Memorandum

February 19, 2014

TO: Longview City Council
Beacon Hill Water & Sewer District Commissioners
Bob Gregory, City Manager
David Campbell, Assistant City Manager
Dell Hillger, General Manager, Beacon Hill Water & Sewer District

FROM: Jeff D. Cameron, Public Works Director

SUBJECT: **Mint Farm Regional Water Supply Project**
Response to Jim Fisher Letter Dated December 11, 2013

On February 13, 2014, staff received a copy of a letter Mr. Jim Fisher submitted to the Longview City Council and Andre Stepankowsky at The Daily News on December 11, 2013. In his letter, Mr. Fisher objects to the Mint Farm groundwater supply and urges Council to return to the Cowlitz River, alleging the groundwater is not safe and was not adequately evaluated.

Mr. Fisher is a Longview resident and experienced environmental consultant with years of experience working with local industry. His concerns about potential contamination from nearby industrial activities were shared by everyone involved when the Mint Farm groundwater supply concept was first created and are precisely why city staff and various technical and environmental consultants spent four years vetting this project to ensure sustainability and, above all else, protection of human health. Throughout every phase of the project, project staff has gone beyond the standard practice of care to evaluate the City's options regarding continuing to use the Cowlitz River as a source or obtaining a different source of supply, as well as analyzing the distribution system water quality issues our customers are experiencing during the re-equilibration period after start-up of the Mint Farm water treatment plant.

During the feasibility analysis, project staff met with and welcomed input from Mr. Fisher concerning the industrial and agricultural activities that have occurred in the area and the types of pollutants that should be included in the analysis. Project staff collaborated with Mr. Fisher to develop an extensive analyte list for groundwater sampling, including a number of unregulated contaminants specific to local industry and previous agricultural activities. Project staff also included a number of unregulated contaminants not related to the local activities, to ensure the feasibility analysis adequately compared the water quality and risks related to using the Cowlitz River, Columbia River, or Mint Farm groundwater as the source of supply.

Mint Farm Regional Water Supply Project
Response to Jim Fisher Letter Dated December 11, 2013

Most of the concerns and conclusions Mr. Fisher stated in his December 11 letter have already been addressed in prior correspondence, which is attached for ease of reference in lieu of repeating the previous responses. Current responses have been inserted into appropriate sections of Mr. Fisher's letter, attached below.

We appreciate Mr. Fisher's concerns and his assistance to the project team during the feasibility study and pre-design report. However, it's apparent that Mr. Fisher and his experts disagree with and are unwilling to accept the conclusions of the City's various experts involved in analyzing and reviewing the feasibility of using the Mint Farm groundwater, and that he/they dismiss the validity of the study and evidence presented to determine the groundwater water supply is sustainable and safe. We disagree with his/their conclusions and continue to support the water supply recommendations and decisions. The Mint Farm groundwater supply was the subject of rigorous testing and analysis, peer review by other technical experts, review by the state Department of Ecology and their technical experts, and review by the state Department of Health, and it is safe to use as the source of the City's water supply.

cc: Craig Bozarth, City Engineer
Amy Blain, Project Manager
Andre Stepankowsky, The Daily News
Jim Fisher, CPEA, CHMM

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December 11, 2013

To: Open Letter to the Longview City Council

Subject: Comments on Community Drinking Water Issues

As a concerned citizen of Longview, I would like to provide some facts related to the city's new drinking water well system, and also the Cowlitz River intake issue.

As several of you may recall, I provided a significant amount of scientific and technical information to the Council in meetings with staff, via e-mail, and testimony at Council Meetings from 2009 to 2011 pointing out the very high risks of abandoning the Cowlitz River and drilling the Mint Farm wells, as a new source of community drinking water (attached is information provided for the public record from my testimony at the Council Meeting on February 4, 2011, my letter to the City Council of January 25, 2010, and comments to City staff at a meeting February 4, 2009).

You may also recall that the February 4, 2011, Council meeting was when a vote was taken to proceed with funding the installation of the Mint Farm well system. Regardless of the large amount of information provided on the high risks and potential negative impacts on water quality and future health of the community from this well water, the Council voted to approve construction. Those who approved were: Mayor Anagnostou, Weber, Botero, Melink, McKinster, and Wallace. Don Jensen, now Mayor, was the only one who voted No, and stated he felt putting city drinking water wells in such a heavily industrialized area was not a good idea. As it turns out, he was right.

In the information provided to the City and the Council by me and several other scientists, engineers and local physicians, it was made clear that the potential high risks were based on an array of known facts, not speculation. Below is a summary of those facts, repeated here especially for the new Council members:

1. Well water hardness. The test well and other existing industrial wells in the Mint Farm showed hardness levels at least three to four times higher than the Cowlitz River. I warned City staff that distributing this new water throughout the community would cause fouling problems and staining of people's sinks, showers, faucets, windows, dishes, cars, etc, and cause odor and

color problems throughout the system. As predicted, this has happened and produced a huge impact already on users of the new city water.

