

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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

NOTICE OF FILING

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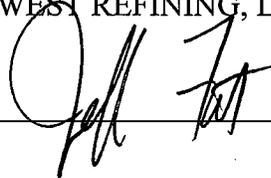
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 SERVICE LIST

Please take notice that on May 14, 2014, we filed electronically with the Office of the Clerk of the Illinois Pollution Control Board the attached RESPONSE OF LEMONT REFINERY TO PRE-FIRST NOTICE COMMENTS OF IEPA AND U.S.EPA, a copy of which is served upon you.

CITGO PETROLEUM CORPORATION and
 PDV MIDWEST REFINING, LLC

By: _____



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CHICAGO AREA WATERWAY SYSTEM)	R08-9(D)
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PROPOSED AMENDMENTS TO 35 Ill.)	
Adm. Code Parts 301, 302, 303 and 304)	

**RESPONSE OF LEMONT REFINERY TO PRE-FIRST NOTICE
COMMENTS OF U.S.EPA AND IEPA**

CITGO Petroleum Corporation and PDV Midwest, LLC (collectively, the “Lemont Refinery”) submits this Response with respect to issues relating to the proposed water quality standards in this proceeding. The Lemont Refinery has proposed specific regulations in the alternative to those which the IEPA has proposed. For each of those items, we believe that the IEPA has failed to provide the requisite information required by Section 27 of the Act. In contrast, the Lemont Refinery has participated in all of the hearings which bear on these issues and presented extensive testimony in support of these alternative regulations.

This reply is limited to specific matters raised by IEPA and U.S.EPA and is focused on the proposed seasonal (winter-time) water quality standard for chlorides and for a BMP-offset based rule for mixing zones. The Agency has proposed the same change to the proposed human health mercury standard did we as an alternative. And even if the Board were to choose to use the “secondary contact” denomination for the non-recreational waters (which U.S.EPA states would be acceptable) our argument in the memorandum we submitted on April 30, 2014 with respect to “Non-Recreational” waters applies equally well.

I. THE BOARD SHOULD ADOPT THE SEASONAL (WINTER) STANDARD FOR CHLORIDES AS PROPOSED BY THE LEMONT REFINERY FOR THE SHIP CANAL. WHEN THE AGENCY AND U.S.EPA ARE PREPARED TO PROPOSE TO CHANGE THE 500 MG/L CHLORIDE STANDARD GENERALLY, THE SEASONAL STANDARD COULD BE REVISITED.

The Lemont Refinery asked Huff & Huff, Inc. to respond to the comments of U.S.EPA and IEPA concerning the proposed winter-time chloride standard. Those comments are submitted as Attachment I and we invite the Board to carefully review them. Of particular note are the following:

Ceriodaphnia: Huff & Huff conducted additional analyses of the Ship Canal last week, to address some of the speculation contained in the U.S.EPA comments. Among other findings of relevance to this matter, that stream survey found not a single *Ceriodaphnia*. That is not surprising because the mean winter temperature was 39.9°, not warm enough for *Ceriodaphnia*. (indeed, there were two stretches of multi-day temperatures below 36° at the water intake for the Lemont Refinery!) U.S.EPA's point of reference in its comment is not representative of the Lower Ship Canal as it involves data taken a mile downstream of the Lockport Lock and Dam and after its confluence with the Des Plaines River. Moreover, Midwest Generation has shut down its two Chicago power plants, and the Will County Station of Midwest Generation is below the Lemont Refinery: it is not surprising that the water temperature at the Lemont Refinery (in the Regulated Navigation Zone) would be so cold. Not a single *Ceriodaphnia* has been found in three sampling events near the Lemont Refinery. And IEPA has produced no evidence to counter Mr. Klocek's direct testimony during the December 17, 2014 hearing. Tr. 161-162.

IEPA asserted that excluding *Ceriodaphnia* should not occur because exclusion of this species "may not be protective of other resident species". But the IEPA does not even provide

an example, let alone assert that there are other resident species present. The Huff & Huff methodology, following U.S.EPA criteria, used the *Daphnia* that was found in the CSSC, as opposed to one that is rarely found, even in the summer months, and has not been detected in the winter months.¹

Sphaerium Fingernail Clams This is another species which simply is not representative of resident species in Use B waters. Thirteen biological surveys by the MWRDGC from 1975 to 2010 show that fingernail clams as *Musculium* and *Eupera* exist in moderate numbers in the CSSC, but that “*Sphaerium* fingernail clams are at best, a rare visitor to the CSSC”, with only two reports in 35 years! As Roger Klocek concluded “The regular presence of *Musculium* fingernail clams and the relative absence of *Sphaerium* clams in the CSSC lend scientific credibility” to the choice to use the former, and not the latter, in the recalculation study submitted to the Board in the December 17 hearing.

Lampsilis Mussel U.S.EPA, again, appears to have not carefully examined the record with respect to its comment on this species. *Lampsilis* mussels are not included in the updated site specific calculations because they do not occur in the CSSC. Indeed, this may be due to the infestation of the zebra mussels.

