# EXHIBIT 11

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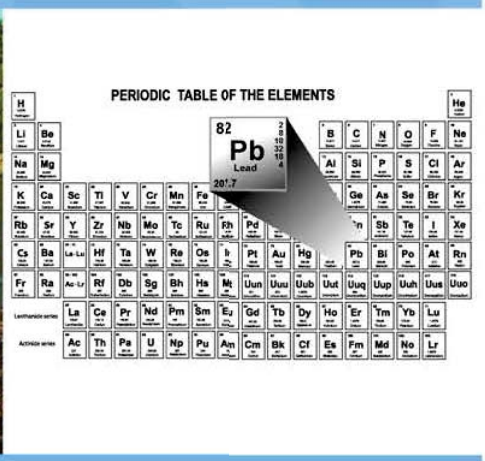
United States Environmental Protection Agency

# Integrated Science Assessment for Lead

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Office of Research and Development
National Center for Environmental Assessment, Research Triangle Park, NC

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# Integrated Science Assessment for Lead

National Center for Environmental Assessment-RTP Division
Office of Research and Development
U.S. Environmental Protection Agency
Research Triangle Park, NC

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**Table ES-1 Summary of causal determinations for the relationship between exposure to Pb and health effects.**

| Health Outcome | Causality Determination[a] (Table with Key Evidence) |
|---|---|
| **Nervous System Effects** (Section 1.6.1) | |
| **Children – Nervous System Effects** (Section 1.6.1.1) | |
| Cognitive Function Decrements | Causal Relationship (Table 4-17) |
| Clear evidence of cognitive function decrements (as measured by Full Scale IQ, academic performance, and executive function) in young children (4 to 11 years old) with mean or group blood Pb levels measured at various lifestages and time periods between 2 and 8 µg/dL. Clear support from animal toxicological studies that demonstrate decrements in learning, memory, and executive function with dietary exposures resulting in relevant blood Pb levels of 10-25 µg/dL. Plausible MOAs are demonstrated. | |
| Externalizing Behaviors: Attention, Impulsivity and Hyperactivity[b,d, e] | Causal Relationship (Table 4-17) |
| Clear evidence of attention decrements, impulsivity and hyperactivity (assessed using objective neuropsychological tests and parent and teacher ratings) in children 7-17 years and young adults ages 19-20 years. The strongest evidence for blood Pb-associated increases in these behaviors was found in prospective studies examining prenatal (maternal or cord), age 3-60 months, age 6 years, or lifetime average (to age 11-13 years) mean blood Pb levels of 7 to 14 µg/dL and groups with early childhood (age 30 months) blood Pb levels >10 µg/dL. Biological plausibility is provided by animal toxicological studies demonstrating impulsivity or impaired response inhibition with relevant prenatal, lactational, post-lactational and lifetime Pb exposures. Plausible MOAs are demonstrated. | |
| Externalizing Behaviors: Conduct Disorders in Children and Young Adults[c, d] | Likely Causal Relationship (Table 4-17) |
| Prospective epidemiologic studies find that early childhood (age 30 months, 6 years) or lifetime average (to age 11-13 years) blood Pb levels or tooth Pb levels (from ages 6-8 years) are associated with criminal offenses in young adults ages 19-24 years and with higher parent and teacher ratings of behaviors related to conduct disorders in children ages 8-17 years. Pb-associated increases in conduct disorders were found in populations with mean blood Pb levels 7 to14 µg/dL; associations with lower blood Pb levels as observed in cross-sectional studies were likely to be influenced by higher earlier Pb exposures. There is coherence in epidemiologic findings among related measures of conduct disorders. Evidence of Pb induced aggression in animals was mixed, with increases in aggression found in some studies of adult animals with gestational plus lifetime Pb exposure but not juvenile animals. The lack of clear biological plausibility produces some uncertainty. | |
| Internalizing Behaviors | Likely Causal Relationship (Table 4-17) |
| Prospective epidemiologic studies find associations of higher lifetime average blood (mean: ~14 µg/dL) or childhood tooth (from ages 6-8 years) Pb levels with higher parent and teacher ratings of internalizing behaviors such as symptoms of depression or anxiety, and withdrawn behavior in children ages 8-13 years. Consideration of potential confounding by parental caregiving was not consistent and findings from cross-sectional studies in populations ages 5 and 7 years with mean blood Pb levels of 5 µg/dL were mixed. Animal toxicological studies demonstrate depression-like behaviors and increases in emotionality with relevant lactational exposures. Plausible MOAs are demonstrated. | |
| Auditory Function Decrements | Likely Causal Relationship (Table 4-17) |
| A prospective epidemiologic study and large cross-sectional studies indicate associations between blood Pb levels and increased hearing thresholds at ages 4-19 years. Across studies, associations were found with blood Pb levels measured at various time periods, including prenatal maternal, neonatal (10 day, mean 4.8 µg/dL), lifetime average, and concurrent (ages 4-19 years) blood Pb levels (median 8 µg/dL). Plausible MOAs are demonstrated. The lack of biological plausibility in animals with relevant exposures produces some uncertainty. | |

**Table ES-1 (Continued): Summary of causal determinations for the relationship between exposure to Pb and health effects.**