Response:

Mr. Fisher previously expressed concern about taste, odor and color issues based primarily on the use of untreated groundwater at the Reynolds Aluminum facility. Those issues are not related to hardness, but are related to iron and manganese in untreated groundwater. The Mint Farm treatment plant was designed to remove iron and manganese to meet state Department of Health secondary maximum contaminant levels established to address those issues. Mr. Fisher did not predict or acknowledge the need for a period of re-equilibration whenever a source of supply is changed, and is attributing water quality impacts contributed by the distribution system to the source water. Other than the white spotting, the predominant water quality impacts we are experiencing are indicative of the condition of the distribution system and a greater than expected re-equilibration period and impact. Mr. Fisher also states he predicted fouling problems due to the hardness of the well water. The project team has determined the staining experienced by customers is caused by iron and manganese being released from accumulated distribution scales, and white spotting is primarily from naturally-occurring silica, not from hardness. The Mint Farm water is moderately hard, and hardness is a minor contributor to white spotting.

2. Well water contamination sources. A historical summary of the many potential contaminants and pollutants known to have been used, spilled, leaked, drained, buried or otherwise existed on and along the entire industrial zone along Industrial Way over the past century was provided to the Council and City staff. Some of the more serious areas and types of these pollutants that could influence well water drinking quality in the future were overlooked and/or not even considered in the Risk Assessment report prepared by the City's consultant, Kennedy/Jenks (report is posted on the City's website). The report did not assess the potential impacts from the tens of thousands of piling that still exist along the entire industrial zone, which were drilled from the ground surface down into the gravel aquifer to support every major industrial building or structure from the early 1900's to the present. That is the aquifer from which the new wells draw their water. Those piling, many of which were treated with Creosote (a very toxic chemical preservative), essentially provide conduits or pathways for any pollutants or contaminants on the surface down to the aquifer. The Creosote piling provide a direct source for leaching toxic contaminants into the well water aquifer. This fact was totally ignored by the consultant, who stated the aquifer was protected by the layer of fine silts and sediments above, and therefore no surface contaminants could migrate down into the aquifer. In fact, the industrial zone is a veritable "pin-cushion" full of existing and old pilings that have been punched through and permeated the surface sediment layers creating a huge potential to contaminate our new water source.

Response:

Piling does not penetrate into the source water gravel aquifer and is not a conduit for contamination to enter the aquifer. See prior City of Longview memorandum dated February 3, 2011, item 2, page 3 of 16.

Mr. Fisher is ignoring key evidence of the quality of the confining layer which protects the aquifer and the hydrogeological characteristic of upward flow of groundwater in the shallow aquifer in the industrial area. In addition to the City's testing, Anchor QEA is under contract to ALCOA to identify the extent of contamination and recommend cleanup plans for contaminants at the Millennium Bulk Terminals site. Anchor QEA's testing has confirmed the City's determination that groundwater in the shallow aquifer flows upward rather than downward. In addition, both the City's and Anchor QEA's testing found no evidence of contamination in the deep aquifer groundwater wells located at the ALCOA property, despite decades of high rate pumping from those wells when Reynolds Aluminum was in operation.

3. Groundwater flow direction. The consultant's groundwater modeling study report shows that the Mint Farm drinking water wells draw water from its recharge source area, which was identified as coming from the Columbia River. The detailed map in the report shows the recharge area originates in a deep water area in the river near the old Reynolds Aluminum dock upstream from Barlow's Point. The drinking water wells pump and draw water into the aquifer via the bottom of the river, and it flows slowly underground in the gravel layer toward the wells. A broad "fan-shaped" flow pattern is created as the water travels from the river, under the former Reynolds plant, the Weyerhaeuser Plant, and even along the abandoned Radakovich landfill, as it heads toward the wells. And, it flows through all of the old pilings that exist in the aquifer between the river and the wells along the way. The report showed that it would take between 1 to 2 years for groundwater under the industrial zone to reach the new wells. It has been approximately eleven months since the wells were turned on (January 2013).

Additionally, another potential contamination fact was overlooked. There are two very large industrial wastewater discharges into the Columbia River upstream of the drinking water well recharge zone near the old Reynolds site. One is from the Weyerhaeuser site and the other from the Keystone paper mill. Each discharges around 30 to 40 million gallons per day of treated pulp mill effluent under their respective NPDES permits. The Columbia River is influenced by tidal effects in this area, with an average of two incoming and two outgoing tides per day. This means that during two 6-hour incoming tidal events each day, the mill effluent discharges will pool-up or circulate in the deep river area where the Mint Farm wells get their recharge water for the aquifer. There is significant potential for pulp mill effluent mixed in river water to be drawn into the deep aquifer that supplies the city's drinking water. Twice per day; every day. And, these mill effluents are not required to be treated to drinking water standards.