¹ The Lemont Refinery would agree to restricting the water bodies to which the alternative winter chloride standard applies to the Lower Ship Canal, or Use B waters upstream of the confluence of the CSSC with the Lower Des Plaines River. Although we had discussed this approach with IEPA and USEPA, and we sent Exhibit B to Roger Klocek’s testimony to USEPA and IEPA when we filed his testimony, only one question was asked with respect to *Ceriodaphnia* at the December 17 hearing. The USEPA and IEPA Comments are the first substantive response we have received. As shown by Attachment I, those comments have ready answers. Indeed, a calculation could be made of the protective winter chloride value below the Lockport Lock and Dam to establish a site-specific chloride value for the Brandon Pool. Other calculations could be made for further downstream segments.

Federal Approvability Huff & Huff addressed each of the U.S.EPA comments in detail, which will not be repeated here. Suffice it to say: Huff & Huff followed the U.S.EPA guidance meticulously. The site specific calculations require professional judgment on the specific organisms to represent each taxa for the specific water body, which is exactly what Huff & Huff did. U.S. EPA seems to be saying other more sensitive species **could** be present, as opposed to Huff & Huff using what **is** present.

We must note, however, that IEPA has proposed that there be no chloride standard during the winter months. This is surprising because IEPA knows, or ought to know, that such is NOT approvable by U.S.EPA. Indeed, the lack of a winter-time TDS standard was the reason U.S.EPA disapproved of the CITGO variance in PCB 12-94. *See* Public Comment #1366. Moreover, IEPA has testified that U.S.EPA would not approve of the 500 mg/L standard even for non-winter months. So it is curious that IEPA would criticize the Lemont Refinery on not knowing what U.S.EPA might approve. Indeed, we wonder if anyone knows what U.S.EPA will approve.

II. THE AGENCY AND U.S.EPA HAVE MISUNDERSTOOD THE BMP-OFFSET APPROACH WE SUGGESTED. THE PROPOSAL IS CONSISTENT WITH FEDERAL LAW AND PROVIDES A NECESSARY RELIEF FOR DISCHARGERS TO EFFLUENT DOMINATED WATERS.

We doubt that IEPA or U.S.EPA can deny that the Lower Ship Canal is an effluent dominated stream. Nor can they deny that snow melt runoff is the principal source of chlorides in the Ship Canal. We were encouraged when IEPA said that “is in discussion with U.S.EPA on a winter concept that would utilize best management practices for point sources and non-point sources.” But “when” that may occur is the problem.

We were disappointed that the Agency has not been willing to meet to investigate our proposal, even though Scott Twait testified the Agency would be open to considering a mixing

zone proposal. *See* 7/29/13 Hrg. Tr. 155. We believe our “offset proposal” using BMPs is a reasonable tool. The problems with mixing zones for effluent dominated waters are well documented in this proceeding. The Ship Canal would not exist except for man-made changes. We know that it takes a very long time to do a TMDL Study, and effluent-dominated water bodies need another approach than the existing mixing zone rule. Through the three CITGO variances decided by the Board, the concept of using BMPs for chlorides has been chosen as a realistic tool for compliance. It is practical and brings in non-point source and stormwater sources into the process of reducing chloride dischargers. We know that chloride levels in snow melt is the cause of the elevated chloride levels. Reducing those discharges, through the use of BMP is practical and can be done quickly using existing permit procedures. (we note that the IEPA has not disputed the testimony from Jim Huff that existing permitting procedures could be used to implement the BMP concept). Our mixing zone proposal is one part of the BMP approach and would allow the re-issuance of existing NPDES permits without the long and expensive efforts involved in variances (which U.S.EPA would likely reject) or a TMDL study.

U.S.EPA's comments with respect to the CITGO BMPs/mixing zone proposal suggests that it is consistent with federal law. First, the Lemont Refinery mixing zone is quite small and meets the U.S.EPA criteria of being “turbulent or other conditions within the mixing zone ensure that aquatic life reside within the mixing zone for a period of time shorter than the exposure period necessary to observe a chronic effect”.² Enclosure 1, page 12. Moreover, the testimony submitted by Huff & Huff and Attachment I hereto show that chloride levels below 624 mg/L are protective on a chronic basis and below 991 mg/L are protective on an acute basis, during the winter months.

² The test recounted by U.S.EPA with respect to turbulence is actually for a Zone of Initial Dilution.

We are not proposing that chronic criteria be exceeded outside the mixing zone. One must be able to measure anything to know if it is compliant. The BMP measures which are the heart of the proposal are designed to be an “offset” or reduction of chloride use. The BMP approach which we have in mind would offset the amount of chlorides discharged above 500 mg/L when the CSSC exceeds 500 mg/L, offsetting the discharger’s contribution. Based on this offset, the discharger would not be causing or contributing to water quality violations. Those chloride offsets would occur during the storm events and snow melt following -- the very same time that the Ship Canal has elevated chloride levels. The relative share of chlorides from CITGO’s discharge to the Ship Canal is 0.2% of the quantity in the Ship Canal; the sampling precision at the average chloride concentration when above 500 mg/L is 15 mg/L, compared to less than the 10 mg/L contributed at the edge of the mixing zone by CITGO. The contribution cannot be measured, it can only be calculated and these amounts are before the reductions achieved by the BMPs. Using an offset approach quantifies the benefit and chloride reduction from the BMPs during the same events that the Ship Canal is elevated. Therefore, the discharge cannot be said to be “causing or contributing” to a water quality violation. Of course, by the time the Lower Ship Canal mixes with the Des Plaines River, we would expect a substantial decline in chloride levels in the combined waters, since the area drained by the Des Plaines River is less urbanized than the area drained by the CSSC.

