2010, we filed electronically with the Office of the Clerk of the Illinois Pollution Control Board the attached Pre-Filed Testimony of James E. Huff, P.E. and accompanying Attachments, a copy of which is served upon you.

CITGO PETROLEUM CORPORATION, and
PDV MIDWEST, LLC, Petitioners

By: 
One of Its Attorneys

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BEFORE THE ILLINOIS POLLUTION CONTROL BOARD
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WATER QUALITY STANDARDS AND)
EFFLUENT LIMITATIONS FOR THE) R08-9
CHICAGO AREA WATERWAY SYSTEM) (Rulemaking-Water)
AND THE LOWER DES PLAINES RIVER:)
Adm. Code Parts 301, 302, 303 and 304) (Subdocket C)

PRE-FILED TESTIMONY OF JAMES E. HUFF, P.E.

Introduction

My name is James E. Huff, and I am Vice President and part owner of Huff & Huff, Inc., an environmental consulting firm founded in 1979. I have previously testified in this rulemaking on May 6, 2009, prior to its subdivision into subdockets, and a copy of my background is summarized in the pre-filed testimony that accompanied that appearance.

I have been retained by the Lemont Refinery to review the Aquatic Life Use designation proposed by the Illinois EPA (the "Agency") for the reach of the Chicago Sanitary and Ship Canal downstream of the Calumet-Sag Channel confluence (the "Lower Ship Canal") and the technical justification provided by the Agency in support of its proposed Aquatic Life Use designation. I have actively followed the UAA proceedings before the Board. I have also evaluated the impact that the proposed use designation will have on the Lemont Refinery. My prior testimony also focused on the uses of the Ship Canal; my testimony here focuses on the Lower Ship Canal and to highlight the use of that segment for snow melt runoff.

The collection of waterways currently under consideration represents a range of dissimilar waterways, from natural streams to manmade canals. To some extent, the Agency's proposed changes recognize these differences in two different use categories, as Use A and Use B. My review was focused on the appropriateness of Use B designation for the Lower Ship Canal.

The Lemont Refinery discharges into the Lower Ship Canal. At the point of its discharge, the Lower Ship Canal can be described - as the Agency has stated - as an “effluent dominated” waterway. The uses of the Lower Ship Canal are demonstrably different than the use of the other bodies of water in the Chicago Area Water System (“CAWS”) and in this Use Attainability Analysis proceeding.

The Agency is proposing to group the Lower Ship Canal as an Aquatic Life Use B Water, a group that also includes the North Branch Chicago River, the Chicago River, South Branch Chicago River, the Calumet River to Torrence Avenue, the Lake Calumet Connecting Channel, and the Lower Des Plaines River from the Lower Ship Canal to the Brandon Road Lock and Dam. With the exception of the Lake Calumet Connecting Channel and the Lower Ship Canal, all of the waterways in this group are natural waterways. A proper consideration of the uniqueness of the artificially created and physically constrained Lower Ship Canal is lost by including it in this grouping. Aquatic Life Use B Waters are, “capable of maintaining aquatic life populations predominated by individuals of tolerant types that are adaptive to the unique physical conditions, flow patterns, and operational controls designed to maintain navigational use, flood control, and drainage functions in deep-draft, steep-walled shipping channels.” (Agency’s Statement of Reasons, p 49). The Agency has proposed statutory language which sets out the “Purpose” of these Aquatic Life Use B restrictions as protecting “the highest quality aquatic life ... that is attainable...” (Agency proposal for 35 Ill. Adm. Code 302.402.)

The focus of my testimony here is on the chloride and sulfate water quality limits proposed for the Lower Ship Canal. Others will address the uses of the Lower Ship Canal for stopping the spread of invasive species such as the Asian Carp from the Illinois River system toward Lake Michigan. In particular, my testimony addresses the Agency’s proposed chloride and sulfate

limits which would “upgrade” the use of the Lower Ship Canal and directly conflict with its current uses. As stated later, I would recommend that the Board *not* accept such an “upgraded” use.

