BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PROPOSED SITE SPECIFIC RULE	)	R08-_____
APPLICABLE TO THE CITY OF GALVA	)	(Site Specific Rulemaking – Water)
SEWAGE TREATMENT PLANTS	)	
DISCHARGE TO EDWARDS RIVER	)	
AND MUD RUN CREEK	)	
35 ILL. ADM. CODE 302.208(g)	)	

NOTICE OF FILING

TO: Ms. Dorothy M. Gunn, Clerk of the Board
Illinois Pollution Control Board
100 West Randolph Street, Suite 11-500
Chicago, Illinois 60601
(VIA ELECTRONIC MAIL)
(SEE PERSONS ON ATTACHED LIST)

PLEASE TAKE NOTICE that I have today filed with the Office of Clerk of the Illinois Pollution Control Board the **ENTRY OF APPEARANCE OF CLAIRE A. MANNING; ENTRY OF APPEARANCE OF ALISON K. HAYDEN; CITY OF GALVA'S PETITION FOR SITE SPECIFIC RULE; MOTION TO WAIVE REQUIREMENT TO SUBMIT 200 SIGNATURES; PRE-FILED TESTIMONY OF BRIAN D. ANDERSON; and MOTION FOR EXPEDITED REVIEW**, copies of which are herewith served upon you.

Respectfully submitted,

CITY OF GALVA, Petitioner,

By: /s/ Claire A. Manning
One of Its Attorneys

Dated: October 17, 2008

BROWN, HAY & STEPHENS, LLP
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CERTIFICATE OF SERVICE

I, the undersigned, hereby certify that I have served the attached ENTRY OF APPEARANCE OF CLAIRE A. MANNING; ENTRY OF APPEARANCE OF ALISON K. HAYDEN; CITY OF GALVA'S PETITION FOR SITE SPECIFIC RULE; MOTION TO WAIVE REQUIREMENT TO SUBMIT 200 SIGNATURES; PRE-FILED TESTIMONY OF BRIAN D. ANDERSON; and MOTION FOR EXPEDITED REVIEW upon the following:

Mr. John Therriault
Assistant Clerk of the Board
Illinois Pollution Control Board
100 West Randolph Street
Suite 11-500
Chicago, Illinois 60601

via electronic mail on October 17 , 2008; and upon:

Division of Legal Counsel
Illinois Environmental Protection Agency
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P.O. Box 19276
Springfield, Illinois 62794-9276

Office of Legal Services
Illinois Department of Natural Resources
524 South Second Street
Springfield, Illinois 62701-1787

Division Chief of Environmental Enforcement
Office of the Attorney General
188 W. Randolph Street
20th Floor
Chicago, Illinois 60601

by depositing said documents in the United State Mail in Springfield, Illinois on October 17, 2008.

/s/ Claire A. Manning
Claire A. Manning

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CITY OF GALVA'S PETITION FOR SITE SPECIFIC RULE

NOW COMES the City of Galva ("Galva"), by and through its attorneys BROWN, HAY & STEPHENS, LLP, and pursuant to 415 ILCS 5/27(a) and 5/28, and 35 Ill. Admin. Code §§102.202, 102.208 and 102.210, hereby petitions the Illinois Pollution Control Board ("Board") for a Site Specific Rule concerning boron or, alternatively, whatever relief the Board deems necessary or appropriate. With this Petition, Galva requests relief from the Board's boron standard in order to ensure that the effluent from its two sewage treatment plants ("STPs") does not violate any relevant regulation or permit condition. In support of this Petition, Galva has attached Exhibit A, a Technical Support Document ("TSD") which was prepared by the engineering firm of Bruner, Cooper & Zuck, Inc. Additionally, Galva offers the following.

I. PROPOSED SITE SPECIFIC RULE

The specific relief requested in this Petition is sought as a result of discussions with the Illinois Environmental Protection Agency ("Agency") and is necessitated by the Agency's position that the Board's General Use water quality standard for boron (1.0 mg/L) ("WQS"), found at 35 Ill. Adm. Code §302.208(g), is appropriately and directly applied as an effluent standard to the effluent from Galva's sewage treatment plant. The source of the boron is the groundwater from aquifers that supply Galva's drinking water. As further explained below, the 1.0 mg/L boron standard has been incorporated into Galva's National Pollutant Discharge

Elimination System ("NPDES") Permit as an effluent standard. Accordingly, unless the Board determines otherwise, the requested relief is necessary to ensure that Galva does not violate any relevant regulation or appropriate permit condition.

As discussed with the Agency, the Site Specific Rule would read as follows:

Section 303.34X. Unnamed Tributary of the South Branch Edwards River and South Branch Edwards River

The boron general use water quality standard of 35 Ill. Adm. Code 302.208(g) does not apply to the waters of the State that are located from the point of discharge of the POTW located at 523 NE 9th Street in Galva, known as the Galva Northeast Sewage Treatment Plant, to an unnamed tributary of the South Branch of the Edwards River, said point being located in Henry County, Township 14 North, Range 4 East, occupying portions of Sections 21, 26, 27, 28, 33, 34, and 35 in the Fourth Principal Meridian, Latitude N 41.175°, Longitude: W 90.035°, to the confluence of said unnamed tributary with the South Branch Edwards River; to the confluence with the Edwards River. Boron levels in such waters must meet a water quality standard for boron of 3.0 mg/L.

Section 303.40X. Mud Run Creek

The boron general use water quality standard of 35 Ill. Adm. Code 302.208(g) does not apply to the waters of the State that are located from the point of discharge of the POTW located ½ mile South of BNSF RR and SW 4th Street in Galva, known as the Galva Southwest Sewage Treatment Plant, to Mud Run Creek, said point being located in Henry County, Township 14 North, Range 4 East of the Fourth Principal Meridian occupying portions of Sections 21, 26, 27, 28, 33, 34, and 35, Latitude 41.154°, Longitude 90.053°, to the confluence of Mud Run Creek with Walnut Creek. Boron levels in such waters must meet a water quality standard for boron of 3.0 mg/L.

II. BACKGROUND

Galva is seeking a Site Specific Rule for discharges from Galva's two STPs: the Northeast STP and the Southwest STP. The Northeast STP is an activated sludge plant that ultimately discharges into an unnamed tributary of the South Branch of the Edwards River. The Southwest STP is an aerated lagoon system, discharging into Mud Run Creek, a tributary of Walnut Creek, which is a tributary of the Spoon River.

As a result of an amendment to the NPDES Permit that covers the Southwest STP (Permit No. IL0023647), Galva is required to sample for boron and meet a boron concentration limit of 1.0 mg/L in its effluent. Although the Board has never developed an effluent standard for boron, the Agency required such condition based upon its interpretation of §304.105 of the Board's rules, which prohibits discharges that would violate applicable water quality standards.

The Board established a WQS for boron of 1.0 mg/L in 1972. The history of the Board's boron regulation is discussed in more detail below, at pages 9-10 and 28-29. While this standard has been the subject of numerous Petitions for Adjusted Standards and Site Specific Rules filed with the Board, outside of these cases the Board has not directly reviewed the technical appropriateness of 1.0 mg/L boron WQS since it was originally promulgated in the Board's initial water quality rulemaking, which preceded the Clean Water Act. Even then, upon its promulgation, the Board *specifically declined to promulgate an effluent standard* for boron, noting the innocuous effect of boron, and citing concerns relative to the practicality and costs of treatment.

Through the Board's site specific rulemaking procedure, Galva seeks a Site Specific Rule applicable to its boron effluent discharge in the context of these circumstances. This Petition establishes that it is neither technically feasible nor economically reasonable to require Galva to comply with a boron WQS of 1.0 mg/L for waters being discharged from either the Northeast STP or the Southwest STP. The substance of this petition will demonstrate that the costs of any alternatives far exceed any benefit to the environment, and establish that compliance with the boron standard in this context is both unnecessary for the protection of the environment and inherently impractical.

As further demonstrated in this Petition, the boron levels in the proposed Site Specific Rule will not harm aquatic life, human health, or the environment generally. In addition, the

Board's adoption of the rule will produce an economically beneficial solution rather than passing on the high and unnecessary costs of treatment or obtaining a new water source to the citizens of Galva.

III. STATEMENT OF REASONS

A. Existing Conditions

Galva is a rural community, with a population of 2,758, located in south central Henry County. Galva occupies portions of Sections 21, 26, 27, 28, 33, 34 and 35 in Township 14 North, Range 4 East of the Fourth Principal Meridian, Henry County, Illinois. See TSD, Exhibit A, Figure 1. Galva owns and operates both a sewage treatment system and a potable water distribution system.

Galva's water supply system draws from a deep aquifer system, obtaining its potable water from two wells, Well No. 4 and Well No. 5. A map of Galva, indicating the locations of Well No. 4 and Well No. 5, is attached in the TSD, at Exhibit A, Figure 2. Well No. 4 is located near the southwest corner of North East 2nd Street and Center Avenue in Galva. Well No. 5 is located on the south side of U.S. Route 34, near Galva's Maintenance Building, in Galva.