Again, we have tried to engage IEPA on this proposal. They want to first meet with U.S.EPA. The Board, by now, should be well aware of the delays involved in waiting for U.S.EPA.³

³ As the Board is well aware, IEPA and the Lemont Refinery have initiated two proceedings to address the U.S.EPA rejection of the Board-granted variance in PCB 12-94. The IEPA moved to vacate the variance granted in PCB 12-94 while the Lemont Refinery has sought to add a water

We are not wedded to mixing zone as the regulatory solution. The BMP approach we proposed is a method that would avoid the gridlock of the mixing zone rule in the Ship Canal and other effluent dominated streams. We know the chloride sources are upstream and road salt is the source. This proposal would provide a tool that could be easily implemented through permitting.⁴

III. THE AGENCY'S REVISED MERCURY STANDARD WOULD BE ACCEPTABLE

The IEPA has proposed a change to the HHS for mercury which is identical to the alternative approach we had proposed in our April 30 comments. We support the IEPA proposal to amend the Harmonic Mean mercury standard as IEPA stated in its April 30 comments.

This leaves the sole question as to whether mercury discharges into a receiving stream that meets the 12 ng/L mercury standard on an annual basis is eligible for a mixing zone. A simple reading of the Board's regulation would conclude "yes" to this question, but the IEPA's interpretation has not been consistent with the language in the regulations. The Board has an opportunity to clarify this question, eliminating this issue from future appeals before the Board.

IV. THE U.S.EPA PROPOSAL TO REVISIT PRIOR BOARD RULINGS IN DOCKET A

While IEPA has not made any proposal to change the Board's decisions with respect to recreational use designations, U.S.EPA seems to suggest it wants a change made. U.S.EPA or IEPA is free to make a proposal for any regulatory change before the Board, like any other

quality condition for TDS and chlorides. *See* PCB 14-04. Those matters have been held in abeyance pending discussions with U.S.EPA. We have been waiting for feed-back from U.S.EPA for nearly six months, just to resolve an issue for a single chloride discharger into effluent dominated waters!

⁴ The agency wants to wait so that proceedings before the Board are "more efficient". For whom? More variance proceedings in the interim? We would suggest Board might consider a sunset rule lasting 10 to 20 years, using the winter chloride criteria developed by Huff & Huff as the standard.

member of the public, and then to support that proposal with evidence and testimony. Absent some formal process which is allowed by the Environmental Protection Act, we submit that the existing decisions on recreational uses are the law and the designated uses.

However, with respect to the Lower Ship Canal, and particularly the Restricted Navigation Area, it really does not matter whether the designation is “non-recreational” or “Secondary Contact”, the proposed human health exposure criteria should not be adopted for these Non-Recreational waters. It does not matter if the name reverts to Secondary Contact. IEPA has submitted no evidence to justify those requirements as water quality standards.

Therefore, the proposed rules which we reference at pages 24 to 26 of our April 30 comments should not be adopted because they are unjustified. Not only are they contrary to decisions the Board has already made in Docket A, they have not been supported by any evidence or other section 27 factors in this proceeding.

Conclusion

The Lemont Refinery respectfully requests the Board adopt the alternative suggestions we have advanced here: a Winter Chloride Criteria for the Ship Canal; a BMP-offset rule as an alternative for dischargers into effluent dominated waters; the alternative language for the mercury HHS; and to decline to adopt certain water quality standards for non-recreational/secondary contact waters.

Dated: May 14, 2014

Respectfully submitted

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By:  _____

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ATTACHMENT I

RESPONSE TO USEPA and ILLINOIS EPA COMMENTS ON CITGO'S
DERIVATION OF SITE SPECIFIC CRITERIA FOR CHLORIDE WATER
QUALITY STANDARDS FOR USE B WATERS

May 13, 2014

Prepared by
Roger Klocek
James Huff, P.E.

INTRODUCTION

These comments are submitted to respond to assertions made in comments filed in Docket D of R08-09 with respect to water quality standards.

In comments filed before the Illinois Pollution Control Board on April 28, 2014, the U.S. EPA had four comments regarding the "Winter Chlorides Site Specific Criteria for the Chicago Sanitary & Ship Canal (CSSC)"(hereafter "Winter Chlorides Criteria"):

1. Deletion of *Ceriodaphnia* in the calculation of the GMAVs.
2. Deletion of *Sphaerium* in the calculation of the GMAVs.
3. Deletion of *Lampsilis* in the calculation of the GMAVs.
4. Whether all appropriate new toxicity data were utilized.

The USEPA nine points for guidance in development of site specific criteria were followed in preparing the Winter Chlorides Criteria, through reviewing candidate taxa for inclusion or deletion in developing the winter chloride criteria for the CSSC. Taxa that are resident species in the CSSC and meet the USEPA's criteria were included in the analysis. Professional judgment is required in the development of site specific criteria when analyzing data that is germane to the taxa present. In the development of the Winter Chlorides Criteria, known existing taxa on the waterway factor in the deletion/inclusion process.

In addition, the Illinois EPA had several comments on the Citgo derivation of Site Specific Criteria. Responses to both sets of comments are included herein:

USEPA COMMENTS

1. *Ceriodaphnia* Water Flea

- USEPA states that *Ceriodaphnia* is repeatedly present in the Chicago Sanitary & Ship Canal (CSSC) **at some times** during the year as cited by prefiled testimony of Roger Klocek November 22, 2013 using INHS (Illinois Natural History Survey) data (emphasis added).