The Lemont Refinery discharge contains sodium sulfate from the recently installed Wet Gas Scrubber used to reduce sulfur dioxide air emissions as well as chlorides removed from the crude oil in the desalting process. Under the Agency’s proposal, the chloride water quality standard would be set at 500 mg/L, and at least during periods when the Ship Canal exceeds 500 mg/L, the Lemont Refinery would be restricted to a discharge of 500 mg/L chlorides, which it can not achieve. The sulfate limit is more complicated in that the sulfate water quality standard is based on the chloride concentration; however, sulfate water quality standards are limited to waterways having less than 500 mg/L chlorides, from which one could conclude that no net increase in sulfates is allowed when the receiving stream exceeds 500 mg/L chlorides.

Uniqueness of the Lower Ship Canal

As the Agency noted in its Statement of Reasons, “the environmental potential for the river was historically deemed to be limited to the point of hopelessness” (Agency’s Statement of Reasons, p 17). The Illinois Pollution Control Board (“Board”) has consistently recognized the challenges, variability, and uniqueness of the CAWS and Lower Des Plaines River and many of the same challenges and limitations that the Board recognized in the early 1970s remain valid today. This is particularly true for the Lower Ship Canal.

The Lower Ship Canal is typically 200 to 300 ft. wide with depths ranging from 27 to 50 ft. (CDM, 2007). The construction of the Lower Ship Canal includes vertical walls and steep embankments. The Lower Ship Canal was completed as part of the greater Ship Canal in 1907

to divert pollutants away from Lake Michigan, the City of Chicago's primary water supply, and it was expanded in 1919 to its present form to increase navigation capabilities and provide additional waste dilution. With the potential exception of the Calumet-Sag Channel, as described later in my testimony, there is no other water body in the CAWS which has the unique physical features, commercial shipping, discharge loadings, and lack of appropriate habitat for aquatic life, as the Lower Ship Canal. And none are so specifically associated with efforts to control the spread of invasive species and the elevated levels of chlorides and TDS from runoff due to snow melt conditions.

The aquatic habitat of the Lower Ship Canal is rated as "poor to very poor" (IEPA, 2006). Overall stream use is designated as *non-support* for fish consumption and aquatic life. The identified causes of impairment were polychlorinated biphenyls (PCBs), iron, oil and grease, dissolved oxygen ("D.O."), total nitrogen, and total phosphorus. Identified sources of the impairment include combined sewer overflows, urban runoff/storm sewers, and impacts from hydrostructure flow regulation/ modification, municipal point source discharges, and other unknown sources.

Stormwater runoff flows into the Lower Ship Canal, carrying with it pollutants from roads, parking lots and other surfaces. In the winter months, this stormwater carries road salt and other chemicals used by the state and municipalities to keep streets, highways and parking lots safe. While there are potential activities to reduce the amount of sodium chloride applied within the basin, there has been no demonstration that these reductions will be sufficient to achieve the proposed chloride water quality standard of 500 mg/L. When de-icing salts cause a spike in the chloride level, the Lemont Refinery loses its mixing zone, as the Lower Ship Canal's upstream water quality exceeds the water quality standard for chlorides.

In addition to the stormwater runoff impact, the electric barrier system and rotenone applications on the Lower Ship Canal are particularly unique hazards to aquatic life. Both these hazards, lying within the same reaches of the Lower Ship Canal as the Lemont Refinery, are designed to create *less* hospitable aquatic life conditions so as to prevent invasive species from entering and leaving the Great Lakes. The Agency's proposal to upgrade the aquatic life use designation of the Lower Ship Canal directly conflicts with the local, state, and federal existing use of these waters as a barrier to halt the spread of invasive species. These barriers were authorized by Congress, with the full recognition on the part of federal and state biologists that any positive fish migration in the Lower Ship Canal was being sacrificed to protect the Great Lakes as well as the Mississippi River Basin from aquatic invasive species.

These electric barriers will not only prevent the aquatic invasive species from migrating, but will also prevent all other fish from migrating up or down the Lower Ship Canal at Lockport, effectively terminating the water body at this point from a biological perspective. Normally, preventing migration is not a desirable outcome, but it is certainly necessary in light of the greater goal of protecting the biological integrity of the Great Lakes and the Mississippi River Basin.