Well No. 4 was drilled in 1933 to a depth of 1,686 feet, stopping in the Shakopee Dolomite Formation. Well No. 4's pump sits 450 feet below ground level, is driven by a 100 horsepower motor, and has a nominal pumping capacity of 550 gallons per minute (gpm). The well was successfully lined a few years ago to exclude water with excessive radium concentrations. This changed the effective depth of the well to 834 feet and reduced the pumping capacity to approximately 420 gpm. Well No. 4 discharges water into a 600 gpm forced draft aerator, sitting 20 feet above ground level, mounted on top of a 43,000 gallon steel storage tank.

Well No. 5 was drilled in 1988 to a depth of 1,770 feet, stopping in the Shakopee Dolomite Formation. Well No. 5's pump is 540 feet below ground level, driven by a 125 horsepower motor, and has a rated pumping capacity of 600 gpm. Well No. 5 was also lined a few years ago to exclude radium bearing waters, which left the effective depth at 794 feet and reduced the pumping capacity of this well to approximately 420 gpm. Well No. 5 discharges water into a forced draft aerator, which is mounted on top of a 20,000 gallon above ground storage tank.

Together, Well No. 4 and Well No. 5 pump an average of 400,000 gallons of water per day for the residents of Galva. The two wells are located approximately ¾ of a mile from each other, but work in tandem through a series of interconnecting 6" and 8" water mains.

B. Boron in Galva's Water Supply

Boron is an element inherent in Galva's Municipal Water Supply, because it is naturally occurring in the groundwater which surrounds Galva. Boron is an inorganic element derived naturally from compounds called borates. Borates are found in oceans, sedimentary rocks, coal, shale, and some soils. Borates are released into the environment from oceans, volcanic activity and other natural releases such as geothermal steam and weathering of clay-rich sedimentary rocks. Boron is among many of the trace elements present in Illinois coal that remain in the ash following combustion. While boron can also be released as a result of human activity, the boron in Galva's water is not caused by any human or external environmental influence, but occurs naturally in Galva's water supply.

Although the State WQS relevant to boron in surface water is 1.0 mg/L, the state potable groundwater standard for boron is twice that: 2.0 mg/L. See 35 Ill. Adm. Code §620.410(a).

There are no federal water regulations concerning boron. In fact, the United States Environmental Protection Agency ("USEPA") has frequently made the determination that boron

does not warrant a national primary drinking water regulation (NPDWR). In June of 2008, the USEPA issued its "Regulatory Determinations Support Document for Selected Contaminants from the Second Drinking Water Contaminant Candidate List" ("USEPA CCL 2 Report"). See *http://www.epa.gov/OGWDW/ccl/pdfs/reg_determine2/report_ccl2-reg2_supportdocument_ch03_boron.pdf.* This report specifically discusses groundwater samples which were collected between 1984 and 1991 from the lower Illinois River Basin, which includes the Spoon River watershed relevant in this Petition. The samples ranged from boron concentrations of 0.05 mg/L to 2.1 mg/L, with the higher concentrations being found in the deeper and more ancient aquifers. *See* USEPA CCL 2 Report, p.3-17.

Considering that Galva obtains its water supply from aquifers in this region, it follows that higher concentration levels of boron are a result of naturally occurring boron contained in Galva's water supply. Groundwater sample results from the wells that supply Galva's potable water confirm this. *See* TSD, Exhibit A, Appendix C. This explains the fact that boron occurs in Galva's discharge at a concentration level greater than the Board's WQS.

Humans are primarily exposed to boron through food and drinking water. Neither the federal Safe Drinking Water Act, 40 C.F.R. §141 (1996), nor Board regulations which adopt the federal drinking water parameters as identical-in-substance rules at 35 Ill. Adm. Code Part 611, contain a numeric potable water standard for boron. It has been reported that concentrations of boron of up to 30 mg/L are not harmful in drinking water, and toxic effects on livestock and fish are reported only at significantly higher levels. *See* McKee, J.E. & Wolf, H.W., Water Quality Criteria, State Water Resources Control Board, State of California, 2d ed. 1973 (1963). The National Research Council has declined to establish any recommended dietary allowance for humans as a result. *See* Dietary Reference Intakes for Boron, 2000, *available online at*

www.nap.edu. Canadian guidelines, developed by Health Canada in 1990, have set the Interim Maximum Acceptable Concentration (IMAC) for boron in drinking water at 5.0 mg/L.[1]

In May, 2008, the USEPA published a Drinking Water Health Advisory for Boron. *See http://www.epa.gov/OGWDW/ccl/pdfs/reg_determine2/healthadvisory_ccl2-reg2_boron.pdf.* The report, herein referred to as the "USEPA Health Advisory Report" is part of the USEPA's Health Advisory (HA) Program, which establishes non-regulatory concentrations of drinking water contaminants at which adverse health effects are not anticipated to occur over specific exposure durations. HAs serve as "informal technical guidance to assist Federal, State and local officials, and managers of public or community water systems in protecting public health when emergency spills or contamination situations occur" but are "not to be construed as legally enforceable Federal standards." USEPA HA Report, at p. 1. The *Lifetime* HA for boron was calculated at 5.4 mg/L. *Id.* at p. 34. The No Observable Adverse Effect Level (NOAEL) calculated from this study was 17.5 mg of boron per kilogram of body weight per day. *Id.* at p.30.

Thus, boron in concentrations significantly higher than the Board's 1.0 mg/L WQS does not pose a risk to human health and safety, as a drinking water source or otherwise.

C. **The Discharge and Permit Terms**

Galva's Municipal Water Supply ultimately feeds directly into Galva's two STPs. As a result, the excess boron levels discovered in the treatment plant effluent is attributed to the naturally occurring boron in Galva's water supply. While Galva's water supply does not exceed any relevant potable drinking water standard and is considered safe for consumption, it is nonetheless the source of the boron concentration in Galva's STP discharge.

[1] Health Canada develops and enforces regulations under Government of Canada legislation. The Department consults with the Canadian public, industry and other interested parties in the development of laws that protect health and safety. See http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/boron-bore/index-eng.php#Exposure. Last visited October 17, 2008.

The Southwest STP is an aerated lagoon system sewage treatment plant, discharging into Mud Run Creek, a tributary of Walnut Creek, which is a tributary of the Spoon River. The Southwest STP treats a design average flow of 0.3 million gallons per day ("MGD") and is designed for a maximum flow of 1.0 MGD. A schematic of the Southwest STP is contained in the TSD, Exhibit A, Figure 6. Effluent from the Southwest STP travels approximately 7.0 miles to Walnut Creek, then discharges into the Spoon River approximately 31.7 miles downstream.

The Northeast STP is an activated sludge plant that discharges into an unnamed tributary of the South Branch of the Edwards River, located in the Mississippi Central River Watershed. The Northeast STP can treat an average flow of 0.385 MGD and is designed for a maximum flow of 0.867 MGD. A schematic of the Northeast STP is contained in the TSD, Exhibit A, Figure 4. Effluent from the Northeast STP travels approximately 1.1 miles downstream in the tributary to the South Branch of the Edwards River. At this point, any effluent flow would travel approximately another 15.0 miles downstream to meet with the Edwards River. A chart reflecting the average monthly discharge flow rates at the Northeast and Southwest STPs is contained in the TSD, Exhibit A, Figure 5.

Discharges emitted from the Southwest STP are covered by NPDES Permit No.IL0023647. NPDES Permit No.IL0023647 requires sampling and reporting for boron with a limit of 1.0 mg/L. NPDES Permit No.IL0023647 was amended, effective August 4, 2004, to include the compliance schedule for the boron effluent limitation. The boron permit condition became effective September 1, 2007.

The boron concentration in the Galva discharge which led to the permit condition was first discovered when monthly sampling was conducted at Mud Run Creek, as part of the Southwest STP effluent sampling requirement. During this time period the maximum concentration of boron detected was 3.0 mg/L. A chart depicting the sampling results at the

Southwest STP is contained in the TSD, Exhibit A, Figure 7. The lower concentrations of boron are correlated to increased amounts of rain, which increases the amount of flow through the STPs and results in a dilution effect. The higher concentrations of boron are attributed to drought conditions in Illinois and the corresponding low flows going through the STPs, which results in higher concentrations.

The Agency established the Galva Sanitary System NPDES permit condition requiring compliance with an effluent standard of 1.0 mg/L for boron. That permit condition applies to the Southwest STP and is contained in NPDES Permit No. IL0023647. Discharges from the Northeast STP are covered by a different permit, NPDES Permit No.IL0026344. The terms of NPDES Permit No.IL0026344 do not at this time require Galva to comply with sampling or effluent limits for boron. Nonetheless, boron levels similar to those traced to the discharge from the Southwest STP were also discovered from the Northeast STP. Moreover, testing conducted July 2005 reveals a correlation between discharges from the Northeast STP and the Southeast STP. Accordingly, and after consultation with the Agency, Galva seeks the same Site Specific Rule for both treatment plants, should the Board agree with the Agency that the permit conditions are appropriate and the relief is necessary.