| Health Outcome | Causality Determination[a] (Table with Key Evidence) |
|---|---|
| Visual Function Decrements | Inadequate to Infer a Causal Relationship (Table 4-17) |
| The available epidemiologic and toxicological evidence is of insufficient, quantity, quality and consistency. | |
| Motor Function Decrements | Likely Causal Relationship (Table 4-17) |
| Prospective epidemiologic studies provide evidence of associations of fine and gross motor function decrements in children ages 4-17 years with lifetime average blood Pb levels and with blood Pb levels measured at various time periods with means generally ranging from 4.8 to 12 µg/dL. Results were inconsistent in cross sectional studies with concurrent blood Pb level means 2-5 µg/dL. Limited evidence in animal toxicological studies with relevant Pb exposures. | |
| **Adults – Nervous System Effects** (Section 1.6.1.2) | |
| Cognitive Function Decrements | Likely Causal Relationship (Table 4-17) |
| Prospective studies indicate associations of higher baseline bone Pb levels with declines in cognitive function (executive function, visuospatial skills, learning and memory) in adults (>age 50 years) over 2- to 4-year periods. Cross-sectional studies provide additional support. Uncertainties remain regarding the timing, frequency, duration and level of the Pb exposures contributing to the effects observed and residual confounding by age. Biological plausibility is provided by findings that relevant lifetime Pb exposures from gestation, birth, or after weaning induce learning impairments in adult animals and by evidence demonstrating plausible MOAs. | |
| Psychopathological Effects | Likely Causal Relationship (Table 4-17) |
| Cross-sectional studies in a few populations demonstrate associations of higher concurrent blood or tibia Pb levels with self-reported symptoms of depression and anxiety in adults. Uncertainties remain regarding the timing, frequency, duration and level of Pb exposures contributing to the observed associations and residual confounding by age. Observations of depression-like behavior in animals with dietary lactational Pb exposure, with some evidence at relevant blood Pb levels, and evidence demonstrating plausible MOAs in experimental animals provides support. | |
| Auditory Function Decrements | Suggestive of a Causal Relationship (Table 4-17) |
| A high-quality prospective epidemiologic study finds associations of higher tibia Pb level with a greater rate of elevations in hearing threshold over 20 years. Some evidence indicates effects on relevant MOAs but important uncertainties remain related to effects on auditory function in animals with relevant Pb exposures. | |
| Visual Function Decrements | Inadequate to Infer a Causal Relationship (Table 4-17) |
| The available epidemiologic and toxicological evidence is of insufficient, quantity, quality and consistency. | |
| Neurodegenerative Diseases | Inadequate to Infer a Causal Relationship (Table 4-17) |
| The available epidemiologic and toxicological evidence is of insufficient, quantity, quality and consistency. | |
| **Cardiovascular Effects** (Section 1.6.2) | |
| Hypertension | Causal Relationship (Table 4-24) |
| Prospective epidemiologic studies with adjustment for multiple potential confounders consistently find associations of blood and bone Pb levels with hypertension incidence and increased blood pressure (BP) in adults. Cross-sectional studies provide supporting evidence. Meta-analyses underscore the consistency and reproducibility of the Pb associated increase in blood pressure and hypertension (a doubling of concurrent blood Pb level (between 1 and 40 µg/dL) is associated with a 1 mmHg increase in systolic BP); however, uncertainties remain regarding the timing, frequency, duration and level of Pb exposures contributing to the effects observed in epidemiologic studies. Experimental animal studies demonstrate effects on BP after long-term Pb exposure resulting in mean blood Pb levels of 10 µg/dL or greater. Plausible MOAs are demonstrated. | |
| Subclinical Atherosclerosis | Suggestive of a Causal Relationship (Table 4-24) |
| Cross-sectional analyses of NHANES data find associations of blood Pb level with peripheral artery disease (PAD) in adults. Animal toxicological evidence is limited to studies of MOA (oxidative stress, inflammation, endothelial cell dysfunction) that demonstrate biologically plausible mechanisms through which Pb exposure may initiate atherosclerotic vessel disease. | |

**Table ES-1 (Continued): Summary of causal determinations for the relationship between exposure to Pb and health effects.**

| Health Outcome | Causality Determination[a] (Table with Key Evidence) |
|---|---|
| Coronary Heart Disease | Causal Relationship (Table 4-24) |
| Prospective epidemiologic studies consistently find associations of Pb biomarkers with cardiovascular mortality and morbidity, specifically myocardial infarction (MI), ischemic heart disease (IHD), or HRV; however, uncertainties remain regarding the timing, frequency, duration and level of Pb exposures contributing to the effects observed in epidemiologic studies. Thrombus formation was observed in animals after relevant long term exposure and MOAs (hypertension, decreased HRV, increased corrected QT (QTc) interval, and corrected QRS complex (QRSc) duration in electrocardiogram [ECG]) are demonstrated in humans and animals. | |
| Cerebrovascular Disease | Inadequate to Infer a Causal Relationship (Table 4-24) |
| The available epidemiologic and toxicological evidence is of insufficient, quantity, quality, and/or consistency. Plausible MOAs, which are shared with hypertension and atherosclerosis, are demonstrated. | |
| **Renal Effects** (Section 1.6.3) | |
| Reduced Kidney Function | Suggestive of a Causal Relationship (Table 4-31) |
| Multiple high quality epidemiologic studies provide evidence that Pb exposure is associated with reduced kidney function; however, uncertainty remains regarding the potential for reverse causality to explain findings in humans. Further, inconsistencies and limitations in occupational studies, epidemiologic studies of children and clinical trials of chelation of CKD patient preclude strong inferences to be drawn based on their results. Although longitudinal studies found Pb-associated decrements in renal function in populations with mean blood Pb levels of 7 and 9 µg/dL, the contributions of higher past Pb exposures cannot be excluded. Animal toxicological studies demonstrate Pb-induced kidney dysfunction at blood Pb levels greater than 30 µg/dL; however, evidence in animals with blood Pb levels < 20 µg/dL is generally not available. At blood Pb levels between 20 and 30 µg/dL studies provide some evidence for dysfunction in kidney function measures (e.g., decreased creatinine clearance, increased serum creatinine, increased BUN). Plausible MOAs (Pb induced hypertension, renal oxidative stress and inflammation, morphological changes, and increased uric acid) are demonstrated. | |
| **Immune System Effects** (Section 1.6.4) | |
| Atopic and Inflammatory Responses | Likely Causal Relationship (Table 4-34) |
| Prospective studies of children ages 1-5 years indicate associations of prenatal cord and childhood blood Pb levels with asthma and allergy. This evidence is supported by cross-sectional associations between higher concurrent blood Pb levels (>10 µg/dL) in children and higher IgE. Uncertainties related to potential confounding by SES, smoking or allergen exposure are reduced through consideration of the evidence from experimental animal studies. The biological plausibility for the effects of Pb on IgE is provided by consistent findings in animals with gestational or gestational-lactational Pb exposures, with some evidence at blood Pb levels relevant to humans. Strong evidence of Pb-induced increases in Th2 cytokine production and inflammation in animals demonstrates MOA. | |
| Decreased Host Resistance | Likely Causal Relationship (Table 4-34) |
| Animal toxicological studies provide the majority of the evidence for Pb-induced decreased host resistance. Dietary Pb exposure producing relevant blood Pb levels (7-25 µg/dL) results in increased susceptibility to bacterial infection and suppressed delayed type hypersensitivity. Further, evidence demonstrating plausible MOA, including suppressed production of Th1 cytokines and decreased macrophage function in animals, provides coherence. | |
| Autoimmunity | Inadequate to Infer a Causal Relationship (Table 4-34) |
| The available toxicological and epidemiologic studies do not sufficiently inform Pb-induced generation of auto-antibodies with relevant Pb exposures. | |