Mixing Zone Implications

Because of the uniqueness of the Lower Ship Canal, a separate use category is appropriate. However, the Agency has proposed strict limits for chlorides and sulfates, essentially proposing standards adopted for "General Use" waters.¹ While I recognize that Subdocket D will directly address water quality standards and limits, it is important in this Subdocket C to recognize the

¹ Sulfates only when the chlorides are greater than 500 mg/L, no net increase in sulfates would be allowed.

impact a use designation and the water quality standards which are appropriate for that use designation, will have on the Lower Ship Canal.

Under 35 Ill Adm Code 302.102, mixing zones and Zones of Initial Dilution (“ZIDs”) are allowed, subject to certain restrictions. Section 302.102(b)(9) prohibits mixing zones for constituents where the water quality standard is already violated in the receiving stream. Assuming for the moment that this prohibition only applies during the period of time the receiving water body exceeds a water quality standard, then there will be times during each year when all dischargers adding any chlorides or sulfates will have to meet the water quality standards at the end of pipe. The Agency noted in its Statement of Reasons (p 76) that it expects that there will be violations of the chloride standard during the winter months, yet it offers no solution in its proposal and it does not address at all the loss of mixing zones. It is likely that every discharger on the Lower Ship Canal will be negatively impacted by this loss of mixing zone, with significant economic implications.

Attachment 1 presents four years of chloride data from the Lemont Refinery’s water intake (which is upstream of its discharge). During the summer and fall months, the chloride levels are typically below 500 mg/L. However during snow melt periods, chloride levels as high as 998 mg/L have been recorded in the Lower Ship Canal. There have been chloride violations every winter/spring recorded in this data. These cold-weather exceedances are attributed to highway and parking lot de-icing runoff. The intense population center (i.e. the City of Chicago and suburban Cook County which are upstream of the Lemont Refinery) on an effluent dominated stream makes achieving a 500 mg/L chloride standard not practicable without drastically changing de-icing practices. Moreover, while ignoring the current uses being made of the Lower Ship Canal, the proposal penalizes the point source dischargers on the Lower Ship Canal.

During periods of elevated chlorides, no discharger can contribute any chlorides or sulfates under the proposed water quality regulations. The Board has already granted variances relating to Total Dissolved Solids to the Lemont Refinery (and changed the water quality standard for TDS for the Exxon-Mobil Refinery) due to the snow-melt phenomenon. Facilities that use once through cooling water would not be allowed to add chlorine (increase in chlorides) to control microbial growth, nor can they add sulfite type compounds to consume any chlorine residual (de-chlorinate) in the discharge. On an effluent dominated stream, chlorinating the incoming water is important to prevent biological growth on the heat exchangers. To discontinue discharging would entail ceasing operations for most industries, which has its own economic ramifications. In addition, new dischargers to the Lower Ship Canal would essentially be limited to operations that did not add any heat (no once through cooling), chlorinate, de-chlorinate, use de-icing salt in the winter, or any process that contributes chlorides or sulfates. I would expect that many existing dischargers would also not be allowed to discharge during periods when the Lower Ship Canal is over 500 mg/L chlorides, as their effluent will also exceed 500 mg/L chlorides during these same periods.

Chloride Reduction Efforts

Excess chlorides in the winter/spring season is not unique to the Lower Ship Canal in Illinois. A considerable effort has gone into education programs to minimize the application of excess de-icing salt. Last year there was a significant spike in salt prices, which provided a larger incentive on users to reduce wastage. What is unique about the Lower Ship Canal is the huge population center upstream. An estimated 270,000 tons of highway salt are applied annually in the Chicago Area. The peak chloride level of 998 mg/L recorded in 2007 would require approximately a 50 percent reduction of salt use during the heaviest storm events, and the 50 percent ignores the

background chlorides. There are certainly opportunities to reduce highway de-icing salt, but I am unaware of any study that indicates a 50 percent reduction in salt in the Chicagoland area is technically feasible. The Village of Winnetka has a green vision that has a goal of reducing salt consumption by 30 percent. For major highways, opportunities to reduce salt consumption by this much is unlikely, because salt application is not optional from a safety perspective. In summary, while efforts to reduce salt usage are underway, achievement of a 500 mg/L chloride water quality standard on the Lower Ship Canal is not technically feasible and does not reflect the uses of the Lower Ship Canal.