D. Boron Regulations

The 1.0 mg/L boron effluent limitation in the NPDES Permit is based upon and equivalent to the numeric limitation in the Board's water quality standards set forth at 35 Ill. Admin. Code 302.208(g). This standard was promulgated in 1972 to implement the requirements of the Federal Water Pollution Control Act Amendments of 1972, the precursor to the Clean Water Act. 33 U.S.C. 1251 et seq. The WQS was codified in its present location in

Title 35 of the Illinois Administrative Code, Section 302.208(g).[2] In its March 7, 1972 Order promulgating the WQS of 1.0 mg/L for boron, the Board stated:

> Boron. The May 12 and today adopted level of 1.0 mg/l is based on evidence that higher levels can harm irrigated crops. While 100% irrigation is unlikely in Illinois, the uncontrolled discharge of large quantities of boron is clearly undesirable. We have proposed no effluent standard because of the lack of evidence as to treatment methods.

In the Matter of: Effluent Criteria, R70-8; *In the Matter of: Water Quality Standards Revisions,* R71-14; *In the Matter of Water Quality Standards Revisions for Intrastate Waters (SWB-14)*, R71-20, (consolidated), Board Opinion, March 7, 1972. As to the refusal to promulgate an effluent standard for boron, in an earlier decision on January 6, 1972 the Board stated its rationale for not setting effluent criteria for boron:

> Boron. There is very little information as to the technology for controlling boron, for it has seldom presented problems. Patterson says small scale data indicate it can be distilled, but distillation is costly. The sole basis for boron water quality limits in the low parts-per-million range is to protect irrigated plants. We omit boron from today's regulation because any instances of interference with agriculture may be handled individually on the basis of water quality standards, in the absence of information as to available and inexpensive treatment methods.

In the Matter of: Effluent Criteria, R70-8; *In the Matter of: Water Quality Standards Revisions*, R71-14; *In the Matter of Water Quality Standards Revisions for Intrastate Waters (SWB-14),* R71-20, (consolidated), Board Opinion, January 6, 1972. Thus, although the Board specifically declined to adopt the 1.0 mg/L boron standard as an effluent standard, the Agency applies it as such via a permit condition. The Board's 1.0 mg/L value for the boron WQS has not been changed, nor has it been directly and technically examined in a General Use WQS regulatory proceeding, since the Board's adoption of that value in 1972.[3] None of Illinois' neighboring states (Indiana, Iowa, Kentucky, and Missouri) have established a WQS for boron.

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[2] Section 302.208(g) was originally Section 302.208(e) but the subsections were re-lettered when additional subsections were added in an amendment published at 20 Ill. Reg. 7682, effective May 24, 1996.
[3] The Board has, however, granted Adjusted Standards with respect to boron. See pages 24 - 25.

E. Nature of Receiving Water

As stated previously, the Southwest STP discharges into Mud Run Creek, a tributary of Walnut Creek, which is a tributary of the Spoon River. Neither Mud Run Creek nor Walnut Creek are large enough to produce enough potable water to sustain any of the surrounding community's drinking water needs. Further, neither Mud Run Creek nor Walnut Creek was assessed as part of the Agency's *Integrated Water Quality Report and Section 303(d) List (2006).*

The Northeast STP discharges into an unnamed tributary of the South Branch of the Edwards River. The South Branch of the Edwards River was rated as "fully supporting" of aquatic life and "fully supporting" of fish consumption by the Agency *Integrated Water Quality Report and Section 303(d) List (2006).* The Agency report also noted that the South Branch of the Edwards River was "not supporting" of primary contact use, based on fecal coliform bacteria data obtained from the river. The source of the coliform bacteria is unknown. In addition, the South Branch of the Edwards River is not a viable source for potable water for any of the surrounding communities. A map of the affected waterways is included in the TSD, Exhibit A, Figure 3.

After ascertaining the concentrations of boron in the monthly sampling results, Galva is seeking a Site Specific Rule to allow for up to a 3.0 mg/L concentration of boron in its effluent. Stream flow data was collected for the affected waterways using the 7 Day 10 Year Low Flow ("7Q10") Map for the Spoon River Region published by the Illinois State Water Survey (ISWS), and the Illinois Streamflow Assessment Model available online from the ISWS. 7Q10 is the average minimum seven-day low-flow hydrological conditions that are expected to occur once in every ten years. The low flow stream discharges were assessed at the 7Q10 event. *See* TSD, Exhibit A, Appendix D for the ISWS data used.

Utilizing the minimum average monthly discharge data from Galva's sewage treatment plants from 2006, and assuming that the maximum recorded boron concentration was to occur during a low flow period, the extent of necessary relief from the boron standard was calculated using the equation below for each of the sewage treatment plants. After applying the appropriate data in the equation, the results reflect the total distance necessary in the streams for boron to be diluted to the present standard of 1.0 mg/L.

$$C_{BORON\ ADDED} = [Q_{STP} \times C_{STP}] / [Q_{STP} + Q_{STREAM}]$$

Where:

$C_{BORON\ ADDED}$	=	Final boron concentration in receiving stream (mg/L)
Q_{STP}	=	Discharge from sewage treatment plant (cfs)
Q_{STP}	=	Boron concentration in STP discharge (mg/L)
Q_{STREAM}	=	Water flow in stream during Q710 conditions (cfs)

At the Northeast STP, the lowest average monthly discharge for 2006 was 0.37 cfs, occurring in the month of July 2006 (TSD, Exhibit A, Figure 5). During low flow periods (represented by the theoretical 7Q10 numbers), the discharge from the Northeast STP would receive adequate dilution at the point where the South Branch of the Edwards River discharges and mixes with the Edwards River. At this point, the boron concentration in the stream would theoretically drop below 1.0 mg/L during 7Q10 conditions.

$C_{BORON\ ADDED}$ = $[Q_{STP} \times C_{STP}] / [Q_{STP} + Q_{STREAM}]$

$C_{BORON\ ADDED}$ = [0.37 cfs X 3.0 mg/L / [0.93 cfs]

$C_{BORON\ ADDED}$ = 0.94 mg/L

As a result of the above calculation, dilution would occur approximately 16.1 miles downstream from the outfall of the Northeast STP. Despite the foregoing, it should be noted that this is considering a worst case scenario; during normal stream flow conditions, dilution would occur much closer to the discharge of the Northeast STP. A map depicting the point of dilution for the Northeast STP is attached in the TSD, Exhibit A, Figure 12.

At the Southwest STP, the lowest average monthly discharge for 2006 was 0.015 cfs, occurring in the month of November 2006 (see the TSD, Exhibit A, Figure 7 and Appendix E). During low flow periods (7Q10), the effluent from the Southwest STP would receive adequate dilution at the point just past where Mud Run discharges into Walnut Creek. Again, it should be noted that this is a worst case scenario, and that during normal conditions dilution would occur much closer to the discharge point of the Southwest STP.

$C_{BORON\ ADDED} = [Q_{STP} \times C_{STP}] / [Q_{STP} + Q_{STREAM}]$

$C_{BORON\ ADDED} = [0.015\ cfs \times 3.0\ mg/L / [0.20\ cfs]$

$C_{BORON\ ADDED} = 0.225\ mg/L$

As a result of the above calculation, dilution would occur approximately 7 miles from the outfall of the Southwest STP. A map depicting the point of dilution for both STPs is included in the TSD. Detailed mass balance calculations for each of the STPs is contained in Exhibit A, Appendix D of the TSD. It should be noted that these calculations assume a worst case scenario, with the 7Q10 flow and a maximum concentration of 3.0 mg/L. In practicality, these conditions would not be found on a day to day basis and the dilution point would occur much closer to the STP outfalls.

E. Affected Sources and Facilities

Landowners neighboring the receiving waters typically use these waterways for drainage purposes only. Therefore, the irrigation concerns which led to the Board's establishment of the boron WQS are not applicable here. Research conducted by Galva's engineers, Bruner, Cooper & Zuck, Inc., indicate that not one of the 22 nurseries located in Henry and Knox counties utilize the receiving waters at issue for irrigation purposes, and that there are no golf courses located directly along the waterways. Katie Boruff and Josh Gibb, the Henry and Knox County Farm Bureau Directors, respectively, have confirmed that they are unaware of any specialty crops

being grown along the waterways requiring constant irrigation. In addition, Gary Clark, Director of the Office of Natural Resources at the Illinois Department of Natural Resources, has indicated that no authorized permits to allow for water withdrawals from these streams exist.

As stated previously, the affected waterways are generally used for drainage purposes only. The fact that these waterways are rarely used and maintain a generally low flow contributes to the conclusion that the granting of this petition will not adversely affect the use of the affected waterways or the environment.

F. Available Treatment and/or Control Options

If the Board finds that the Agency is correct to require a 1.0 mg/L boron effluent standard via a permit condition relevant to Galva's discharge, regulatory relief is necessary. It is sought in the form of a Site Specific Rule, at the urging of the Agency.[4] To further justify such relief, Galva has explored numerous options for controlling the boron concentration in its effluent, including boron removal techniques and obtaining alternative sources of water. This section identifies those options. The next section evaluates them.