**Table ES-1 (Continued): Summary of causal determinations for the relationship between exposure to Pb and health effects.**

| Health Outcome | Causality Determination[a] (Table with Key Evidence) |
|---|---|
| **Hematologic Effects** (Section 1.6.5) | |
| Decreased Red Blood Cell (RBC) Survival and Function | Causal Relationship (Table 4-35) |
| Animal toxicological studies demonstrate that exposures resulting in blood Pb levels relevant to humans (2-7 µg/dL) alter several hematological parameters (Hemoglobin [Hb], Hematocrit [Hct], and mean corpuscular volume [MCV]),increase measures of oxidative stress and increase cytotoxicity in red blood cell (RBC) precursor cells. Limited body of epidemiologic studies provides additional support for the association of Pb exposure with these endpoints. Plausible MOAs are demonstrated in experimental animals. | |
| Altered Heme Synthesis | Causal Relationship (Table 4-35) |
| Consistent findings from studies in experimental adult animal studies report that relevant exposures (e.g. blood Pb levels of 6.5 µg/dL) cause decreased ALAD and ferrochelatase activities. Additional support is garnered from a larger body of ecotoxicological studies demonstrating decreased ALAD activity across a wide range of species and a limited body of epidemiologic studies. Plausible MOAs are demonstrated in experimental animals. | |
| **Reproductive and Developmental Effects** (Section 1.6.6) | |
| Development | Causal Relationship (Table 4-48) |
| Multiple cross-sectional epidemiologic studies report associations between concurrent blood Pb levels and delayed pubertal onset for girls (6-18 years) and boys (8-15 years). These associations are consistently observed in populations with concurrent blood Pb levels 1.2-9.5 µg/dL. Few studies consider confounding by nutrition. Uncertainties remain regarding the timing, frequency, duration and level of Pb exposures contributing to the effects observed in epidemiologic studies of older children. Experimental animal studies demonstrate delayed onset of puberty in female pups with blood Pb levels of 1.3-13 µg/dL and delayed male sexual maturity at blood Pb levels of 34 µg/dL. | |
| Birth Outcomes (e.g., low birth weight, spontaneous abortion) | Suggestive of Causal Relationship (Table 4-48) |
| Some well-conducted epidemiologic studies report associations of maternal Pb biomarkers or cord blood Pb with preterm birth and low birth weight/fetal growth; however, the epidemiologic evidence is inconsistent overall and findings from experimental animal studies are mixed. | |
| Male Reproductive Function | Causal Relationship (Table 4-48) |
| Key evidence is provided by toxicological studies in rodents, non-human primates, and rabbits showing detrimental effects on semen quality, sperm and fecundity/fertility with supporting evidence in epidemiologic studies. Toxicological studies with relevant Pb exposure routes leading to blood Pb concentrations ranging from 5-43 µg/dL reported effects on sperm quality and sperm production rate, sperm DNA damage, and histological or ultrastructural damage to the male reproductive organs. Consistent associations in studies of occupational populations with concurrent blood Pb levels of 25 µg/dL and greater, report detrimental effects of Pb on sperm; however, uncertainties remain regarding the timing, frequency, duration and level of Pb exposures contributing to the effects observed in epidemiologic studies. | |
| Female Reproductive Function | Suggestive of Causal Relationship (Table 4-48) |
| Although findings are mixed overall, the body of evidence include some high-quality epidemiologic and toxicological studies, suggesting that Pb may affect some aspects of female reproductive function (hormone level, placental pathology). | |

**Table ES-1 (Continued): Summary of causal determinations for the relationship between exposure to Pb and health effects.**

| Health Outcome | Causality Determination[a] (Table with Key Evidence) |
|---|---|
| **Cancer** (Section 1.6.7) | |
| Cancer | Likely Causal Relationship (Table 4-50) |
| The animal toxicological literature provides the strong evidence for long-term exposure (i.e., 18 months or 2 years) to high concentrations of Pb (> 2,600 ppm) inducing tumor development; findings from epidemiologic studies inconsistent. Plausible MOAs are demonstrated. | |

[a] In drawing conclusions regarding the causal relationship between Pb exposure and human health effects, evidence in the range of relevant pollutant exposures or biomarker levels was considered. Specifically, population-based epidemiology studies were emphasized with the recognition that many of the U.S populations studied included individuals with higher past than recent Pb exposures. Evidence from toxicological studies of effects observed in experimental animals at biomarker levels (e.g. blood Pb) comparable to those currently experienced by the U.S. general population were emphasized. Generally, studies with dietary exposures resulting in blood Pb levels within one order of magnitude above the upper end of the distribution of U.S. blood Pb levels were considered in forming concusions, with the majority of studies reporting blood Pb levels below 30 µg/dL. Studies with higher blood Pb levels were considered if they informed the evaluation of MOA, mechanisms, or kinetics. (Preamble, Section 1.1).

[b] Within the attention deficit hyperactivity disorder domain of externalizing behaviors, studies of Pb exposure have focused primarily on attention, impulsivity, and hyperactivity. Because the studies of ADHD were limited in terms of their design and did not adequately consider potential confounding by factors such as SES, parental education, or parental caregiving quality, they were not a major consideration in drawing conclusions about the relationship between Pb exposure and attention, impulsivity, and hyperactivity.

[c] Two domains of conduct disorders,(i.e., undersocialized aggressive conduct disorder and socialized aggressive conduct disorder), are combined for the purpose of this assessment because it is difficult to differentiate between these two domains in the available epidemiologic studies, which examine multiple endpoints such as delinquent behavior, aggression, antisocial behavior. Criminal offenses are included in the evaluation because they can be predicted by earlier conduct disorders (Section 4.3.3.2).

[d] There was limited evaluation of potential confounding by parental psychopathology, which is a strong risk factor for externalizing behaviors, in the majority of the epidemiologic studies; however, evidence of an association of between psychopathology in parents and Pb exposure in their children is not available (Section 4.3.3).

[e] Strong evidence from experimental animal studies reduces uncertainty related to confounding generally.

### Effects of Pb Exposure in Children

Multiple epidemiologic studies conducted in diverse populations of children consistently demonstrate the harmful effects of Pb exposure on cognitive function (as measured by IQ decrements, decreased academic performance and poorer performance on tests of executive function). Blood Pb-associated effects on cognitive function were found in populations of children (ages 4-10) with mean or group blood Pb levels measured concurrently or earlier in the range of 2-8 µg/dL[1]. Evidence suggests that some Pb-related cognitive effects may be irreversible and that the neurodevelopmental effects of Pb exposure may persist into adulthood (Section 1.9.4). Epidemiologic studies also demonstrate that Pb exposure is associated with decreased attention, and increased impulsivity and hyperactivity in children (externalizing behaviors). This is supported by findings in animal studies demonstrating both analogous effects and biological plausibility at relevant exposure levels. Pb exposure can also exert harmful effects on blood cells and blood producing organs, and is likely to cause an increased risk of symptoms of depression and anxiety and withdrawn behavior (internalizing behaviors),

[1] The age range and blood Pb levels are based on studies described in detail in Section 4.3.2.

decreases in auditory and motor function, asthma and allergy, as well as conduct disorders in children and young adults. There is some uncertainty about the Pb exposures contributing to the effects and blood Pb levels observed in epidemiologic studies; however, these uncertainties are greater in studies of older children and adults than in studies of young children (Section 1.9.5). Despite these uncertainties, it is clear that Pb exposure in childhood presents a risk; further, there is no evidence of a threshold below which there are no harmful effects on cognition from Pb exposure.