The Board Should Reject any Upgrade in Water Quality Uses for the Lower Ship Canal

An upgrade of designated water quality uses and associated criteria in the Lower Ship Canal, particularly as it regards TDS, chlorides, or sulfates, is not appropriate. The Lower Ship Canal is used to prevent the spread of invasive species, to carry runoff from de-icing, and for commercial activity vital to the local economy. Even the existing standard of 1,500 mg/L for TDS set out in 35 Ill. Adm. Code 302.407 cannot be met during periods of road salt runoff. As a result, the Board has had to repeatedly grant variances to account for such runoff (*see, e.g.,* PCB 08-33, Opinion and Order, May 15, 2008).

Nonetheless, the Agency seeks to copy most of its General Use water quality standards from 35 Ill. Adm. Code 302.208(e-g) and insert them into a revised 35 Ill. Adm. Code 302.407(e-g).² The proposed chloride standard in 35 Ill. Adm. Code 302.407(g) of 500 mg/L paradoxically upgrades the existing water quality standards despite the fact that the current standard cannot be met and that there are external biological, political, and economic reasons that will prevent any increase in aquatic life quality for the Lower Ship Canal.

There is no indication in the record I reviewed that the Agency has considered the loss of mixing zones that will occur on the Lower Ship Canal if the Use B designation and the associated proposed water quality standards are adopted to this waterway. The unintended consequences of the Agency's proposed UAA rules for chlorides and sulfates could be addressed by other means, such as the development of Best Management Practices (BMP) for chlorides and sulfates in place of winter water quality standards for these parameters. The Lemont Refinery expects to bring forward further testimony on this issue in Subdocket D.

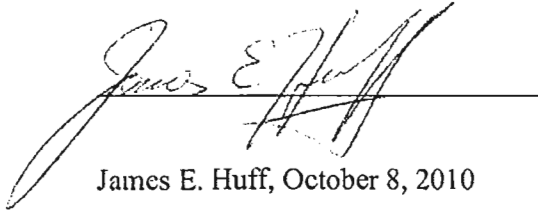
Conclusion

The uniqueness of the Lower Ship Canal, as outlined in my testimony, is so apparent that a separate use category is needed. The Agency recognized that the Lower Ship Canal met 3 of the criteria which justified not upgrading the use of this segment. See Exhibit 29]. That recognition occurred before the Board considered the effect of the invasive species such as the Asian carp,

² In at least one instance, for example, the Agency even seeks to impose *more restrictive* water quality standards on these formerly designated "Secondary Contact" waters than it imposes on the "General Use" waters. The proposed arsenic water quality standard in 302.407(e) is 340 µg/L for acute standards and 150 µg/L for chronic standards. By comparison, the existing "General Use" water quality standard in 302.208(e) is 360 µg/L for acute standards and 190 µg/L for chronic standards.

without regard to the snow melt runoff conditions that I have addressed above. The use of the Lower Ship Canal as a control point for prevention of invasive species migration, and the technical infeasibility of attainment of the proposed chloride standard due to its use in receiving snow-melt runoff from the most heavily urbanized area in the state [and hence with the greatest need for de-icing practices] justifies special attention to this segment of the CAWS. Such a use category should recognize the existing uses and limitations of the Canal. Since this set of hearings is focused on the proposed uses of the CAWS, I will not go further into the appropriate water quality standards for the Lower Ship Canal. But I would urge the Board to establish a separate use designation for the Lower Ship Canal and examine in another docket the appropriate water quality standards based on the unique conditions of the Lower Ship Canal.

Thank you, this concludes my pre-filed testimony.



James E. Huff, October 8, 2010

Attachment 1Lemont Refinery Water Intake Chloride Levels (in mg/L)