Response: The site specific derivation was for winter chloride standards. In pre-filed testimony Roger Klocek referenced one INHS study from 1978 that collected *Ceriodaphnia* and testified on December 17, 2013 that there are periodic collections of small numbers of *Ceriodaphnia* at only the Western Avenue (Chicago, Illinois) location on the CSSC and that no other *Ceriodaphnia* collections at other CSSC stations have been reported based on INHS data from 2010-2012. The recent INHS Plankton collections took place from April/May through September/October. Generally

Ceriodaphnia as well as most water fleas, declined in numbers in September/October. No winter sampling was done by INHS.

Huff & Huff has conducted three plankton surveys between July 2013 and May 2014 between Lemont and Lockport, Illinois, and no *Ceriodaphnia* have been found.

- USEPA states that the density of Cladoceran taxa is highest for Bosminidae (80%) followed by ...*Ceriodaphnia*...at the Lockport Lock and Dam.

Response: The statement is correct; however, it is irrelevant to the discussion about *Ceriodaphnia* in the CSSC because the Lockport Lock and Dam collection site is representative of the CSSC only after mixing with the DesPlaines River waters *downstream* of the Lockport Lock and Dam. The INHS Lockport Lock and Dam site is not representative of the plankton found in the CSSC.

- USEPA states that *Ceriodaphnia* is present at the Lockport Lock and Dam based on Mr. Klocek's prefiled testimony of November 22, 2013, using INHS data.

Response: Mr. Klocek expanded on this item when he testified on December 17, 2014. He explained that the INHS Lockport Lock and Dam collections were downstream of the confluence of the Des Plaines River with the CSSC, and that the plankton collections were therefore not representative of the CSSC. The Des Plaines River was likely contributing the *Ceriodaphnia* to the collection site. The INHS collections labeled as *Lockport Lock and Dam* were made at River Mile 290, approximately 1 mile **downstream** of the Lockport Lock and Dam, and the confluence of the CSSC with the DesPlaines River.

- USEPA says that there is an absence of sufficient data from November to April to show that *Ceriodaphnia* is not present, though it acknowledges Mr. Klocek's November 2013 collection which produced no *Ceriodaphnia*.
- **Response:** Standard zooplankton methodologies for streams typically occur from April-May through September-October in Northern U.S. latitudes, not only due to difficulty in collection for the researcher but more importantly because the water flea populations decline in streams to the point of non-detection, even with doubled or trebled collection effort. We are aware of a single zooplankton study for *streams* in northern latitudes in the U.S. that have been carried out during the winter, though more stream winter studies are carried out in southerly climates. A study on the Illinois River from 1908 (Kofoid) did not find any *Ceriodaphnia* present during the winter months, but did find them other times of the year. Huff & Huff's November 18, 2013 plankton collection showed a sharp drop in numbers and diversity of water fleas present, compared to summer numbers, with no *Ceriodaphnia* present. A May 5, 2014 plankton collection by Huff & Huff downstream of Citgo on the CSSC using 55 micron nets showed no *Ceriodaphnia* present. The May, 2014 sampling showed no water fleas (cladocera) present. Table 1 presents the results of the three Huff & Huff plankton collections.

- (a) USEPA refers to literature that some cladocerans (water fleas) do overwinter as adults in **lakes**, giving them a head start in spring production. (b) USEPA further notes that winter water temperatures are higher in the CSSC than in many other water bodies and that adult cladocerans are **likely to be present** due to higher water temperatures.

Response: (a) The dynamics and relative abundance of lake plankton and stream plankton are different. Lake plankton literature far exceeds that of stream plankton literature for winter months. The literature cited by the USEPA, specifically Lampert et al. (2010 and 2012), suggest that several species of *Daphnia*, a water flea, in relatively unpolluted **lakes** in Norway can either produce resting eggs (ephipia), overwinter as parthenogenic females, or both produce resting eggs *and* overwinter as adult females. A further reference not cited by USEPA, (Domis et al. 2007), lists multiple species of *Daphnia* from different **lakes** in the U.S. and Europe where the same species produces either resting eggs, or adult females or both forms depending upon the lake found in. From this information, one cannot conclude that there are adult water fleas present in the CSSC during winter.

- (b) We agree that winter water temperatures are higher in the CSSC than in most “typical” waterways in Northern Illinois, due to its urbanization and its man-made shape. Attached to this response are the recorded winter temperatures at the CSSC at the Citgo water intake. The mean winter temperature was 39.9°F (Table 2), not warm enough to expect to find *Ceriodaphnia*. If Cladocera (the order of water fleas that includes *Ceriodaphnia*) persist as overwintering adults in the CSSC due to the warmer water, they should be readily detected by standard sampling methods. Samples taken in November, 2013 and again in May 2014 failed to find any *Ceriodaphnia* present. The findings clearly show *Ceriodaphnia* adults were not present in the winter months in the CSSC. The November 2013 samples did find one type of water flea species present, *Bosmina*, in much reduced numbers from its July 12, 2013 presence in the CSSC. The May, 2014 sampling showed no water fleas (cladocera) present.
- USEPA cites the INHS website, <http://wwx.inhs.illinois.edu/fieldstations/kbs/ansi/ansi-asian-carp-research/>, which states that populations of zooplankton in the CAWS are as high in these waters as in other Illinois River waters ...where we expect that the plankton populations are undergoing reproduction.