### Effects of Pb Exposure in Adults

A large body of evidence from both epidemiologic studies of adults and experimental studies in animals demonstrates the effect of long-term Pb exposure on increased blood pressure (BP) and hypertension (Section 1.6.2). In addition to its effect on BP, Pb exposure can also lead to coronary heart disease and death from cardiovascular causes and is associated with cognitive function decrements, symptoms of depression and anxiety, and immune effects in adult humans. The extent to which the effects of Pb on the cardiovascular system are reversible is not well-characterized. Additionally, the frequency, timing, level, and duration of Pb exposure causing the effects observed in adults has not been pinpointed, and higher past exposures may contribute to the development of health effects measured later in life. It is clear however, that Pb exposure can result in harm to the cardiovascular system that is evident in adulthood and may also affect a broad array of organ systems.

## Ecological Effects of Pb

Ecological effects of Pb are summarized for terrestrial, freshwater and saltwater ecosystems, and the ISA discusses endpoints common to plants, invertebrates and vertebrates along with considerations of uncertainties in relating atmospheric Pb concentrations to ecosystem effects. Effects of Pb in ecosystems are primarily associated with Pb deposition onto soil and water, subsequent transport, and exposure through environmental media (soil, water, sediment, biota). The 2006 Pb Air Quality Criteria Document (AQCD) (U.S. EPA, 2006b) and previous EPA assessments reported effects of Pb exposure on both terrestrial and aquatic organisms that included reduced survival, reproduction and growth as well as effects on behavior, development, and heme production. Studies reviewed in this ISA generally support the ecological findings of previous Pb assessments with some effects observed in additional species and at lower concentrations. Reproduction, growth, and survival are endpoints commonly used in ecological risk assessment because they can lead to effects at the population, community,

# EXHIBIT 12

Resolution: 130165.2

Presented: 3-11-13

Adopted: 3-25-13

**AMENDED RESOLUTION TO PURCHASE CAPACITY FROM KAREGNONDI WATER AUTHORITY**

**BY THE MAYOR:**

The Karegnondi Water Authority (KWA) is a governmental consortium of cities and counties in southeastern Michigan that was created to build a water pipeline that will provide water from Lake Huron to interested communities in Sanilac, Lapeer, and Genesee counties. The incorporating bodies that created the KWA are Sanilac County, Lapeer County, Genesee County, the City of Flint, and the City of Lapeer.

The City of Flint is currently in a year to year contract with the City of Detroit for the purchase of water. A study was conducted that projected that staying with Detroit will cost the region $2.1 billion over the next 25 years. In contrast, if the region builds its own pipeline, the projected costs are $1.9 billion over the same period. After the initial 25 year period, the projected costs would be less then 25% of the projected water costs from Detroit.

In order to build the pipeline, the KWA needs commitment from its members regarding the capacity that each member will purchase in the pipeline. The KWA is allowed to withdraw 85 million gallons of water per day. Capacity is available to members in increments of 1 million gallons per day known as units. For each unit of capacity that a member purchases, the buyer shall pay to the KWA a one time fee of $32,300.00. Additionally, the buyer shall pay to the KWA not less then $32,300.00 per unit per year until such time as water is made available to the buyer. After water is made available, the buyer shall pay to the KWA an estimated amount not to exceed $355,300.00 per unit per year until such time that the bonds are paid in full. If it is determined that the costs per unit will exceed $355,300.00 the buyer has a right to cancel the contract.

The purchase of capacity along with the payment of other costs necessary to operate the pipeline gives the member a right to water for sale to its customers. The buyer has a right to resell capacity and water rights. Each party entering into a capacity contract shall also be entitled to appoint additional board members equal to the party's percentage share of the total capacity under contract.

The City of Flint has decided that it is in its long term best interests to enter into a contract with the KWA to purchase SIXTEEN (16) units of capacity, plus TWO (2) units from the Flint River.

**IT IS RESOLVED** that City officials are authorized to enter into a contract with KWA to purchase SIXTEEN (16) units of capacity, plus TWO (2) units from the Flint River.

**IT IS FURTHER RESOLVED** that the City Administrator is authorized to provide KWA information needed to administer the contract and, with approval of the Chief Legal Officer, to make minor (non-material) modifications to the contract.

APPROVED AS TO FORM:

Peter M. Bade
Chief Legal Officer

APPROVED AS TO FINANCE:

Gerald Ambrose
Finance Director

APPROVED BY MAYOR:

Dayne Walling
Mayor

APPROVED BY CITY COUNCIL
ON: March 25, 2013

Inez Brown
Clerk, City of Flint

APPROVED BY
CITY COUNCIL
MAR 25 2013

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# EXHIBIT 13

Michigan

# With just 17 miles to go, KWA pipeline work might not stop for mild winter

By **Ron Fonger | rfonger1@mlive.com**
on January 05, 2016 at 5:06 AM, updated January 05, 2016 at 9:30 AM

*(This story has been updated to correct the target completion date for the KWA pipeline.)*

GENESEE COUNTY, MI — Five contractors and about 1,200 workers are taking advantage of a mild winter as they push to build the last 17 miles of the **Karegnondi Water Authority pipeline** to Lake Huron. It's possible they won't be stopped by the weather until the job is complete.

Genesee County Drain Commissioner Jeff Wright said the goal for the pipeline to reach Flint remains June, but is weather-dependent. He said the project is on budget, estimated to cost $285 million, including $24 million in built-in, mostly unspent, contingencies.

Flint officials have been anxious to see the pipeline completed on time because it continues to buy water from the Detroit water system and that funding will run out at about the same time.

"We all need to work together," Wright said. "You can't just be the city of Flint or Genesee County anymore."

The KWA is a partnership that includes both the city and the county, formed to build the massive public works project and cut Detroit from its role as the broker of water for the region.

Using spiral weld steel pipe, manufactured in 50-foot sections, crews are burying the 66-inch-diameter pipeline on a path that starts with an intake at Lake Huron and snakes west, running parallel to the existing pipeline owned by the Detroit water system.

Among the 17 miles still under construction: From Fargo to Bricker roads on Fisher Road in Sanilac County; from Shephard to Maple Valley roads on Fisher Road in Sanilac County; and Norway Lake, Klam and Stanley roads — from M-24 to German Road — in Lapeer County.

While the county has continued to buy Detroit water as the pipeline is built, Flint's decision to join the KWA led to its failed attempt to make the Flint River the city's water source in the interim.

The city had problems from the start treating river water, finally pulling the plug on the effort after studies showed lead was leaching into the water supply because of the corrosiveness of the water and improper treatment.