Galva has considered utilizing ion exchange and potable water reverse osmosis for removing boron from the water. In addition, Galva has considered obtaining alternative sources of water by (1) drilling a new well, (2) obtaining water from the City of Kewanee, and (3) obtaining water from the City of Galesburg, which would thereby eliminate the boron concentrated water from flowing into Galva's STPs.

i. Ion Exchange

Galva has explored the option of removing excess boron from its discharge water at the two STPs by utilizing an ion exchange process. Ion exchange is the process of selectively

[4] The Agency believes that a Petition for Site Specific Rule relief is more appropriate than Adjusted Standard relief, in the context of the relief here sought. Additionally, the amendment proposed is to Part 304, as prior Board cases have appeared to determine that relief from Part 304 of the Board's regulations was more appropriate than relief from Part 302. See *In the Matter of Rhodia, Inc., et. at.*, AS 01-9, slip op. at 10 (IPCB, January 10, 2002).

removing charged inorganic species from water by using an ion-specific resin. In this situation, boron ions would be replaced by charged ions on the resin surface as it passes through an exchange media. When the supply of resin becomes saturated with water, the exchange media is backwashed, regenerated with a solution of acid, and rinsed. A properly operated ion exchange process will reduce boron levels in the water by approximately 90%.

ii. Potable Water Ion Exchange Process

As Galva's municipal water supply contains boron (see TSD, Exhibit A, Appendix C), and directly feeds into the two sewage treatment plants, Galva has also considered the option of removing excess boron from its potable water supply, prior to the water being sent to the distribution system and to the sewage treatment plants. The ion exchange process for the potable water supply would be the same as is discussed in the previous section.

iii. Potable Water Reverse Osmosis Process

Galva has explored the option of removing excess boron from its potable water supply by using reverse osmosis ("RO"). Again, this method would be used to eliminate excess boron prior to the water entering the sewage treatment plants. Although RO has been successfully used to remove boron from water, it is not as common of an application as ion exchange. RO utilizes a semi-permeable membrane which allows some water permeation, but acts as a highly selective barrier. This highly selective barrier separates inorganic and microbial species in the water. In RO, the application of external pressure differentials to the solution causes water to flow against the natural direction in the membrane, producing water more pure than the original solution. The USEPA reported that the potential for RO use in boron treatment is limited, however, based on their findings. USEPA CCL 2 Report, p. 3-24. The largest reported concentration of boron removed using RO was 15%. *Id.*

iv. Drill a New Well

It is clear that if Galva could find a sustainable alternate source of water, free of boron, the boron discharge problem could be avoided. Like Galva, most of Galva's neighboring communities supply water to their residents with water obtained from deep wells. Further, the water supplied in neighboring communities is obtained from the same or similar geological formations as Well No. 4 and Well No. 5 in Galva. If Galva were to commence drilling for new water, boron free water would most likely be located in more shallow wells located in sand and gravel deposits below the Earth's surface.

v. City of Kewanee

Another alternative source of boron free water is from the City of Kewanee, located approximately 12 miles northeast of Galva.

vi. City of Galesburg

A final possible alternative source for boron-free water exists in the City of Galesburg, located approximately 22 miles southwest of Galva.

G. Technical Feasibility and Economic Reasonableness

i. Ion Exchange

In a typical ion exchange scenario, after the exchange media is backwashed, regenerated with a solution of acid, and rinsed, the wastewater is discharged to drain after the pH is adjusted. However, in this situation, the resulting boron concentration of the wastewater would not make this option possible. After the regeneration cycle, the wastewater would have a boron concentration of approximately 3100 mg/L. In the event the wastewater from the backwash and rinse cycles is diluted, the wastewater would still have a boron concentration of 375 mg/L.

Considering the above-mentioned discussion on high boron concentration, if an ion exchange unit were placed at each of the two sewage treatment plants and treated 50% of the

effluent, approximately 5,000 gallons of wastewater would be produced at each STP every 8-9 days. In effect, 5,000 gallons of wastewater containing high concentrations of boron would have to be disposed of every 4-5 days.

When disposing of the highly boron concentrated wastewater, two methods of disposal are available. First, the wastewater could be pumped or trucked to a large sewage treatment plant which discharges into a major river. Geographically, in this scenario, the only available options would be large sewage treatment plants located in either the Quad Cities or Peoria. However, both of these locations are roughly 50 miles away from Galva.

A second option is for an evaporation pond to be used for the wastewater. Although this method is potentially feasible in Galva's situation, more site specific details would need to be known and cost estimates developed before making a proper judgment on whether evaporation ponds would be effective. Moreover, evaporation ponds typically are not very effective in the central Illinois climate, with the exception of relatively small amounts of wastewater.

Galva has evaluated the estimated costs associated with constructing ion exchange facilities at the two STPs. The following chart lists these estimated costs but does not include ongoing operation and maintenance costs.

Construction Items	**Cost**
Ion Exchange Equipment	$420,000
Backwash Storage Tank	$78,750
Building	$105,000
Plant Piping	$52,500
Electrical	$78,750
HVAC	$21,000
Site Work	$10,500
Miscellaneous	$15,750
Subtotal	$782,250
10% Contingency	$78,225
Subtotal Construction	$860,475
x 2 Plants	$1,720,950
Non-Construction Items	

Design Engineering	$177,450
Construction Engineering	$100,800
Legal Fees	$17,210
Subtotal Non-Construction Items	$295,460
(Engineering Fees based on Rural Development Fee Schedule and Legal Fees based on 1% of Construction)	
Total Estimated Cost:	**$2,016,410**

Although utilizing an ion exchange process is effective in removing excess boron from water, the process creates an inordinate amount of wastewater with highly concentrated boron. In addition to being responsible for over $2,000,000 in initial construction costs, Galva would be responsible for disposing of 5,000 gallons of wastewater at an offsite location every 4-5 days. Regardless of whether this wastewater is piped or trucked to a location 50 miles away, or transported to an evaporation pond, high maintenance and day-to-day operation costs would drive up the financial burden on the citizens of Galva. When considering the technical and economic burdens associated with utilizing ion exchange, and the absence of a negative impact from adopting the proposed site specific rule, it is clear that ion exchange is neither technically feasible nor economically reasonable.

ii. Potable Water Ion Exchange Process

Unlike treatment of the wastewater at the STPs by ion exchange, in this scenario, the ion exchange process would need to be applied to the potable water supply on a daily basis. Assuming 50% of the potable water supply would be treated, boron levels could potentially be reduced by 55%-60%. However, it is important to note that every 7-8 days, approximately 5,000 gallons of boron-concentrated wastewater would need to be disposed of. Therefore, this potential treatment option for removal of boron, as well as the one previously discussed, would create a larger problem (disposal) than it would attempt to solve (achieving compliance with the WQS for boron). The following chart is an estimate of the construction costs for constructing an

ion exchange facility near Well No. 5 for treating the potable water supply by ion exchange. The chart does not include ongoing operation and maintenance costs.

Construction Items	Cost
Ion Exchange Equipment	$525,000
Backwash Storage Tank	$105,000
Finish Water Reservoir	$210,000
Building	$136,500
Plant Piping	$63,000
Electrical	$105,000
HVAC	$31,500
Site Work	$21,000
Raw/Finish Water Mains (± 4000' each)	$420,000
Miscellaneous	$31,500
Subtotal	$1,648,500
10% Contingency	$164,850
Subtotal Construction	$1,813,350
Non-Construction Items	
Design Engineering	$163,800
Construction Engineering	$94,500
Legal Fees	$18,134
Permit Fees (B.N.S.F.)	$10,000
Subtotal Non-Construction Items	$286,434
(Engineering Fees based on Rural Development Fee Schedule and Legal Fees based on 1% of Construction)	
Total Estimated Cost:	**$2,099,784**

As stated in the previous section, although utilizing an ion exchange process is effective in removing excess boron from water, the process creates an inordinate amount of highly boron concentrated wastewater. Galva would be responsible for disposing of 5,000 gallons of wastewater at an offsite location every 4-5 days and over 2,000,000 in initial construction costs. Regardless of whether this wastewater is piped or trucked to a location 50 miles away, or transported to an evaporation pond, high maintenance and day-to-day operation costs would drive up the financial burden on the citizens of Galva. When considering the technical and economic burdens associated with utilizing ion exchange, and the absence of a negative impact from adopting the proposed Site Specific Rule, it is clear that ion exchange is not technically nor

economically reasonable. Moreover, this process would not solve the problem at issue as it would produce water with concentrations of boron exorbitantly higher than the existing levels with nowhere to dispose of it. While ion exchange has been cited as a theoretical removal process, in reality, it is not an option in this case.

iii. Potable Water Reverse Osmosis (RO) Process

A typical RO procedure results in 75% of the water permeated being recovered, and 25% of the concentrate being sent to waste. However, after the necessary pre and post-cycle flushes are used to rinse the membranes, about 1/3 of the water would actually have to be sent to waste. As a result, assuming 50% of water is treated to reduce the concentration of boron, approximately 100,000 gallons of wastewater would be produced each day.

The production of 100,000 gallons of wastewater per day creates too large of a burden to consider off-site disposal at a larger facility or evaporation ponds. As a result, the only other available option for the disposal of the wastewater would be to drill a deep well injection. A deep well injection's typical application is for the disposal of RO waste resulting from seawater treatment plants. Deep well injection construction costs are extremely high, and are typically only used in seawater treatment plants because the options for treating water are so limited that the cost can be justified in these cases.