Response: The quote referred to by USEPA from the INHS website is:

“Zooplankton densities in the CAWS appear to be similar to or higher than those observed in the Illinois River, suggesting that the CAWS are capable of providing sufficient food resources for Asian carp.”

This quote is used out of its context and is used to draw an inference for the CSSC contrary to the facts stated in the INHS website. Only one CSSC station that the INHS sampled is represented on the CAWS (Chicago Area Waterways) at Western Avenue, Chicago, IL. The INHS data show that the plankton densities at Western Avenue are among the lowest on the CAWS. Perhaps the entire collection of plankton samples

through all portions of the CAWS may be comparable in density to the Illinois River but they are not representative of the CSSC. Zooplankton are definitely reproducing on the CSSC. Samples taken by Huff & Huff in 2013 show *Bosmina*, a water flea, as well as cyclopoid copepods to be successfully reproducing in the summer (Table 1). Again, the USEPA continues to miss the purpose of the Winter Chloride Criteria, which was to calculate a **winter conditions only standard**.

- USEPA states that there does not appear to be evidence that *Ceriodaphnia* are not reproducing in the CSSC.

Response: Based upon the three years of data collected by the INHS from one sample station located at Western Ave. Chicago, *Ceriodaphnia* are not always present each month during **non-winter** months (2010-2012) at Western Avenue. When *Ceriodaphnia* are present, they are in low numbers and comprise a low percentage of the total water flea biomass. No *Ceriodaphnia* have been taken by Huff & Huff based on three collections in the CSSC during July and November, 2013 and May, 2014. Again, the chloride site specific criteria's focus is on **winter** conditions only, and there is no evidence that *Ceriodaphnia* are present in the winter, nor is there any evidence to suggest reproduction in the winter months by *Ceriodaphnia*. The water temperatures are too cold for *Ceriodaphnia* reproduction in the winter months.

2. Sphaerium Fingernail Clams

- The USEPA suggests that the *Sphaerium* fingernail clam should be retained for site specific chloride calculations due to their presence on the CSSC.

Response: The regular presence of *Musculium* fingernail clams and the relative absence of *Sphaerium* clams in the CSSC scientifically justifies the choice to use *Musculium* clams in the Winter Chloride Criteria rather than the *Sphaerium*.

The family of Sphaeriidae clams in Illinois includes four genera, collectively called fingernail clams as listed below.

- *Sphaerium* spp., fingernail clams with USEPA chloride toxicity data
- *Musculium* spp., fingernail clams with USEPA chloride toxicity data
- *Eupera* sp., the mottled fingernail clam without USEPA chloride toxicity data
- *Pisidium* spp., a type of fingernail clam commonly called a pea clam without toxicity data

Eupera is an introduced species of fingernail clam that was first reported in the CSSC in 2006. Fingernail clams are about the size of a pinky fingernail, live for approximately 12 to 18 months and have a direct life cycle of reproduction, unlike the freshwater mussels that require a fish host to complete larval growth. Fingernail clam identification is often difficult in the field due to the clam's small size and the general tendency for different genera and species to look similar externally, (Thorp and Covich, 2001).

Historical records of mollusk occurrence from the CSSC date back to Baker (1898, 1901). Baker reported no fingernail clams from the CSSC but did find pulmonate snails present in the CSSC circa 1900.

The *Musculium* fingernail clams declined in the Illinois River as far downstream as Peoria, IL. Sparks (1983), describes that the fingernail clam population in an approximately 100 mile stretch of the Illinois River beginning at Hennepin, IL (River Mile 210), and continuing downstream, effectively reached zero population by 1954. Fingernail clam survival in the CSSC was not confirmed until 1991, when Sparks found living *Musculium* and *Sphaerium* fingernail clams at Lockport, IL at River Mile (RM), 292.2, approximately 1.2 miles upstream of the Lockport Lock and Dam (op cit.). Sparks did not find fingernail clams at four other CSSC upstream stations (RM 310, 313, 315.3 and 317).

A 1992 collection by Huff & Huff, Inc. at Lemont, IL collected benthic invertebrates to calculate a *Macroinvertebrate Index of Biotic Integrity* (MBI). To calculate an MBI, each type of organism is assigned a numeric value from 1 to 11, and the values are plugged into a simple formula to arrive at a single MBI number, which can be used to interpret general stream health. Living Sphaeriidae fingernail clams and zebra mussels were recorded during the Huff and Huff 1992 collection, but no Asiatic clams were noted. No attempt was made to accurately determine the genera of the clams in 1992 as all of the clam genera counted for the same MBI tolerance value. The sphaeriid clams were entered into the MBI record as belonging to the genera *Sphaerium/Pisidium* (Huff & Huff, Inc., 1992). In approximately 1992, the Asiatic clams began appearing locally in the CAWS and young Asiatic clams may have been mistaken in the 1992 sample for Sphaeriidae clams, which they resemble. On-shore dredge tailing across the CSSC from the Lemont Refinery site were investigated by Klocek and found to contain Asiatic clams that were well weathered. The dredge tailings show the presence of dozens of relic Asiatic clams but no relics of Sphaeriidae clams (Klocek, personal observation, 2005). Re-sampling the bottom substrates for any bivalves at the Lemont Refinery site is no longer possible due to the presence of the electric fish barrier.