With Lake Huron water and a solid treatment plant, Wright said Flint will be in a better position to process KWA water than it was dealing with the river. Treating river water is difficult because it has broad temperature variations and relatively high turbidity.

Among other developments with the project, the drain commissioner said:

- A $71 million county water treatment plant is about 75 percent complete and could be ready to begin test treatment of water by June.

  "We're going to run it for several weeks if not a month or so" before sending KWA water to customers, he said.

- Although only Flint and Genesee County are current full partners in KWA, Imlay City and Lapeer continue to show interest.
- Genesee County and Flint have the potential to have some of the lowest water rates in all the Midwest, making the area attractive to businesses, but Flint's lead-in-water problems will have to be overcome or it may hurt the area's future job growth.
- The county will have a 120 million-gallon storage reservoir in Lapeer County.

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**Ad Choices**

# EXHIBIT 14

# Karegnondi
# Water Authority®

## BYLAWS

**Originally Adopted: October 26, 2010**
**As Modified By KWA Resolution No. 2013-07 on September 23, 2013**

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## SECTION I – DEFINITIONS

**Section 1.1** **Act.** The Act shall be defined as Act 233, Public Acts of Michigan, 1955, as amended, MCL § 124.281 *et seq*.

**Section 1.2** **Articles of Incorporation.** The Articles of Incorporation shall be defined as the Articles of Incorporation of Karegnondi Water Authority, as amended.

**Section 1.3** **Authority.** The Authority is defined as the Karegnondi Water Authority.

**Section 1.4** **Authority Board.** The Authority Board is defined as the Board as set forth in Article VII of the Articles of Incorporation, MCL § 141.421 *et seq*.

**Section 1.5** **City of Flint or Flint.** The City of Flint is defined as the City of Flint, Genesee County, Michigan.

**Section 1.6** **City of Lapeer.** The City of Lapeer is defined as the City of Lapeer, Lapeer County, Michigan.

**Section 1.7** **Constituent Municipality.** A Constituent Municipality means a Constituent municipality as defined by Section 1(b) of the Act.

**Section 1.8** **County of Genesee or Genesee.** The County of Genesee is defined as the County of Genesee, Michigan.

**Section 1.9** **County of Lapeer.** The County of Lapeer is defined as the County of Lapeer, Michigan.

**Section 1.10** **County of Sanilac or Sanilac.** The County of Sanilac is defined as the County of Sanilac, Michigan.

**Section 1.11** **Good Standing.** Good Standing is defined as a municipality that has no outstanding debts or obligations to the Authority more than thirty (30) days delinquent.

**Section 1.12** **Incorporating Board.** The Incorporating Board is defined as the Incorporating Board as set forth in Article VII of the Articles of Incorporation.

**Section 1.13** **Incorporators.** Incorporators is defined as the Incorporating Municipalities as set forth in Article II of the Articles of Incorporation.

**Section 1.14** **Majority Vote.** A Majority Vote is defined as a vote of a majority of a quorum of the Authority Board present and voting.

**Section 1.15** **Malfeasance.** Malfeasance is defined as a wrongful act which the actor has no legal right to do, or any wrongful conduct which affects, interrupts, or interferes with performance of official duty, or an act for which there is no authority or warrant of law or which a person ought not to do at all, or the unjust performance of some act, which party performing it has no right, or has contracted not, to do.

**Section 1.16** **Misfeasance.** Misfeasance is defined as the improper doing of an act which an individual is required to do.

**Section 1.17** **Nonfeasance.** Nonfeasance is defined as the omission of an act which a person is obligated or has the responsibility to perform, or the omission to perform a required duty at all, or the total neglect of duty.

**Section 1. 18** **Resolution.** A Resolution is defined as a written document or an oral motion that is acted upon and approved by a Majority Vote of the Authority Board.

**Section 1.19** **Vacancy.** A Vacancy is defined as an officer of the Board that is permanently unable to fulfill their duties or resigns during the term in which they are serving. A Vacancy for temporary absence or disability shall be filled as set forth in Article VIII of the Articles of Incorporation.

## SECTION II – DUTIES

In addition to the duties explicit in the statement of purpose set forth in ARTICLE III of the Articles of Incorporation, the Authority's duties shall include, but not be limited to, the following:

**Section 2.1** To operate, administer, manage and maintain a water supply system, or any other system permitted by the Act, in conjunction with the Counties of Lapeer, Genesee, and Sanilac, the Cities of Lapeer and Flint, and any other municipalities or agencies that have entered into a capacity contract with the Authority.

**Section 2.2** To cause a water supply system, or any other system permitted by the Act, to be planned and instituted that will adequately and efficiently serve the residents of Genesee, Sanilac, and Lapeer Counties, the Cities of Lapeer and Flint and any other municipalities or agencies that have entered into a capacity contract with the Authority.

**Section 2.3** To hire and maintain employees, contractors, and other professionals as necessary to fulfill the purposes of the Authority.

**Section 2.4** To engage in any other necessary and attendant involvement, including planning, construction, or other functions necessary to maintain continuing water supply system, or any other system permitted by the Act, to the Counties of Lapeer, Genesee, and Sanilac, the Cities of Lapeer and Flint, or any other municipalities or agencies that have entered into a capacity contract with the Authority.

**Section 2.5** Any other purpose that the Authority Board determines is consistent with the intent of the Act.

## SECTION III – COMMITTEES

The committees of the Authority shall be created by Resolution of the Authority upon the recommendation of the Chair of the Board. The Authority Board shall appoint such committees as may be deemed necessary, including standing, ad hoc, or special committees.

## SECTION IV - OFFICERS AND DUTIES

The Authority Board shall have the following officers:

**Section 4.1** Chair of the Board. The Chair of the Board shall preside at all meetings. The Chair shall be responsible for timely, fair and reasonable conduct of the meeting's business. The Chair shall sign on the behalf of the Authority all documents and instruments required to be signed by the Chair of the Authority. The Chair shall assign duties to officers, committees and subcommittees of the Agency to the extent it is not inconsistent with these Bylaws.

**Section 4.2** Vice-Chair. The Vice Chair shall act in the place of the Chair in the event of an absence, inability to act or improper refusal to act, and shall exercise and discharge such other duties as may be required of the Chair of the Board or the Authority Board.

**Section 4.3** Secretary. The Secretary, who need not be a member of the Authority Board, and may be a governmental or privately retained person or entity, shall record the votes and keep the minutes of all meetings and proceedings of the Authority Board and of the members; serve notice of meetings of the Authority Board and of the members; keep appropriate current records showing the members of the Authority Board together with their addresses; provide agendas prepared by the Chief Executive Officer, and shall perform such other duties as required by the Authority Board. The Secretary shall furnish such bonds, the cost of which shall be paid by the Authority as may be required by law or by resolution of the Authority Board for the faithful performance of official duties of the Officers of the Authority Board. The Secretary shall co-sign all documents as required by the Authority Board.