<u>2007</u>		<u>2008</u>		<u>2009</u>		<u>2010</u>	
1/1/07	174	1/7/08	562	1/2/09	342	1/1/10	344
1/5/07	156	1/11/08	272	1/5/09	297	1/4/10	350
1/8/07	113	1/18/08	270	1/9/09	270	1/6/10	301
1/12/07	133	1/21/08	256	1/12/09	300	1/8/10	276
1/15/07	250	1/25/08	252	1/16/09	436	1/11/10	223
1/19/07	239	1/28/08	514	1/19/09	470	1/15/10	311
1/22/07	203	2/1/08	556	1/23/09	331	1/18/10	267
1/26/07	384	2/4/08	625	1/26/09	282	1/22/10	297
1/29/07	286	2/8/08	896	1/30/09	224	1/25/10	342
2/2/07	225	2/11/08	848	2/2/09	298	1/29/10	281
2/5/07	227	2/15/08	666	2/6/09	214	2/1/10	310
2/9/07	181	2/18/08	489	2/9/09	270	2/5/10	259
2/12/07	224	2/22/08	351	2/13/09	402	2/8/10	305
2/16/07	181	2/25/08	376	2/16/09	355	2/12/10	283
2/19/07	695	2/29/08	299	2/20/09	310	2/15/10	833
2/23/07	549	3/3/08	460	2/23/09	344	2/19/10	446
2/26/07	600	3/7/08	398	2/27/09	376	2/26/10	648
3/2/07	734	3/10/08	364	3/2/09	255	3/1/10	559
3/5/07	616	3/14/08	333	3/6/09	881	3/3/10	580
3/9/07	395	3/17/08	316	3/9/09	167	3/5/10	528
3/12/07	250	3/21/08	301	3/13/09	198	3/8/10	422
3/16/07	350	3/24/08	294	3/16/09	237	3/12/10	343
3/19/07	340	3/28/08	388	3/20/09	252	3/19/10	536
3/23/07	281	3/31/08	413	3/23/09	249	3/22/10	261
3/23/07	281	4/4/08	333	3/27/09	245	3/22/10	261
3/26/07	415	4/7/08	328	3/30/09	237	3/26/10	259
3/30/07	258	4/11/08	275	4/3/09	225	3/29/10	285
4/2/07	252	4/14/08	247	4/6/09	228	4/2/10	266
4/6/07	236	4/18/08	158	4/10/09	210	4/5/10	246
4/9/07	232	4/21/08	266	4/13/09	231	4/9/10	187
4/13/07	214	4/25/08	251	4/17/09	214	4/12/10	192
4/16/07	242	4/28/08	242	4/20/09	240	4/16/10	210
4/20/07	259	5/2/08	224	4/24/09	218	4/19/10	215
4/23/07	241	5/5/08	90	4/27/09	220	4/23/10	218
4/27/07	136	5/9/08	220	5/1/09	155	4/26/10	191
4/27/07	136	5/12/08	172	5/4/09	174	4/30/10	197
4/30/07	169	5/16/08	172	5/8/09	204	5/3/10	196
5/4/07	176	5/19/08	174	5/11/09	187	5/7/10	177
5/7/07	215	5/23/08	213	5/15/09	205	5/10/10	165
5/11/07	202	5/26/08	204	5/18/09	119	5/14/10	143
5/14/07	200	5/30/08	170	5/22/09	155	5/17/10	129
5/18/07	191	6/2/08	183	5/25/09	189	5/21/10	234
5/21/07	180	6/6/08	163	5/27/09	191	5/24/10	252
5/23/07	188	6/9/08	133	5/29/09	349	5/28/10	131
5/25/07	170	6/13/08	130	6/1/09	142	5/31/10	336
5/28/07	187	6/16/08	157	6/5/09	156	6/4/10	100
6/1/07	150	6/20/08	165	6/8/09	159	6/7/10	132
6/4/07	138	6/23/08	175	6/12/09	168	6/11/10	127
6/8/07	145	6/27/08	171	6/15/09	120	6/14/10	143
6/11/07	148	6/30/08	110	6/19/09	115	6/18/10	104
6/15/07	144	7/4/08	144	6/22/09	108	6/21/10	457
6/18/07	141	7/7/08	154	6/24/09	132	6/25/10	197
6/22/07	110	7/11/08	156	6/26/09	197	6/28/10	100
6/25/07	119	7/14/08	124	6/26/09	120	7/2/10	580
6/29/07	108	7/18/08	135	6/29/09	130	7/5/10	143
7/2/07	108	7/21/08	105	7/3/09	84	7/12/10	123
7/6/07	115	7/25/08	110	7/6/09	111	7/16/10	122

Attachment 1

Lemont Refinery Water Intake Chloride Levels (in mg/L)