The record search of MWRDGC studies from 1975 through 1977 found no *Sphaerium* or *Musculium* in the CSSC sampling sites, including the Lockport sample site (approximately 1 mile upstream of the lock and dam), but did find *Sphaerium* on the South Branch Chicago River (*not* CSSC) at the Madison Street and Jackson Street sample sites. No further MWRDGC biological reports that deal with the CSSC and mollusks are available until 2001. From 2001 through 2010, *Sphaerium* fingernail clams were found once during 2009 at the Cicero Avenue (sample site 75), within the CSSC. The records indicate that a *single specimen* of *Sphaerium* sp. was taken by petite Ponar dredge and no specimens were taken by Hester-Dendy Samplers. No further records of *Sphaerium* are present at any of the six MWRDGC sample sites on the CSSC for the ten year period between 2001 through 2010; however, other fingernail clam species were taken from the CSSC during that time span.

The most abundant fingernail clam recorded for any sample site in the CSSC was for site 42 at Route 83 during 2010 when 248 *Eupera* per cubic meter were reported, with no other fingernail clams present. During 2001-2010, records exist for *Musculium* and

Eupera fingernail clams reported from one or more of the six sample locations in all years except 2001, 2002 and 2003. From 2001-2003 the only bivalves reported were the Asiatic clam (*Corbicula*) and the zebra mussel (*Dreissena*).

In comparison to the CSSC fingernail clam data, MWRDGC-CAWS (excluding CSSC) data was searched for all sample locations for the year of 2001 exclusively. Sixteen sample locations, representing the Chicago River, North Branch Chicago River, Skokie River, Middle Fork North Branch, Calumet River and Des Plaines River and others, returned fingernail clam data for all locations as *Musculium*, or *Pisidium*. One record for *Sphaerium* is reported at sample site 31 (Middle Fork North Branch Chicago River), where 136 *Sphaerium* per cubic meter were recorded during 2001. The largest number of fingernail clams recorded from any site was 6,229 *Musculium* recorded at site 106 (West Branch North Fork Chicago River). Asiatic clams and zebra mussels were reported sporadically at various sites in the CAWS during 2001 by MWRDGC. The observation is that *Sphaerium* are regularly encountered in other parts of the CAWS but not in the CSSC.

In conclusion, the recent fingernail clam records based on thirteen biological surveys covering the years 1975 through 2010 from the MWRDGC shows that fingernail clams as *Musculium* and *Eupera* exist in moderate numbers in the CSSC. From 1975 to 2010 the *Sphaerium* fingernail clam has been reported only twice over this 35 year period. Once, a single specimen collected during 2009 from the CSSC at one location (Cicero Ave.) and the other in 1993 at Lockport IL. *Sphaerium* are at best, a rare visitor to the CSSC with two reports of occurrence spanning 35 years. *Sphaerium* fingernail clams are relatively abundant in the North Branch Chicago River and its forks (Klocek and Krueger, 2004). *Musculium* and *Pisidium* fingernail clams are common and often abundant in many river segments of the CAWS, excluding the CSSC. The regular presence of *Musculium* fingernail clams and the relative absence of *Sphaerium* clams in the CSSC scientifically justifies the choice to use *Musculium* clams in site specific chloride re-calculation rather than use *Sphaerium*.

3. Native Mussel- *Lampsilis*

The USEPA states that there does not appear to be any justification offered by Citgo for removal of the *Lampsilis* mussel from the GMAV (Genus Mean Acute Value) calculations.

Response: *Lampsilis* mussels are not included in the updated site specific calculations because they do not occur in the CSSC. No further justification is necessary. Two species of *Lampsilis* are assigned GMAV values by The USEPA. *Lampsilis fasciola*, the wavy rayed lamp mussel is only known from the Vermillion River in Illinois and is a state endangered species due to its rarity. (Cummings and Mayer, 1992). The other species for which there are chloride studies is *Lampsilis siliquoidea*, the fatmucket. The fatmucket is widely distributed and common in Illinois streams and in some lakes and its range includes many streams in Cook and Will County. It can be found buried in compacted silt, sandy and gravelly substrates in shallow waters. (Klocek, et al., 2007.)

The INHS has one of the premier mussel databases in the U.S. with a cataloged collection of more than 144,000 specimens, predominantly Illinois species. An INHS database query for bivalves returned results for the CSSC of three species. The introduced zebra mussel (*Dreissena polymorpha*), the Asiatic clam (*Corbicula fluminea*) and the mottled fingernail clam, (*Eupera cubensis*), also introduced species are the only bivalves reported from the CSSC. None of the native mussels have been found as living or relic specimens in the CSSC. MWRDGC reports find the same species that INHS lists plus the fingernail clams (addressed in the previous section), but report no native mussels in its collections on the CSSC, which include the use of Ponar dredges in its methodology. MWRDGC reports note native mussels on other CAWS sites exclusive of the CSSC.

No native mussels are expected to occur in the CSSC due to the continued infestation of the CSSC with zebra mussels, which smother native mussels by overgrowing the native mussel's shell at the area of the of the incurrent and excurrent siphons (Schlosser et al. 1996). Zebra mussels are also known to out-compete native mussels and fingernail clams for available food because of the high filtration rate of the zebra mussel (Strayer and Smith, 2001; Lauer and McComish, 2001). Zebra mussel competition may explain why the native mussels and native fingernail clams are rare or missing in the CSSC.

4. Additional Data

USEPA recommends that *Musculium* fingernail clams and *Brachionus* rotifers be added to the site specific calculations for the chloride after the data is normalized for hardness and sulfate used in the Iowa criteria derivation.