# EXHIBIT 15

**EM SUBMISSION NO.:** 2013EM041

**PRESENTED:** 3-28-13

**ADOPTED:** 3-29-13

**BY THE EMERGENCY MANAGER:**

**RESOLUTION TO PURCHASE CAPACITY FROM KAREGNONDI WATER AUTHORITY**

The Karegnondi Water Authority (KWA) is a governmental consortium of cities and counties in southeastern Michigan that was created to build a water pipeline that will provide water from Lake Huron to interested communities in Sanilac, Lapeer, and Genesee counties. The incorporating bodies that created the KWA are Sanilac County, Lapeer County, Genesee County, the City of Flint, and the City of Lapeer.

The City of Flint is currently in a year to year contract with the City of Detroit for the purchase of water. A study was conducted that projected that staying with Detroit will cost the region $2.1 billion over the next 25 years. In contrast, if the region builds its own pipeline, the projected costs are $1.9 billion over the same period. After the initial 25 year period, the projected costs would be less then 25% of the projected water costs from Detroit.

In order to build the pipeline, the KWA needs commitment from its members regarding the capacity that each member will purchase in the pipeline. The KWA is allowed to withdraw 85 million gallons of water per day. Capacity is available to members in increments of 1 million gallons per day known as units. For each unit of capacity that a member purchases, the buyer shall pay to the KWA a one time fee of $32,300.00. Additionally, the buyer shall pay to the KWA not less then $32,300.00 per unit per year until such time as water is made available to the buyer. After water is made available, the buyer shall pay to the KWA an estimated amount not to exceed $355.300.00 per unit per year until such time that the bonds are paid in full. If it is determined that the costs per unit will exceed $355,300.00 the buyer has a right to cancel the contract.

The purchase of capacity along with the payment of other costs necessary to operate the pipeline gives the member a right to water for sale to its customers. The buyer has a right to resell capacity and water rights. Each party entering into a capacity contract shall also be entitled to appoint additional board members equal to the party's percentage share of the total capacity under contract.

It is in the long term best interests of the City of Flint to enter into a contract with the KWA to purchase up to eighteen (18) units of capacity.

**IT IS RESOLVED** that City officials are authorized to enter into a contract with KWA to purchase up to eighteen (18) units of capacity.

**IT IS FURTHER RESOLVED** that the City Administrator is authorized to provide KWA information needed to administer the contract and, with approval of the Chief Legal Officer, to make minor (non-material) modifications to the contract.

**APPROVED AS TO FORM:**

**Peter M. Bade, City Attorney**

**APPROVED AS TO FINANCE:**

For **Gerald Ambrose, Finance Director**

**EM DISPOSITION:**

**ENACT** ✓ **FAIL** _____ **DATED** 3-29-13

**Edward L. Kurtz, Emergency Manager**

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# EXHIBIT 16

89 (Rev. 02-11)

STATE OF MICHIGAN
DEPARTMENT OF TREASURY
LANSING

RICK SNYDER
GOVERNOR

ANDY DILLON
STATE TREASURER

Mr. Edward Kurtz
Emergency Manager
City of Flint
1101 South Saginaw Street
Flint, MI 48502

April 11, 2013

Dear Mr. Kurtz:

Thank you for your March 29, 2013 letter, which is attached for reference. As the Emergency Manager for the City of Flint ("Flint" or "City"), you have asked for my concurrence, pursuant to Public Act 436 of 2012, the Local Financial Stability and Choice Act, to authorize a contract in excess of $50,000.00 not subject to competitive bidding. This request was related to the City entering into an agreement with the Karegnondi Water Authority (KWA) for provision of raw water for the City.

In considering your request, I took note of the following facts in support of Flint joining KWA. First, there is widespread support in the City for this move, including the support of the Mayor, the City Council, and the Emergency Manager. Second, this move will provide a unique opportunity for the City and County to partner on an important project, which will hopefully lead to future regional collaboration. Third, the Department of Environmental Quality is supportive of the City participating in the KWA project. Finally, your representations that this deal will lead to substantial savings for the City over the coming decades, savings that are desperately needed to help with the turnaround of the City of Flint.

It is my understanding that the Detroit Water and Sewer Department is making a final best offer to Genesee County and the City of Flint next Monday, April 15, 2013. As such, this approval will be effective at 5 pm on April 16, 2013 after receiving written notice from the City that either no such offer was presented to the county and the City or that an offer was received and was rejected in good faith based upon specified objections.

For the reasons described above and subject to the conditions set forth herein, pursuant to Section 12 (3) of PA 436 of 2012, I am authorizing you to proceed with adopting the resolution and entering into a contract with KWA.

Sincerely,

Andy Dillon
State Treasurer

P.O. BOX 30716 • LANSING, MICHIGAN 48909
www.michigan.gov/treasury • (517) 373-3200

# EXHIBIT 17

# CITY OF FLINT

*OFFICE OF THE EMERGENCY MANAGER*

**Darnell Earley,** ICMA-CM, MPA
Emergency Manager

**ELECTRONIC COMMUNICATION**

March 7, 2014

Ms. Sue McCormick
Detroit Water and Sewer Department
Detroit, Michigan

**RE: DWSD Water Rates**

Dear Ms. McCormick:

Thank you for the correspondence dated February 12, 2014 which provides Flint with the option of continuing to purchase water from DWSD following the termination of the current contract as of April 17, 2014.

Following DWSD's April 17, 2013 notice of termination of the water service contract between the City of Flint and DWSD, the City of Flint has actively pursued using the Flint River as a temporary water source while the KWA pipeline is being constructed. We expect that the Flint Water Treatment Plant will be fully operational and capable of treating Flint River water prior to the date of termination. In that case, there will be no need for Flint to continue purchasing water to serve its residents and businesses after April 17, 2014.

We are aware that Genesee County has been in negotiations with DWSD to purchase water from DWSD following the termination of our contract, and we understand that an agreement may be imminent. Should that occur, there would be no further need for the City to discuss with DWSD any continuing purchase of water. Should that not occur, however, we would be interested, if Genesee County were to so request, to purchase water from DWDS for some period of time. In such an event, our demand for water would be only for the amount necessary to provide Genesee County with water. That amount would be approximately half of the amount Flint is currently purchasing from DWSD.

City of Flint • 1101 S. Saginaw Street • Flint, Michigan 48502
www.cityofflint.com • (810) 766-7346 • Fax: (810) 766-7218

However, in the very unlikely event that the City of Flint is not able to draw water from the Flint River no later than April 17, 2014, then the City would like the option of continuing to purchase water from DWSD for a period of time, up to the time water is available from KWA.