Response:

Again, the groundwater does not "flow through all of the old pilings" because the pilings do not penetrate into the gravel aquifer.

Mr. Fisher incorrectly states the influence of the tides. The tides raise the level of the river because it has to overcome the higher water level in the ocean; but the river never stops flowing toward the ocean and does not "pool up" within the recharge area.

The Preliminary Design Report (PDR) did not specifically address outfalls on the Columbia River but they were not overlooked as suggested. Kapstone, Weyerhaeuser, Millennium Bulk and the TRWWA all have outfalls on the Columbia River upstream of the aquifer recharge area delineated by Kennedy/Jenks Consultants. Effluent streams behave similarly to potential contaminant spills - the vastly greater volume of flow in the river dilutes the discharge and carries it downstream past the recharge area. These discharges do not contain sufficient quantities of heavy, high specific gravity pollutants to settle to the bottom of the river bed. The potential for pulp mill effluent to be drawn into the aquifer is insignificant given the dilution and mixing that occurs in the river, and the vastly greater volume of river flow to carry the diluted effluent downriver past the recharge area. And the argument that the effluent is not treated to drinking water standards is a false argument – the Columbia River and the Cowlitz River themselves do not meet drinking water standards.

Mr. Fishers's concern about effluent streams is a perfect example of the inherent protection afforded by a groundwater source as compared to a surface water source. The City's surface water intake struture on Fishers Lane is located downstream of nine often overlooked wastewater treatment plant discharges on the Cowlitz River, which is also tidally influenced. These flows do not pool around the Cowlitz River intake during incoming tides, but do make the water supply increasingly more vulnerable to cryptosporidium, giardia, pharmaceuticals and "emerging contaminants" associated with wastewater discharges and surface water sources.

4. Groundwater "Sentry-Well" Monitoring. In order to give some type of early warning of contamination being drawn from the industrial zone toward the Mint Farm wells, the City installed a series of deep and shallow monitoring wells at various locations between the industrial zone and the drinking water wells. This in itself is a signal that the City knew there may be potential risks of contamination in the aquifer from the industrial zone history, even though the consultant stated there was little or no risk in their report. These monitoring wells are ONLY sampled once every six months, with the first sampling (since the drinking water wells went into operation) occurring in July 2013. The second sampling should occur in January 2014. A review of the July data set showed the Arsenic in Deep Well #8 has increased to 11.9 parts per billion (ppb) (EPA standards limit Arsenic to 10 ppb). Also, Deep Well #6 showed detectable levels of Diquat (1.1 ppb) and Paraquat (1.5 ppb), both very toxic herbicides (weed killers). This may be an indication that the groundwater in the aquifer is being drawn toward the drinking

water wells as predicted, and the detection of these contaminants (and possibly others) are already moving toward the drinking water wells. Sampling at 6-month intervals is not sufficient to give the City enough warning to take action to install emergency treatment in time for whatever contaminants show up, before having to legally shut down the wells. And, the City has no backup system to provide adequate drinking water if the wells become contaminated.

Response:

The monitoring wells were not installed solely as an early warning system; their primary purpose was to provide data to determine the feasibility of locating the groundwater supply in the Mint Farm area because the project team initially had prudent concerns about aquifer productivity and the risk of contamination of the aquifer. The project team concluded there is little risk of contamination only after testing water from these wells on numerous occassions. Further, the project team did not state "no risk". No water supply - groundwater or surface water - is risk free; even sources in undeveloped rural or forest areas have some risk. The fact that the initial test wells have been turned into sentry wells and incorporated into the City's Wellhead Protection Program indicates that staff is proactively managing its aquifer resource.

The monitoring wells are sampled at 6-month intervals because there is no physical evidence to support the need for more frequent sampling. Each sampling event takes staff 2-3 days to collect, laboratory analysis costs approximately $15,000 and takes a month or more to obtain results (radionuclides test results can take 2-3 months). More frequent sampling is not practical or justified; the additional cost would not result in reducing the already low risk level.

The July 2013 sampling event identified total arsenic at a concentration of 11.9 micrograms per liter (ug/l) at monitoring well DW-8, which is just above the Maximum Contaminant Level (MCL) of 10 ug/l. This is slightly higher than the 9.17 ug/l result in June 2009 and the 11.3 ug/l result measured later in November 2013. All results are within normal variations based on water variability, sampling method, temperature, hold time, test method, etc. Monitoring well DW-8 is on the northern boundary of the groundwater flow path serving the Mint Farm wellfield and does not represent the majority of water pumped from the wellfield. Further, the fact the Arsenic level in the test well water exceeds the MCL is irrelevant; the MCL applies to treated drinking water and the treatment plant consistently removes Arsenic to a level of 2 ug/l in the finished drinking water.