Response.

Musculium fingernail clams were used in the site specific calculations, *Sphaerium* was not used for the reasons noted above regarding frequency of occurrence.

Brachionus rotifers, are present in the CSSC. *Brachionus*, like all temperate rotifers produce eggs that overwinter and are protected by a relatively impervious shell that protects them from environmental shocks, including desiccation. Dry rotifer eggs can be wind-blown and readily colonize ephemeral ponds, lake and streams. Rotifers are present in un-disinfected sewage treatment plant effluents, such as the Stickney Plant, which continuously discharges rotifers into receiving waters all year as eggs, juveniles, and/or adults, as long as water temperatures are warm enough for survival. The reproductive cycle for rotifers can be short, on the order of 4 days, so even if due to elevated chlorides they were wiped out, they would re-establish within days. Rotifers are an important food source for water fleas and for larval fish during the non-winter months. Their importance in the CSSC in the winter months is as a reservoir of overwintering eggs that when hatched, will serve as first foods for water fleas and larval fish. From the Huff & Huff monitoring in early May 2014, the rotifer population is healthy, despite winter chloride values this past winter above 500 mg/L.

Historically rotifers have not been included in the list of aquatic species used for deriving water quality standards. That USEPA has conducted some rotifer toxicity tests is interesting, but its applicability on actual stream standards has not been established. For the reasons cited above, the ability to rapidly re-populate after stress and their presence as adult rotifers or as resistant overwintering eggs in northern climates need to be determined before rotifers should be included in any water quality standard derivation.

ILLINOIS EPA COMMENTS

1. The Illinois EPA commented that *Ceriodaphnia* should be included when calculating the appropriate water quality limits. The Agency notes that exclusion of this species “may not be protective of other resident species.”

Response.

The Agency’s general comment fails to identify **what** resident species it believes the *Ceriodaphnia* represents. *Ceriodaphnia*, while widespread is not necessarily present in all waterbodies. Lake Michigan is known to have a regular population of *Ceriodaphnia* seasonally, and it is likely that the *Ceriodaphnia* found in the upper CSSC at one location at Western Avenue are stragglers from Lake Michigan inputs. The Winter Chloride Criteria followed USEPA protocol for derivation of standards based on actual species present; *Ceriodaphnia* is not among the resident species.

2. The Agency goes on to note regarding the *Ceriodaphnia*, “It is nationally recognized as a surrogate species for other planktonic crustaceans that have not undergone the same standardization of culturing and testing procedures.”

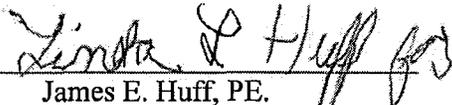
Response.

This statement is irrelevant regarding the derivation of water quality standards for the CSSC. The Agency is confusing biomonitoring testing with water quality standards. The Winter Chloride Criteria used the *Daphnia* that is dominant in the CSSC, as opposed to one that is rarely found, and has never been found in the winter months.

The Illinois Natural History Survey (INHS) sampled one location on the upper Chicago Sanitary and Ship Canal (CSSC) at Western Avenue, and found relatively low numbers of *Ceriodaphnia* present during summer months. The INHS sampled at a location titled “Lockport Lock and Dam” but this location is approximately one river mile *downstream* of the lock, where DesPlaines River water and the CSSC already have mingled. Thus, the INHS “Lockport Lock and Dam” location is not representative of the CSSC plankton, and *Ceriodaphnia* is likely being contributed from the Des Plaines River to this sample site. In support of this statement, Citgo conducted plankton sampling during July 12, 2013, November 18, 2013 and on May 5, 2014 at a CSSC site in Lockport Illinois, and *Ceriodaphnia* were not found. See response to comment number 1 from the USEPA.

Conclusion.

The Winter Chloride Criteria resulted in recommended acute and chronic standards which are appropriate for the CSSC based upon the fauna and their life stages that actually reside in the waterway during the winter. Current faunal diversity in the CSSC is lower than other portions of the CAWS and other northern Illinois streams. This is consistent with the Aquatic Life Use B established by the Board for the CSSC. Based upon the actual fauna present, the usages of the CSSC including the large urban area upstream and its de-icing practices, and the Regulated Navigation Zone, the Winter Chloride Criteria proposed by Citgo would be protective on the existing aquatic life on the CSSC.



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TABLE 1.
PLANKTON COLLECTIONS NEAR LEMONT and LOCKPORT, ILLINOIS 2013-2014

	Upstream Lemont Ref. July 12, 2013	Downstream Lemont Ref. July 12, 2013	Lockport Dock Nov. 18, 2013	Lockport Dock May 5, 2014
Cladocera - Water Fleas				
Bosmina longirostris	152.6 /L	172.6 /L	0.03 /L	absent
Diaphanosoma sp.	5.1 /L	3.5 /L	absent	absent
Copepods				
Diacyclops thomasi (bicuspidatus)	17.5 /L	22 /L	absent	....
Cyclopoid copepods (unidentified)	....	....	absent	1.1 /L
Rotifers				
Brachionus sp.	net too large	net too large	net too large	0.64 /L
Other Associates				
aquatic mites - (Hydrachnida)	present		absent	present
Plumatella sp. cysts (Bryozoa)	common		common	present
Asterionella sp. Diatoms	net too large		net too large	present
Spirogyra fragments (algae)	net too large		net too large	present
Physical & Gear				
Water Temperature °F	53.5	53.5	52	51
Dissolved Oxygen in mg/L	7.5	7.5	....	....
Conductivity	...		....	....
net mesh	153 micron	153 micron	153 micron	55 micron
Approximate % sample examined	2	2	5	5
Tow in feet	4,000	4,000	500	250
Cubic feet processed*	891	891	111.4	55.7
approximate liters processed	25,230	25,230	3,155	1,569
depth net in feet	1 to 8	1 to 8	1 to 2	1 to 2