Consequently, I am requesting that you clarify your proposal for the City of Flint to continue purchasing water from DWSD under the following scenarios:

- Flint, upon the request of Genesee County, purchases water for sale to Genesee County for up to 3 years, beginning April 17, 2014, in an amount approximately 50% of the volume currently purchased by the City;
- Flint purchases water from DWSD in approximately the same volume as currently, for up to 3 years, beginning April 17,2014, with the ability to reduce that volume by up to 50% during that period, upon 30 days notice to DWSD
- Flint purchases water from DWSD in approximately the same volume as currently, for up to 3 years, beginning April 17, 2014, with the ability to reduce that volume by up to 50% during that period, upon 30 days notice to DWSD, and further, to terminate the reduced volume purchase should Genesee County and DWSD reach an agreement whereby Genesee County directly purchases water from DWSD.

Thank you and please contact me if you have any questions. I look forward to your response.

Sincerely,

Darnell Earley, ICMA-CM, MPA
Emergency Manager
City of Flint

# EXHIBIT 18

**Byrne, Randall (Treasury)**

| | |
|---|---|
| **From:** | Cline, Richard (Treasury) |
| **Sent:** | Tuesday, March 18, 2014 3:27 PM |
| **To:** | Dempkowski, Angela (Treasury) |
| **Cc:** | Byrne, Randall (Treasury) |
| **Subject:** | Modified - One Resolution for Approval - EME1982014 |
| **Attachments:** | EME1982014.PDF |
| **Importance:** | High |

Angela,

I have reviewed the following resolution:

**EME1982014 - Resolution to Zito Construction for Initial Watermain Cut-In @ the Water Plant - $676,300.00 (Water Fund)**

The recommended vendor was the only submission to the City's request for bid. Typically, I have concerns about awarding bids to only one bidder.

However, the City has a very aggressive timeline in order to meet an April completion date before losing service from DWSD. The City also stated that they held multiple meetings to encourage maximum vendor participation, however, this aggressive timeline may have impacted the number of bids received.

This resolution does appear to conform with Section 12 (3) of PA 436 as it exceeds $50,000 in value and was competitively bid. Also, per the same section, the City is not requesting the State Treasurer to issue an exemption from this section.

The City also appears confident that this contract can execute the requested work.

Given the aggressive timeline, I am, therefore, recommending approval of this resolution.

**Eric Cline** | Unit Operations Specialist - Office of Fiscal Responsibility
State of Michigan | Michigan Department of Treasury
430 W. Allegan Street, 3rd Floor | Lansing, MI 48922
(517) 335-2078 | cliner1@michigan.gov

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**From:** Dempkowski, Angela (Treasury)
**Sent:** Tuesday, March 18, 2014 9:43 AM
**To:** Cline, Richard (Treasury)
**Subject:** FW: One Resolution for Approval - EME1982014

Angela Dempkowski
Senior Executive Management Assistant

17-0068

(Bid No. 14-092)

EM SUBMISSION NO.: EME 1982014

PRESENTED: 3-13-14

ADOPTED: _____

BY THE EMERGENCY MANAGER:

**RESOLUTION TO ZITO CONSTRUCTION FOR INITIAL WATERMAIN CUT-IN @ WATER PLANT**

BY THE EMERGENCY MANAGER

RESOLUTION

The Department of Purchases and Supplies has solicited a bid for an initial watermain cut-in @ the Water Plant as part of an upgrade project to said facility; and

Zito Construction was the sole bidder from eight solicitations for said requirements. The funding for this request will come from the following account number: 591-545.300-801.000; and

IT IS RESOLVED, that the Proper City Official, upon the Emergency Manager's approval, are hereby authorized to enter into a contract with Zito Construction for watermain cut-in at the Water Plant in an amount not to exceed $676,300.00. (Water Fund)

APPROVED-PURCHASING DEPT:

Derrick Jones, Purchasing Manager

APPROVED AS TO FINANCE:

Gerald Ambrose, Finance Director

For

APPROVED AS TO FORM:

Péter M. Bade, City Attorney

**\EFM DISPOSITION:**

ENACT _____ REFER TO COUNCIL _____ FAIL _____

DATED: _____

Darnell Earley, Emergency Manager

071013 – DFJ

# RESOLUTION STAFF REVIEW

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**DATE**:
March 13, 2014

**Agenda Item Title**:
Water Main Cut-in

**Prepared By**:
Brent Wright, Water Plant Supervisor

**Background/Summary of Proposed Action**:
The City of Flint is upgrading its Water Treatment Plant to become our Primary Drinking water source. As part that overall project the Initial Water Main Cut-in and midpoint Chlorination process systems must be completed. This will allow for the use of the River as source water and prepare the connection for the KWA source once completed.

The City did have two pre-conference meeting to discuss the aforementioned projects to encourage maximum participation from the vendor community. The City received one vendor to submit and we are requesting the approval of Zito Construction to perform the work.

**Financial Implications**: Funding available for purchase

**Budgeted Expenditure?** Yes ☒ No☐ **Please explain if no: N/A**

**Account Nos:** **591-545.300-801.000**

**Pre-encumbered? Yes** ☐ **No**☐ **Requisition # (Various)**

**Other Implications (i.e., collective bargaining): None**
The City is requesting that this request be expedited in order to meet aggressive timeline.

**Staff Recommendation:** Recommend Approval

**Staff Person:** _____
(Dept Head or other authorized staff)

# EXHIBIT 19

# City of Flint

**Dayne Walling**
**Mayor**

**Utilities Division**

**Darnell Earley**
**ICMA-CM, MPA**
**Emergency Manager**

To: Darnell Earley, Emergency Manager
Howard Croft, DPW Director
Jerry Ambrose, Finance Director

From: Daugherty Johnson, Utilities Administrator

RE: Water Plant Upgrade February expenditure request

In accordance with the Water Plant Upgrade plan (Phase II Segments I & II) the following budgeted requisitions will need State Treasury approval. These upgrades will allow for the City to utilize the Flint River as our primary drinking water source until KWA supply is available. These planned expenditures are contained within the FY14 Budget Amendment. These final items are expected to total $3,982,475.

**Item 1 Chemical Systems/Ozone:** Design work is completed and ready to bid. Expected total cost is $700,000.

**Item 2 Electrical Upgrades:** The purchase of the equipment was approved by the State in November and orders were placed. The installation design is completed and bids are due February 20th. Expected cost is $1,200,000. The City will need an executed contract by February 28th in order to have the work completed prior to April start up date.

Consumers Energy's portion of the Electrical upgrades is $225,000. The attached Work Agreement and Purchase Order needs to be executed by Feb. 19th in order to meet the April start up date.

**Item 3 Mid-point Chlorination:** Design work is completed and ready to bid. The equipment and installation is expected to cost $445,000. The City will need an executed installation contract and purchase orders by Feb 28th in order to meet the April start up date.