The following chart is an estimate of the construction costs for constructing a RO treatment facility near Well No. 5. The chart does not include operation and maintenance costs.

Construction Items	Cost
Reverse Osmosis Equipment	$1,050,000
Concentrate Storage Tank	$420,000
Deep Well & Injection System	$3,150,000
Replace Well Pumps	$78,750
Building	$157,500
Plant Piping	$78,750
Electrical	$105,000

HVAC	$31,500
Site Work	$26,250
Raw/Finish Water Mains (± 4000' each)	$420,000
Miscellaneous	$105,000
Subtotal	$5,622,750
10% Contingency	$562,275
Subtotal Construction	6,185,025
Non-Construction Items	
Design Engineering	$467,250
Construction Engineering	$266,700
Legal Fees	$61,005
Permit Fees (B.N.S.F.)	$10,500
Subtotal Non-Construction Items	$805,455
(Engineering Fees based on Rural Development Fee Schedule and Legal Fees based on 1% of Construction)	
Total Estimated Cost:	**$6,905,955**

RO is neither a technically feasible nor financially reasonable (nor responsible) option for addressing boron levels in Galva's discharge. As the above discussion demonstrates, utilizing RO would only eliminate 2/3 of boron from processed water. Moreover, approximately 100,000 gallons of highly-concentrated boron wastewater would be produced each day requiring disposal. As offsite disposal of this large amount of wastewater would not be technically feasible, Galva citizens would be forced to incur the substantial costs associated with drilling a deep well for injection of the highly-concentrated wastewater. This process would cost citizens of the City of Galva nearly $7,000,000. When considering the negligible effect this proposed Site Specific Rule would have on the environment, it is clear that RO is not a reasonable option.

v. Drill a New Well

A search of the Illinois State Water Survey's Private Well Database indicates that there are very few private shallow wells near Galva. The nearest location for a new well, which would not have the boron issues associated with the deep wells surrounding Galva, would be in the far northeastern portion of Henry County near the Green River, approximately 20 to 25 miles from

Galva.[5] A map detailing the location of this alternative water source is included in the TSD, Exhibit A, Figure 11.

If Galva were to pursue a drilling project for water, a test drilling program would be required to establish whether an adequate supply of potable water is actually present. After the test drilling, Galva would have to address issues regarding pumping facilities, pipelines, etc. Although it is difficult to determine the up-front costs on drilling for water, as it depends on the extent, cost, and success of the drilling project, Galva has received an estimate from a well driller that it would cost at least $100,000 for the initial drilling project. The uncertainties inherent in such a project, the cost associated with constructing a 20-25 mile pipeline, and the negligible benefit that would result from a new well render this option also not reasonable.

v. City of Kewanee

After inquiry was made by Galva to the City of Kewanee regarding the possibility of obtaining water, the City of Kewanee responded that it would not be feasible, as the amount of water needed by Galva in the future may be too great for its capacity. A map detailing the location of this alternative water source is included in the TSD, Exhibit A, Figure 11.

vi. City of Galesburg

Galva has had discussions with officials from the City of Galesburg regarding obtaining water service from Galesburg, which have been positive, but entirely too expensive. A map detailing the location of this alternative water source is included in the TSD, Exhibit A, Figure 11. Although the estimated cost of a pipeline from the City of Galesburg to Galva is difficult to estimate, considering the potential participation of other municipalities along the route, the City of Galesburg presented a report to Galva discussing technical issues and estimated costs. According to the report, the City of Galva would be responsible for approximately $13.6 million

[5] "Groundwater Geology in Western Illinois, North Part", Illinois State Geological Survey, Circ. 222 (1956).

of the total estimated project cost of $16.1 million; however, this estimate does not include operation and maintenance costs.

H. Economic Impact of Proposed Rule

If Galva is required to comply with WQS for boron of 1.0 mg/L, as applied by the Agency to its effluent, Galva would be required to take costly measures to eliminate excess boron from its effluent. The options available to Galva, and their associated upfront costs, can be summarized as follows:

a. Ion Exchange - $2,016,410
b. Potable Water Ion Exchange - $2,099,784
c. Potable Water Reverse Osmosis - $6,905,955
d. Drill New Well – Initial search $100,000, not including actually drilling.
e. City of Kewanee – Not possible.
f. City of Galesburg - $13,600,000.

In addition to these staggering upfront costs, Galva would be responsible for significant maintenance and operational costs. As many of these options include complex offsite disposal issues, additional day-to-day costs will be incurred, as well. These costs combined with the upfront construction, design, and legal costs make these options impractical without significant financial assistance. Officials from Galva have visited both Springfield and Washington, D.C. in search of grant funds to address the boron issue, but were advised that funds were tight or previously earmarked for other purposes.

The options available for building large-scale pipeline systems for an alternative potable water supply are expensive, and the water supply sources are a considerable distance from Galva. The City of Kewanee option is not available and the City of Galesburg option has numerous issues which still need to be resolved. Finally, the drilling option involves an expensive operation to develop wells and to construct an adequate pipeline.

Galva is a small rural community in Henry County, without the resources necessary to deal with the costs associated with compliance with the Agency's application of a 1.0 mg/L

effluent standard for boron discharges from its sewage treatment plants. As the Site Specific Rule proposed in this petition would produce no foreseeable negative implications on the environment, application of a 1.0 mg/L standard for boron is neither environmentally nor economically reasonable. If Galva were forced to pursue one of the above options without any assistance, the user rates for the citizens of Galva would likely rise to a record level in Illinois. Given the lack of environmental necessity for the application of this standard to these treatment plants (see below), government assistance is itself unlikely.

I. Environmental Impact of Proposed Rule

Compliance with the Board's WQS for boron is not necessary here since the basis for the establishment of the WQS (potential impact on select irrigated crops) is not an issue. Clearly it is neither reasonable nor necessary to apply the boron WQS as an effluent standard in this instance.

The proposed rule would simply establish a reasonable effluent standard for boron, applicable to Galva's discharge, should the Board agree such standard is necessary. The standard reflects the naturally occurring boron relevant to the Galva environs, which both sustains the Galva citizens as their source of drinking water and is ultimately disposed of in the Galva sewage treatment plants. Quite simply, there is no foreseeable environmental impact incurred by the adoption of this Site Specific Rule.

Dr. Brian D. Anderson, Ph.D. in biology, Director of the Illinois Natural History Survey and former Director of the Office of Scientific Research and Analysis of the Illinois Department of Natural Resources, was retained as a scientific expert to give a summary and his opinion as to the potential effects of boron on aquatic life. He will testify at the hearing in this matter and his testimony can be summarized as follows: the Board's WQS of 1.0 mg/L is "over-protective of aquatic life." *See Pre-Filed Testimony of Dr. Brian D. Anderson,* filed simultaneously with this Petition, p.8.

The Site Specific Rule proposed by this petition is well within the relief standards for boron that the Board has allowed in other contexts. In a 1995 Adjusted Standard proceeding, the Board allowed Illinois Power Company ("Illinois Power") to discharge water with a boron effluent concentration of 9.9 mg/L. See *In the Matter of: Petition of Illinois Power Company (Baldwin Power Plant) for Adjusted Standard from 35 Ill. Adm. Code 302.208 and 35 Ill. Adm. Code 304.105*, AS 96-1 (1995). In that case, the Board fully examined the environmental impact of boron, and concluded that the higher boron concentration would not adversely affect the Kaskaskia River ecosystem.

Similarly, the Board allowed Illinois Power to discharge water with a boron effluent concentration of 4.5 mg/L at its Duck Creek Station. See *In the Matter of: Petition of Illinois Power Company (Duck Creek Station) for Adjusted Standard from 35 Ill. Adm. Code 302.208 and 35 Ill. Adm. Code 304.105*, AS 96-8 (1995). Again, Illinois Power provided great technical detail concerning the environmental effect of high boron concentrations in water and, as a consequence, the Board granted an adjusted standard which allowed Illinois Power to discharge boron with a concentration of 4.5 mg/L.

As a final example, in 1994 the Board granted an adjusted standard for the City of Springfield to discharge boron at a concentration of 11.0 mg/L. See *In the Matter of: Petition of the City of Springfield, Office of Public Utilities for an Adjusted Standard from 35 Ill. Adm. Code 302.208(e)*, AS 94-9 (1994). Galva is aware that a new Petition for Site Specific Rule was recently filed by the City of Springfield, relevant to its boron discharge, and is currently pending Board hearing. The Board caused that proposed rule to be published for First Notice, and it appeared in the October 10, 2008 edition of the *Illinois Register,* 32 Ill. Reg. 41, Oct. 10, 2008. See *In the Matter of: Proposed Site Specific Rule for City of Springfield, Illinois, Office of Public*

Utilities, City Water, Light and Power and Springfield Metro Sanitary District from 35 Ill. Adm. Code Section 302.208(g), R09-08, Board Order, September 16, 2008.

As is evident from the above discussion, relief previously granted by the Board for discharges with concentrations of 11.0 mg/L, 9.9 mg/L, and 4.5 mg/L demonstrates that the boron water quality adjustment sought in this Petition is, on the basis of prior Board precedent and environmental protection, inherently reasonable.