2007		2008		2009		2010	
7/9/07	100	7/28/08	111	7/10/09	108	7/19/10	435
7/13/07	104	8/1/08	111	7/13/09	116	7/23/10	158
7/16/07	103	8/4/08	99	7/17/09	118	7/26/10	100
7/20/07	108	8/8/08	109	7/20/09	110	7/30/10	146
7/23/07	114	8/11/08	101	7/24/09	104	8/2/10	109
7/27/07	99	8/15/08	100	7/27/09	106	8/6/10	554
7/30/07	105	8/18/08	99	7/31/09	99	8/9/10	116
8/3/07	102	8/22/08	90	8/3/09	100	8/13/10	110
8/6/07	102	8/25/08	140	8/7/09	88	8/16/10	503
8/10/07	90	8/29/08	126	8/10/09	103	8/20/10	116
8/13/07	101	9/1/08	90	8/14/09	90	8/23/10	122
8/17/07	99	9/5/08	77	8/17/09	89	8/27/10	102
8/20/07	111	9/8/08	88	8/21/09	91	8/30/10	105
8/24/07	92	9/12/08	112	8/24/09	85	9/3/10	620
8/27/07	88	9/15/08	140	8/28/09	73	9/6/10	80
8/31/07	115	9/19/08	110	8/31/09	77	9/10/10	83
9/3/07	105	9/22/08	138	9/4/09	100	9/13/10	293
9/7/07	101	9/26/08	116	9/7/09	96	9/17/10	89
9/10/07	91	9/29/08	89	9/11/09	86	9/20/10	105
9/14/07	89	10/3/08	96	9/14/09	88	9/24/10	83
9/17/07	94	10/6/08	106	9/16/09	88	9/27/10	445
9/21/07	87	10/10/08	86	9/18/09	83	10/1/10	596
9/24/07	100	10/20/08	115	9/21/09	86	10/4/10	95
9/28/07	105	10/24/08	124	9/25/09	85		
10/1/07	101	10/27/08	119	9/28/09	80	Max:	833
10/5/07	99	10/31/08	127	10/2/09	79	Average	266
10/8/07	110	11/3/08	145	10/5/09	82		
10/12/07	107	11/7/08	146	10/9/09	94		
10/15/07	107	11/10/08	152	10/12/09	92		
10/19/07	104	11/14/08	115	10/16/09	100		
10/22/07	91	11/17/08	147	10/19/09	100		
10/26/07	103	11/21/08	149	10/23/09	118		
10/29/07	114	11/24/08	154	10/26/09	81		
11/2/07	111	11/28/08	149	10/30/09	121		
11/5/07	122	12/1/08	155	11/2/09	72		
11/9/07	120	12/5/08	133	11/6/09	111		
11/12/07	127	12/8/08	244	11/9/09	158		
11/16/07	130	12/12/08	272	11/11/09	134		
11/19/07	128	12/15/08	277	11/13/09	137		
11/23/07	122	12/19/08	313	11/16/09	151		
11/26/07	100	12/22/08	337	11/20/09	137		
11/30/07	103	12/26/08	448	11/23/09	133		
12/7/07	261	12/29/08	385	11/27/09	145		
12/10/07	717			11/30/09	119		
12/14/07	654	Max:	896	12/4/09	119		
12/17/07	404	Average:	231	12/7/09	143		
12/21/07	998			12/9/09	144		
12/24/07	614			12/11/09	286		
12/28/07	488			12/14/09	275		
12/31/07	412			12/18/09	301		
				12/21/09	259		
Max:	998			12/25/09	412		
Average:	214			12/28/09	424		
				Max:	881		
				Average:	187		

CERTIFICATE OF SERVICE

I, the undersigned, certify that on this 8th day of October, 2010, I have served electronically the attached Pre-Filed Testimony of James E. Huff, P.E., accompanying Attachments, and Notice of Filing upon the following person:

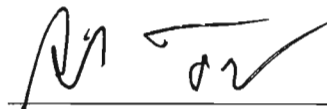
John Therriault, Clerk
Pollution Control Board
James R. Thompson Center
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Chicago, IL 60601

and by U.S. Mail, first class postage prepaid, to the following persons:

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Stefanie N. Diers, Assistant Counsel
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