present = 1-9 organisms

common = 10-50 organisms

abundant = >50 organisms

*0.262 ft² diameter x 0.85 efficiency of water passage x length of tow

Lockport Dock located at RM 292.5, at 41.589813°, -88.067277°, approximately 1.7 miles upstream of Lockport Lock and Dam

TABLE 2
CHICAGO SANITARY AND SHIP CANAL TEMPERATURE
UPSTREAM OF LEMONT REFINERY, ILLINOIS OUTFALL

Date	Influent T °F	Date	Influent T °F	Date	Influent T °F
1-Dec-13	45.3	7-Jan-14	34.8	22-Feb-14	39.9
2-Dec-13	45.2	12-Jan-14	37.8	23-Feb-14	38.2
3-Dec-13	46.8	13-Jan-14	36.5	24-Feb-14	38.1
4-Dec-13	46.9	14-Jan-14	38.4	25-Feb-14	38.3
5-Dec-13	46.9	15-Jan-14	39.8	26-Feb-14	38.6
6-Dec-13	47.2	16-Jan-14	39.9	27-Feb-14	38.0
7-Dec-13	46.9	17-Jan-14	39.5	28-Feb-14	37.7
8-Dec-13	46.1	18-Jan-14	38.6	1-Mar-14	37.0
9-Dec-13	45.3	19-Jan-14	39.0	2-Mar-14	37.0
10-Dec-13	44.1	20-Jan-14	38.6	3-Mar-14	37.2
11-Dec-13	42.5	21-Jan-14	39.7	4-Mar-14	37.6
12-Dec-13	41.3	22-Jan-14	39.6	5-Mar-14	37.6
13-Dec-13	41.1	23-Jan-14	39.1	6-Mar-14	38.2
14-Dec-13	40.9	24-Jan-14	37.6	7-Mar-14	38.1
15-Dec-13	40.4	25-Jan-14	36.8	8-Mar-14	39.6
16-Dec-13	39.2	26-Jan-14	35.8	9-Mar-14	41.1
17-Dec-13	38.7	27-Jan-14	35.8	10-Mar-14	42.5
18-Dec-13	38.8	28-Jan-14	35.3	11-Mar-14	43.3
19-Dec-13	38.8	29-Jan-14	34.1	12-Mar-14	42.7
20-Dec-13	39.8	30-Jan-14	34.3	13-Mar-14	41.3
21-Dec-13	40.4	31-Jan-14	35.0	14-Mar-14	41.4
22-Dec-13	41.9	1-Feb-14	34.8	15-Mar-14	42.5
23-Dec-13	44.1	2-Feb-14	35.9	16-Mar-14	42.1
24-Dec-13	41.7	3-Feb-14	36.0	17-Mar-14	41.1
25-Dec-13	41.9	4-Feb-14	37.8	18-Mar-14	41.8
26-Dec-13	40.4	5-Feb-14	38.2	19-Mar-14	43.2
27-Dec-13	39.2	6-Feb-14	37.5	20-Mar-14	43.2
28-Dec-13	40.8	7-Feb-14	36.2	21-Mar-14	43.5
29-Dec-13	42.3	8-Feb-14	35.9	22-Mar-14	43.6
30-Dec-13	41.7	9-Feb-14	36.7	23-Mar-14	44.1
31-Dec-13	40.9	10-Feb-14	36.6	24-Mar-14	44.8
1-Jan-14	40.6	11-Feb-14	35.6	25-Mar-14	44.8
2-Jan-14	40.5	12-Feb-14	36.6	26-Mar-14	44.5
3-Jan-14	38.9	13-Feb-14	36.6	27-Mar-14	44.7
4-Jan-14	38.1	14-Feb-14	37.5	28-Mar-14	44.5
5-Jan-14	38.7	15-Feb-14	37.4	29-Mar-14	44.9
6-Jan-14	37.1	16-Feb-14	36.8	30-Mar-14	45.1
7-Jan-14	34.8	17-Feb-14	38.0	31-Mar-14	46.1
8-Jan-14	34.6	18-Feb-14	39.0	Min	34.1
9-Jan-14	35.1	19-Feb-14	38.1	Avg:	39.9
10-Jan-14	34.9	20-Feb-14	40.2	Max	47.2
11-Jan-14	35.1	21-Feb-14	40.9		

CERTIFICATE OF SERVICE

I, the undersigned, certify that on May 14, 2014, I served electronically the attached
RESPONSE OF LEMONT REFINERY TO PRE-FIRST NOTICE COMMENTS OF IEPA
AND U.S.EPA upon the following:

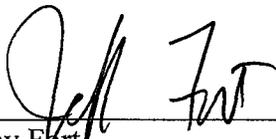
John Therriault, Clerk
Pollution Control Board
James R. Thompson Center
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and by U.S. Mail, first class postage prepaid, to the following persons:

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