J. Compliance with the Proposed Adjusted Water Quality Standard

Granting the proposed Site Specific Rule for boron will not result in any change from the present operating conditions of the Northeast STP or the Southwest STP. Since past and present discharges have had no adverse impact on the receiving waters at issue, allowing discharges to meet the proposed Site Specific Rule should likewise have no adverse impact. Further, compliance with the proposed Site Specific Rule should not pose any problems for the City of Galva.

The boron concentration proposed for Galva in this Petition will have no effect on navigational or industrial uses, and will affect neither aquatic life nor wildlife. Even if the receiving waters were to be used for crop irrigation in the future, adverse impacts are highly unlikely and would be negligible, as well as speculative.

IV. SYNOPSIS OF TESTIMONY

Petitioners will call several individuals to testify in support of the facts set forth in this Petition and requested relief. As stated previously, Dr. Brian Anderson will testify as to the nature of boron and its toxicity, as well as his opinion as to the impact a Site Specific Rule for boron would have, if any, on the receiving streams. For the convenience of the Board, his Pre-Filed Testimony is being filed simultaneously with the filing of this Petition.

Galva will also call engineers Shawn Maurer and Stephen Bruner, P.E., P.L.S., from Bruner, Cooper & Zuck, Inc. One or both will testify as to the background data they gathered in preparing the TSD enclosed with this Petition. Larry Lawson, plant engineer for Galva's STPs, may be called to testify regarding the process and conditions at the STPs. David Dyer, City Manager for the City of Galva, is prepared to testify regarding Galva's review of alternative options. Petitioners reserve the right to call additional individuals to testify.

V. MOTION FOR WAIVER OF SIGNATURE REQUIREMENT

In a separate Motion filed simultaneous with this Petition, Galva respectfully requests that the Board waive the requirement, set forth at 35 Ill. Admin. Code 102.202(f), that a petition for rulemaking be signed by at least 200 persons.

VI. STATEMENT OF RECENCY

The rules proposed in this Petition do not amend any existing rules. Instead, this rulemaking would establish a new rule, a specific boron effluent standard applicable to Galva's discharge STP discharge. This Site Specific Rule is proposed to be added to Part 304 of the Board's Rules for General Effluent Standards. It would amend the most recent version of Part 304 published on the Board's Web Site, last amended in R04-26 at 30 Ill. Reg. 2365, effective February 2, 2006. It would be applicable only to the Galva circumstances relayed in this Petition.

VII. ATTACHMENT

Galva includes the following Attachment in support of its proposed Site Specific Rule, and hereby makes it a part of this Petition: Technical Support Document ("Exhibit A"). Additionally, Galva submits, simultaneously with this filing, the Pre-Filed Testimony of Dr. Brian Anderson.

VIII. CONSISTENCY WITH FEDERAL LAW

The Board has great latitude and authority to establish appropriate General Use water quality standards and effluent standards relevant to the State of Illinois. 415 ILCS 5/13(a). The Board has discussed its state authority in a case involving fluoride discharges relative to the City of Effingham:

> Generally, states must adopt water quality standards which protect the designated use of interstate and intrastate waters. 33 U.S.C. §1313(c)(1998). The Board has adopted the water quality standards at 35 Ill. Adm. Code §302.203 in compliance with federal law. States may also revise water quality standards. 40 C.F.R.§131.4 (1998).
>
> The Board has stated previously that federal directives give it "broad discretion in determining the appropriate standard of control to apply to discharges from water treatment plants." *In re Site Specific Exception to Effluent Standards for the Illinois American Water Company, East St. Louis Treatment Plant* (February 2, 1989), R85-11, slip. Op. at 10.

See *In the Matter of: Site Specific Rule for City of Effingham Treatment Plant Fluoride Discharge*, 35 Ill. Adm. Code 304.233, R03-11 (July 24, 2003).

The Board has exercised its statutory authority in its 1972 promulgation of a WQS for boron, and in its simultaneous determination *not* to promulgate a boron effluent standard. It has also exercised its authority in its various Opinions and Orders, cited herein, which have granted relief from the boron standard.

Pursuant to Section 303 of the Clean Water Act (33 U.S.C. 1313) states are granted the authority and flexibility to promulgate appropriate water quality standards applicable to both interstate and intrastate waters, subject to USEPA approval. The WQS at issue in this Petition, the WQS for boron, is found in Board rules developed pursuant to the Board's statutory authority to develop rules of general applicability.

The Board's promulgation of the boron standard has preceded the federal Clean Water Act as we know it today, and the myriad of case law that has transpired since its enactment. While the Board has revisited the boron standard many times in its history, it has done so only in

the context of site specific relief from the standard; since its promulgation, the Board has never directly evaluated, in the context of the Agency's triennial rulemaking responsibility or otherwise, the continued appropriateness of the State General Use WQS for boron from a technical, economic or environmental perspective. Furthermore, over the course of the years since the Board's promulgation of the boron standard as a WQS, none of its neighboring states have determined to do so. Neither has any federal standard for boron ever been developed.

Under Illinois law, the Board's water quality standards are subject to site specific revision pursuant to the Board's site specific rulemaking authority or its authority to grant adjusted standard relief. 415 ILCS 5/27; 5/28; 5/28.1. Accordingly, the requested Petition for Site Specific Rule is well within the State's authority and consistent with federal law, authority and guidance concerning boron.

IX. RELIEF REQUESTED

Galva respectfully requests that the Board grant the site specific relief requested herein or whatever other relief the Board deems appropriate. Such other relief may include a Board order, issued after a full consideration of the issues, stating that this relief is not necessary as the Agency application of the General Use boron standard as an effluent standard applicable in Galva's NPDES permit is neither appropriate nor required.

As demonstrated above, treatment of Galva's STP effluent to come into compliance with a boron WQS and effluent standard of 1.0 mg/L is neither technically feasible nor economically reasonable for this site. Moreover, compliance with the 1.0 mg/L standard would require Galva to incur great expense to either treat excess boron or obtain an alternative water source. This increased expense would have a severe negative economic impact on Galva, and potentially the State of Illinois, as well. Such expense is not reasonable, because there is no environmental benefit to be gained from compliance. A site specific standard of 3.0 mg/L of boron will neither

harm aquatic life in the receiving streams to which Galva discharges, nor will it have an adverse impact on the environment generally.

Rather, the circumstances before the Board in this matter suggest that an application of the boron WQS, developed in 1972, as an effluent standard for boron discharged from a water treatment plant owned by a small town whose water supply itself safely contains a boron concentration higher than what the Agency will allow for discharge is simply untenable. An application of the boron WQS as an effluent standard for Galva's NPDES permits is neither reasonable nor necessary.

The Board has great authority to protect the environment, and is called upon to do so in a manner which takes into consideration a variety of factors. These factors include the existing physical conditions, the character of the area involved, including the character of surrounding land uses, zoning classifications, the nature of the existing air quality or receiving body of water, as the case may be, and the technical feasibility and economic reasonableness of measuring or reducing the particular type of pollution. *See* 415 ILCS 5/27(a). Galva urges that an application of those factors will justify the relief requested herein, or any other relief the Board deems appropriate.

WHEREFORE, for the above and foregoing reasons, the Petitioners, CITY OF GALVA, respectfully requests that the Illinois Pollution Control Board promulgate the site specific standard requested, or grant such other relief as is just and appropriate.

Respectfully submitted:

CITY OF GALVA
Petitioner,

By: /s/ Claire A. Manning
One of their Attorneys

Dated: October 17, 2008

BROWN, HAY & STEPHENS, LLP
Claire A. Manning
Registration No. 3124724
Alison K. Hayden
Registration No. 6291618
205 S. Fifth Street, Suite 700
P.O. Box 2459
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(217) 544-8491

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PROPOSED SITE SPECIFIC RULE	)	R08-_____
APPLICABLE TO THE CITY OF GALVA	)	(Site Specific Rulemaking – Water)
SEWAGE TREATMENT PLANTS	)	
DISCHARGE TO EDWARDS RIVER	)	
AND MUD RUN CREEK	)	
35 ILL. ADM. CODE 302.208(g)	)	

ENTRY OF APPEARANCE OF CLAIRE A. MANNING

NOW COMES Claire A. Manning of the law firm of Brown, Hay & Stephens, LLP, and hereby enters her appearance on behalf of Petitioner, CITY OF GALVA.

Respectfully submitted,

CITY OF GALVA, Petitioner,

By: /s/ Claire A. Manning
Claire A. Manning

Dated: October 17, 2008

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BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PROPOSED SITE SPECIFIC RULE	)	R08-_____
APPLICABLE TO THE CITY OF GALVA	)	(Site Specific Rulemaking – Water)
SEWAGE TREATMENT PLANTS	)	
DISCHARGE TO EDWARDS RIVER	)	
AND MUD RUN CREEK	)	
35 ILL. ADM. CODE 302.208(g)	)	

ENTRY OF APPEARANCE OF ALISON K. HAYDEN

NOW COMES Alison K. Hayden of the law firm of Brown, Hay & Stephens, LLP, and hereby enters her appearance on behalf of Petitioner, CITY OF GALVA.