**Item 4 Pump Station 4:** Design complete, bids opened. We need to issue the PO to order the pump and valve for installation early next fiscal year. Bids came in at $307,475. Actual expense will be in July.

**Item 5 Raw Water Piping Connection:** The design work is complete and ready to bid. This work must be completed prior to the April start date because we will be unable to shut down when KWA Raw Water arrives. The expected cost is $380,000.

**Item 6 Lime Softening residuals disposal:** Design work is well underway in accordance with the proposed DEQ Consent Order. This work will entail berm construction and drain demolition in the lagoon. It will also require pumping facilities to dewater the lagoon into our Sanitary Sewer. This work is expected to be completed prior to April start up to improve water quality and address environmental concerns. Estimated Cost is $725,000.

# EXHIBIT 20

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**From:** Cook, Pat (DEQ) <COOKP@michigan.gov>
**Sent:** Friday, April 24, 2015 10:43 AM
**To:** Deltoral, Miguel
**Cc:** Poy, Thomas; Porter, Andrea
**Subject:** RE: Flint Corrosion Control?

Hi Miguel - Flint is currently not practicing corrosion control treatment at the WTP. When they started treating water at their WTP last spring, we placed them on full chart (100 sites) Pb/Cu monitoring for two consecutive 6 month periods. WQ monitoring is also being conducted. The first round of samples after switch-over from DWSD (July 1, 2014 – Dec 31, 2014) had 90th percentiles of 6 ppb for Lead and 110 ppb for Copper. The second round of samples (Jan 1, 2015 – June 30, 2015) is underway with approximately 20 of the 100 sample site results in. The highest lead result out of the 20 received thus far is 13 ppb.

Based on the matrix of recommended corrosion control study components for Large PWS's for both Lead and Copper, there are no additional requirements for the City of Flint based on the levels of lead and copper in the current source water and the results of the lead and copper distribution monitoring. The only provision of the Lead & Copper Rule which classifies the existing treatment of large PWSs as optimized for corrosion control is when the difference between the 90% Pb-TAP and Pb-POE is less than the lead practical quantitative level (PQL) for each six-month period of the initial monitoring program. By definition, the PQL for lead is 0.005 mg/L; and the lead value for the source water used in this determination is the highest source water lead concentration. If this condition is met, then no study or testing is required. We believe this condition has been met for Flint. However, we will re-evaluate this after the 2nd round of 6 month sampling is completed.

If you have any further questions, please contact the Lansing District Supervisor, Steve Busch at (517) 643-2314 or at buschs@michigan.gov.

Have a good (and hopefully warm) weekend!

Patrick Cook, P.E.
Community Drinking Water Unit
Office of Drinking Water & Municipal Assistance
Michigan Department of Environmental Quality
Phone: (517) 284-6514

cookp@michigan.gov

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**From:** Deltoral, Miguel [mailto:deltoral.miguel@epa.gov]
**Sent:** Thursday, April 23, 2015 12:33 PM
**To:** Cook, Pat (DEQ)
**Cc:** Poy, Thomas; Porter, Andrea
**Subject:** Flint Corrosion Control?

Hi Pat,

What's Flint doing now (post Detroit) for corrosion control treatment?

Miguel A. Del Toral
Regulations Manager
Ground Water and Drinking Water Branch
77 West Jackson Blvd (WG-15J)
Chicago, IL 60604
Phone: (312) 886-5253

# EXHIBIT 21

# Closing the valve on history: Flint cuts water flow from Detroit after nearly 50 years

By **Dominic Adams | dadams5@mlive.com**
**Follow on Twitter**
on April 25, 2014 at 4:52 PM, updated January 17, 2015 at 10:13 AM

FLINT, MI – It will take two days before Flint residents can taste history.

On Friday, April 25, Mayor Dayne Walling turned off the flow of water from Detroit and officially ended Flint's nearly 50-year dependence on its neighbor to the south.

Officials said it will take about two days before the Flint River water will completely work its way through the treatment plant and flow from resident's faucets.

The city plans to use the Flint River until the Karegnondi Water Authority pipeline is built, which will bring untreated Lake Huron water to Genesee County.

"Water is an absolute vital service that most everyone takes for granted," Walling said. "It's a historic moment for the city of Flint to return to its roots and use our own river as our drinking water supply."

With about a dozen people looking on inside a small outbuilding at the Flint water treatment on the city's northside, Walling pressed a small black button switching the feed from green to red as people around counted down from three.

Beforehand, officials raised glasses of water in celebration.

**FLINT WATER**

Flint water crisis could mean two dozen layoffs if state fails to pay $1.1M

State unveils big plans for Flint recovery after water crisis

Plan to loan workers $15K for Flint houses so crazy it just might work

Flint lead lines may not be only problem for water, officials say

Lead testing held for dogs in Flint water crisis at downtown church

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Representatives from the Michigan Department of Environmental Quality, as well numerous elected and city officials were at the Flint water treatment plant on Friday for the ceremonial closing of the valve from Detroit.

"Individuals shouldn't notice any difference," said Steve Busch, Lansing and Jackson district supervisor in the DEQ's office of drinking water and municipal assistance.

He said Flint still had a final bacteria test that it passed Friday morning, allowing Flint to close the valve to Detroit.

Flint will use the river until the KWA builds its pipeline to Genesee County. The $274 million project is expected to be complete sometime in 2016.

"This is indeed the best choice for the city of Flint going forward," said Flint Emergency Manager Darnell Earley.

When Walling flipped the switch, pumps powered down as water ceased flowing from the 36-inch water main from Detroit.

"There have been a lot of questions from our customers because this is such a major change," he said. "When the treated river water starts being pumped into the system, we move from plan to reality. The water quality speaks for itself."

Flint wanted had hoped to complete the turn off on Monday, but more **work was needed on its disinfectant system**.

"If we miss the date for shutting off the valve to Detroit – that doesn't mean the project is a failure – that means we're working on it," Earley said.

"The Flint River is a different river than it was the last time we used it – that was pre-Clean Water Act," Flint Utilities Director Daughtery Johnson **told The Flint Journal last week**, adding that the city made two years' worth of improvements at the water plant in nine months. "It's a great system. It's a great asset the city has. Every drop we pull out, we're going to clean and put right

back in the river."

Johnson said although the hardness of the water treated from the Flint River will be higher than it is now from Detroit, customers still shouldn't notice a difference. Higher hardness in water means it may take more water and soap to create a lather.

On April 17, the **water treatment plant took in 12 million gallons** of river water for treatment test runs that have been ongoing since.

Detroit terminated its contract with the city effective April 17 last year when Flint decided to purchase water through the KWA.

*Dominic Adams is a reporter for The Flint Journal. Contact him at **dadams5@mlive.com** or 810-241-8803. Follow him on **Twitter**, **Facebook** or **Google+**.*

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