Respectfully submitted,

CITY OF GALVA, Petitioner,

By: /s/ Alison K. Hayden
Alison K. Hayden

Dated: October 17, 2008

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BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PROPOSED SITE SPECIFIC RULE	)	R08-_____
APPLICABLE TO THE CITY OF GALVA	)	(Site Specific Rulemaking – Water)
SEWAGE TREATMENT PLANTS	)	
DISCHARGE TO EDWARDS RIVER	)	
AND MUD RUN CREEK	)	
35 ILL. ADM. CODE 302.208(g)	)	

MOTION TO WAIVE REQUIREMENT TO SUBMIT 200 SIGNATURES

NOW COMES the CITY OF GALVA ("Galva"), by and through its attorneys, Brown, Hay & Stephens, LLP and request the Illinois Pollution Control Board ("Board") to waive the requirement, under 415 ILCS 5/28(a) and 35 Ill. Admin. Code § 102.202(g), to submit 200 signatures with their Petition for Site Specific Rule stating as follows:

1. Attached to this Motion is a Petition for Site Specific Rule seeking relief from the General Use numerical water quality standard of 1.0 mg/L and requesting a site specific boron effluent standard of 3.0 mg/L.

2. The attached Petition for Site Specific Rule demonstrates that the requested standard is necessary as complying with the current standard of 1.0 mg/L is not technically feasible nor economically reasonable.

3. The Board has waived signature requirements for site specific rulemaking petitions in the past, including recently. *See In the Matter of: Proposed Site Specific Rule for City of Springfield*, R09-08, Board Order, September 16, 2008 (a similar petition regarding boron currently pending before the Board and scheduled for hearing on November 3, 2008); *In the Matter of: Site-Specific Rule for City of Joliet Wastewater Treatment Plant Fluoride and Copper Discharges, 35 Ill. Adm. Code 303.432,* R07-21,

Board Order, June 21, 2007; and *In the Matter of: Site Specific Rule for City of Effingham Treatment Plant Fluoride Discharge, 35 Ill. Adm. Code 304.233,* R03-11 (2003).

4. Granting this Motion would be in the public interest in light of the burden complying with the 1.0 mg/L standard places on the citizens of Galva.

WHEREFORE, Petitioner, CITY OF GALVA, respectfully requests the Illinois Pollution Control Board to waive the requirement to submit 200 signatures in support of its Petition for Site Specific Rule.

Respectfully submitted:
CITY OF GALVA
Petitioner,

By: /s/Claire A. Manning
One of its Attorneys

Dated: October 17, 2008

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BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PROPOSED SITE SPECIFIC RULE	)	R08-_____
APPLICABLE TO THE CITY OF GALVA	)	(Site Specific Rulemaking – Water)
SEWAGE TREATMENT PLANTS	)	
DISCHARGE TO EDWARDS RIVER	)	
AND MUD RUN CREEK	)	
35 ILL. ADM. CODE 302.208(g)	)	

PRE-FILED TESTIMONY OF DR. BRIAN D. ANDERSON

My name is Brian Anderson and I am the Director of the Illinois Natural History Survey, where I oversee an annual budget of $12.5 million, over 300 staff, and 450 research projects per year. Prior to working for the Illinois Natural History Survey I was the Assistant to the President for Planning and Institutional Development at Lincoln Land Community College. I also spent two years as the Chairperson for the Department of Biology and the Physical Sciences where I oversaw 14 full-time and over 20 adjunct faculty, and taught a class in geology, among others. Prior to my time at Lincoln Land Community College I was the Director of the Illinois Department of Natural Resources, Office of Resource Conservation and of the Office of Scientific Research and Analysis. I hold a Ph.D. in biology from the University of Louisville, a Masters degree in Zoology from DePauw University and a biology degree from Kalamazoo College.

I was retained by the City of Galva to evaluate this Petition for Site Specific Rule and give my opinion regarding the environmental consequences of an alternative boron water quality standard of 3.0 mg/L relative to the City of Galva's discharge from its Sewage Treatment Plants. The following is my opinion testimony concerning this Petition.

The Nature of Boron

The element boron (atomic symbol = B) has an atomic number of 5 and an atomic weight of 10.81. The atomic weight reflects the relative occurrence of two natural isotopes ^{10}B (19.9%) and ^{11}B (80.1%). Boron is a group 13 element with 3 electrons in its outer shell. It displays chemical properties intermediate between metals and non-metals. However, it shares more similarities to silicon (a group 14 element) than to aluminum or gallium (other group 13 elements), for example, it is a semiconductor rather than a metallic conductor. (WebElements Periodic Table, available at www.webelements.com).

Boron does not occur naturally in its elemental form. It usually occurs naturally as sodium or calcium borate minerals (borates contain boron bonded to 3 oxygen atoms), as borosilicate minerals, and in some hot springs as boric acid. Borax (hydrous sodium borate = $Na_2B_4O_7 \cdot 10H_2O$) is one of the most common borate minerals and is mined extensively from evaporative deposits in the southwestern United States.

Boron in soil and in surface water usually results from weathering of rocks containing borate and borosilicate minerals. Boron can also be released from volcanic or geothermal sources, and evaporation of seawater. Boron occurs naturally in ocean water at concentrations around 4.5 mg/L, and in the surface waters of North America at concentrations from 0.02 mg/L to as much as 360 mg/L in areas with borate deposits. However, typical boron surface water concentrations in North America are less than 0.1 mg/L, with 90% below 0.4 mg/L. Average boron concentrations in groundwater can be much higher as a result of leeching from borate and borosilicate minerals that are part of the local geology. (*United Nations Environment Programme, International Labour Organisation, and World Health Programme on Chemical Safety, Environmental Health*

Criteria 204: Boron available at http://www.inchem.org/documents/ehc/ehc/ehc204.htm, hereafter Environmental Health Criteria 204).

Boron Toxicity

Terrestrial Species

Boron has been recognized as an essential trace element for plant growth for decades, and while it is suspected that it may also be an essential trace element for mammals, this has not been proven. The National Research Council has, therefore, established no recommended dietary allowance for humans (National Research Council, Recommended Dietary Allowances, 10th ed. National Academy Press, Washington, DC, 1989). Boron has toxic effects in humans only at very high doses and sustained exposures. The U.S. Environmental Protection Agency has established an oral reference dose (RfD) of 0.2 mg/kg-day. The RfD is an estimated daily exposure that is unlikely to result in a significant risk of deleterious effects during a person's lifetime. The critical effect on which this RfD was calculated was decreased fetal body weight in rats (USEPA, Integrated Risk Information System, Boron and Compounds, CASRN 7440-42-8 (08/05/2004), available at http://www.epa.gov/iriswebp/iris/subst/0410.htm). The USEPA has recently release a drinking water health advisory for boron (Drinking Water Health Advisory for Boron, USEPA, Document Number: 822-R-08-013, May 2008). Health advisories describe concentrations of drinking water contaminants at which adverse health effects are not anticipated to occur over specific periods of exposure, commonly one day, ten day, long-term (depending on study duration), or lifetime. As described in the publication cited above, "HAs [Health Advisories] serve as informal

technical guidance to assist Federal, State and local officials, and managers of public or community water systems in protecting public health when emergency spills or contamination situations occur. They are not to be construed as legally enforceable Federal standards." The shorter-exposure health advisories are routinely also developed separately for children and adults. The Lifetime Health Advisory uses the RfD and was calculated as 5.4 mg/L (rounded to 5.0 mg/L). The Long-term Health Advisory for Children was the lowest advisory calculated at 1.8 mg/L (rounded to 2mg/L). It was based on a two-year study documenting testicular atrophy in rats. It should be noted that the No Observable Adverse Effect Level (NOAEL) calculated from this study was 17.5 mg of boron per kilogram of body weight per day. The much lower Health Advisory limits include an "uncertainty factor" for both interspecies and intraspecies variability, a factor of 100 in this case.

As previously mentioned, boron is an essential trace element for plant growth, but there is a relatively narrow range between essential effects and toxic effects in some sensitive species. Reduced yields of some boron sensitive crops have been observed at concentrations as low as 0.5-0.75 mg/L., while some show tolerances as high as 6.0 mg/L. (T.A. Bauder, R.M. Waskom and J. G. Davis; Irrigation Water Quality Criteria; Colorado State University Extension; Revised March 2007; available at http://www.ext.colostate.edu/pubs/crops/00506.html). Citrus crops and fruit trees are the some of the most susceptible species.

Aquatic Species

Environmental Health Criteria 204, cited above, provides a comprehensive review of the toxicological literature related to the effects of boron on a wide range of aquatic species.

A summary of tabular data provided therein follows:

Microorganisms

Aquatic microorganisms including bacteria, protozoa, and algae showed no significant growth inhibition (EC_{10} or above, i.e., 10% or more individuals exhibiting growth inhibition) below boron concentrations of 7.6 mg/L.

Aquatic Macrophytes

A study conducted by Nobel (1981, The effect of boron on submerged soft-water macrophytes. Angew Bot, 55: 501-514 (in German with English summary)) on several submerged macrophytes yielded an LC_{50} for a couple species at concentrations of boron as low as 5 mg/L. However, the authors of the study concluded that since they used an "oligotrophic calcium deficient nutritive medium" for their assays, this overestimated the toxicity of boron in harder waters. Of course submerged macrophytes are uncommon in the turbid waters found in most of Illinois.

Freshwater Invertebrates

Environmental Health Criteria 204 reports on studies covering a wide range of invertebrate groups including daphnia, tubificid worms, chironomids, mosquitos, and snails. All are relatively tolerant of high boron concentrations; the snail and crustacean species displayed the lowest LC_{50}'s at boron concentrations of 28.35 mg/L after 24-hour exposures.

Freshwater Vertebrates

Environmental Health Criteria 204 reviews studies on a wide range of fish species. Embryonic and larval fish are more susceptible to the chronic effects of boron. Environmental Health Criteria 204 summarizes the observed chronic effects on fish this

way, "On the basis of median lethal concentrations (LC_{50}), no species was found to be especially sensitive. The range of LC_{50}s for all species was 12.2-235 mg boron/litre."

The rainbow trout is routinely cited as a fish species uncharacteristically vulnerable to boron, particularly their egg and larval stages. Environmental Health Criteria 204 cites a NOEC (No Observable Effect Concentration) reported by Birge and Black (1981, Toxicity of boron to embryonic and larval stages of largemouth bass *(Micropterus salmoides)* and rainbow trout *(Salmo gairdneri)*-- Completion report, Cincinnati, Ohio, Procter & Gamble Company) for boron of .009 to .103 mg/L for rainbow trout. However, this report is not consistent with another paper cited (Bingham, 1982, The boron concentration of wild trout streams in California, Riverside, California, University of California, Department of Soil Science (Unpublished document)) which identifies California surface waters supporting viable populations of wild rainbow trout with boron concentrations ranging from <0.01 to 13.1 mg/L. They also cite a follow-up study to the Bingham report (EA Engineering, Science, and Technology, 1994, Boron concentrations and rainbow trout populations in seven states in the western United States. Corvallis, Oregon (Unpublished report prepared for the Procter & Gamble Company, Cincinnati)) that surveyed 37 western fisheries biologists who reported no instances where rainbow trout populations were limited by boron, and identified several locations supporting reproducing populations of trout with boron concentrations near or above 1 mg/L, including the East and Paulina lakes in Oregon (>0.9 mg/L), Firehole River in Wyoming (>0.9 mg /L), Napa River in California (>1.2 mg/L), and Little Warm Springs in California (>3.2 mg/L).

This apparent contradiction may be explained by another study discussed in Environmental Health Criteria 204, which used natural source dilution waters in experiments on embryonic fish as opposed to reconstituted water. The referenced study suggests that laboratory toxicity testing may overestimate the toxicity of boron in natural waters, (perhaps providing an added margin of safety in water quality guidelines). Of course there are no trout populations in the Illinois waters for which the adjusted standard is being requested.

Finally, boron toxicity studies on the eggs and larvae of leopard frogs and Fowler's toads are reviewed. The larvae of the leopard frog is most susceptible to boron with chronic LC_{50}'s for boron of 47 mg/L reported for 7.5 day exposures in relatively soft water (hardness of 50 mg/L $CaCo_3$).

Water Quality Standards for Boron

The U.S. Environmental Protection Agency does not recommend the establishment of any water quality standards for boron, not even a drinking water standard (See National Recommended Water Quality Criteria, USEPA Office of Water, Office of Science and Technology 2006 (4304T)). In guidelines they do recommend a standard of .75 mg/L for long-term irrigation of sensitive crops and USEAP has issued a Drinking Water Health Advisory for Boron as discussed in detail above. Of all the states surrounding Illinois, only Missouri has water quality standards for boron. Missouri has established a Drinking Water Standard of 2.0 mg/L and an Irrigation Standard of 2.0 mg/L. They have adopted no standard to protect aquatic flora or fauna. Illinois apparently adopted a General Water Quality Standard for boron of 1.0 mg/L in 1978 and has never updated it.

Potential Effects on Aquatic Life

Since little mixing is available in the streams receiving effluent from the Galva sewage treatment facilities, it is probably reasonable in this case to apply the General Water Quality Standard for boron as an Effluent Standard. However, the current scientific literature suggests that the Illinois General Water Quality Standard for boron of 1.0 mg/L is over-protective of aquatic life.

Respectfully submitted:

CITY OF GALVA
Petitioner,

By: /s/ Claire A. Manning
One of its Attorneys

Dated: October 17, 2008

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BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PROPOSED SITE SPECIFIC RULE	)	R08-_____
APPLICABLE TO THE CITY OF GALVA	)	(Site Specific Rulemaking – Water)
SEWAGE TREATMENT PLANTS	)	
DISCHARGE TO EDWARDS RIVER	)	
AND MUD RUN CREEK	)	
35 ILL. ADM. CODE 302.208(g)	)	

MOTION FOR EXPEDITED REVIEW

NOW COMES the City of Galva ("Galva"), by and through its attorneys Brown, Hay & Stephens, LLP, and pursuant to 35 Ill. Adm. Code 101.512, hereby request the Illinois Pollution Control Board ("Board") to expedite review of Galva's Petition for Site Specific Rule ("Petition"). In support of this Motion for Expedited Review ("Motion"), Petitioner state as follows:

1. As set forth more fully in the Petition, filed simultaneously with this Motion, Galva seeks a Site Specific Rule to apply to Galva's effluent discharge with respect to boron distinct from the 1.0 mg/L water quality standard for boron found at 35 Ill. Adm. Code 302.208(g). The proposed Site Specific Rule would constitute an alternative water quality standard applicable to the effluent discharge of boron from Galva's two Sewage Treatment Plants ("STPs").

2. Boron is an element found naturally in Galva's Municipal Water Supply, supplied by two wells.

3. Galva's Municipal Water Supply ultimately feeds into Galva's two STPs, the Northeast and Southwest STPs, which discharge into an unnamed tributary of the South Branch of the Edwards River and Walnut Creek, respectively.

4. The Southwest STP NPDES Permit No. IL0023647 was amended, effective August 4, 2004, to require sampling for boron, effective September 1, 2007, and that its effluent meet a boron limitation of 1.0 mg/L.

5. Galva has been consulting with staff of the Illinois Environmental Protection Agency ("IEPA") throughout the development of this Petition and seeks to have the proposed Site Specific Rule adopted as soon as possible because it is necessary to enable Galva to achieve compliance with its NPDES Permit.

6. Galva requests that the Board send the proposed Site Specific Rule to First Notice, at its earliest opportunity, without a decision being reached on the merits of the proposal. Such Board action is appropriate in this context and is consistent with Board action in similar site specific requests. *See In the Matter of: Proposed Site Specific Rule for City of Springfield*, R09-08, Board Order, September 16, 2008 (a similar petition regarding boron currently pending before the Board and scheduled for hearing on November 3, 2008) and *In the Matter of: Revisions to Water Quality Standards for Total Dissolved Solids in the Lower Des Plaines River ExxonMobil Oil Corporation*, R06-24 (2006).

7. Galva also requests that the Board schedule this matter for hearing as soon as practicable pursuant to Section 28(a) of the Environmental Protection Act, 415 ILCS 5/28(a), and Section 5-40(b) of the Illinois Administrative Procedures Act, 5 ILCS 100/5-40(b).

8. Galva believes that this Petition presents all information necessary for the Board to make an informed decision to publish the proposed rule pursuant to the First Notice provisions of the Illinois Administrative Procedures Act, 5 ILCS 100/5-40(b), and is fully prepared to expeditiously respond to any requests or questions from the Board.

9. As the City of Springfield currently has a similar Petition pending before the Board, which the Board recently accepted for expedited review and sent to First Notice, it would alleviate the burden on the Board to review both Petitions at the same time, and would promote the interests of judicial economy. *See In the Matter of: Proposed Site Specific Rule for City of Springfield*, R09-08, Board Order, September 16, 2008.

10. Galva will be prejudiced if this Motion is denied because it continues to be subject to enforcement for failure to meet its NPDES effluent standard for boron despite any realistic environmental rationale for such standard.

11. This Motion is accompanied by an Affidavit attesting that the facts herein are true. *See* 35 Ill. Adm. Code 101.512(a).

WHEREFORE, for the above-cited reasons, Petitioner, CITY OF GALVA, respectfully requests that the Illinois Pollution Control Board grant this Motion for Expedited Review, accept this matter for publication as First Notice and schedule a hearing as soon as practicable.

Respectfully submitted,

CITY OF GALVA
Petitioner,

By: /s/ Claire A. Manning
One of its Attorneys

Dated: October 17, 2008

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AFFIDAVIT

State of Illinois)
) SS.
County of Henry)

I, David L. Dyer, being first duly sworn on oath, affirms that, based upon appropriate inquiry, the facts set forth in the Motion for Expedited Review above are true and correct.

David L. Dyer
City Administrator
City of Galva
210 Front Street
Galva, Illinois 61434
(309) 932-2555

Subscribed and sworn to before me
this 2 day of October, 2008.

Teresa R. Byers
Notary Public

OFFICIAL SEAL
TERESA R. BYERS
NOTARY PUBLIC - STATE OF ILLINOIS
MY COMMISSION EXPIRES 8-17-2009