Low level detections of diquat and/or paraquat are sporadically observed in monitoring wells along the CDID ditches at concentrations less than 1.5 ug/l. This is an order of magnitude below the MCL of 20 ug/L for diquat; no MCL exists for paraquat. Re- testing does not show a repeatable positive result; one of the control blanks also tested positive for diquat; and the occasional detections are attributed to herbicide use for vegetation control along the ditches and the potential for human error when collecting the sample.

5. Fortifying Drinking Water with Phosphates. This is a bad idea and essentially only a "band-aid" attempt at stabilizing scale in old distribution piping. Addition of another "hardness"-related chemical will only exacerbate the problems of water hardness addressed above; staining, water-spots, valve/faucet failure, scale formation in household fixtures, etc. Additionally, adding phosphates to the water may increase human health issues related to osteoporosis, electrolyte interference, malabsorption of Magnesium/Calcium/Potassium, etc., and have another adverse health effect similar to drinking many carbonated sodas (such as colas, etc.) every day. The citizens of Longview should not have their water fortified with Phosphates as a way to address a really bad drinking water source decision and problem in the first place.

Response:
Phosphates were evaluated as a way to address a distribution system problem, not a source water problem. However, the project team is not recommending phosphates be implemented at this time.

Use of phosphate for corrosion control is common practice and many water purveyors have successfully implemented it, including the City of Kelso at one time. Many different types of ortho and poly phosphates are NSF International certified for use in drinking water. The project team was evaluating doses of 3-4 mg/l of a blended phosphate - well below any NSF standard. Additionally, the Food and Drug Administration considers phosphates to be generally recognized as safe as a food additive. The typical phosphate levels found in a drinking water are many times lower than the levels found in the average American diet. For example, a person would have to drink ten to fifteen liters of water to equal the amount of phosphates in just one can of soda.

Phosphates are primarily used to inhibit corrosion in water system piping and to prevent oxidation and precipitation of certain water constituents. They are not considered a "hardness-related chemical" and there is no evidence phosphates would exacerbate water hardness.

6. Cowlitz River Intake. The only problem with the Cowlitz River as a continuing source of drinking water for the community was the occasional sand accumulation near the intake, which required some spot-dredging to keep water flowing into the intake. I provided the City with a workable solution to the sediment accumulation problem, and personally discussed the potential efficacy with Army Corps of Engineers (ACOE) in Portland. Simply stated, the idea was to install two low-head piling jetties opposite the Cowlitz River intake on the Kelso side of the river. The jetties would extend from the bank to approximately mid-river, and would function to slightly constrict and speed up river velocity along the bank near the intake. This very slight increase in velocity would effectively keep sand from settling in front of the intake. Problem solved. ACOE staff said such a system would likely solve the problem, and even offered to help with the modeling and engineering. City staff ignored the idea. In fact, ACOE published a report (June 2010) on how to address the long-term sediment accumulation issue in the lower Cowlitz River, and the use of multiple low-head jetties throughout the lower Cowlitz was offered

as a viable solution. The report even includes maps of potential jetty placement locations to "route" the sediments through the lower river by increasing river velocity, and effectively "scouring" the sediments out of the system. Recently, I read that the City wants to retain the Cowlitz River intake and reconstruct pumps and piping to use Cowlitz River water to refresh water in Lake Sacajawea. Why not go a step further and restore the intake, pumps and piping to resume pumping drinking water from the Cowlitz. Given the right approach and consultations with WDOE, ACOE and NOAA/NMFS, I'm sure approvals can be gained to restore the city's drinking water system from the Cowlitz, contrary to speculation by City staff that it is not possible (as recently reported in the TDN). This would essentially solve both problems; restore our drinking water and alleviate most of the distribution piping problems related to groundwater chemistry (and prevent future toxic contamination), and allow resuming the pumping of Cowlitz River water to Lake Sacajawea.

Response:
See prior City of Longview memorandum dated February 3, 2011, item 9, page 11 of 16.

Additionally, the March 2010 listing of eulachon (smelt) as a threatened species under the Endangered Species Act significantly increases the challenge of modifying the intake and continuing to withdraw water from the Cowlitz River. Further, the ACOE has not experienced much success controlling sediment on the Cowlitz River. In addition to the attempts noted in the February 2011 memorandum, the ACOE dredged a significant volume of material from the mouth of the Cowlitz River to remove sediment accumulation that was acting as a weir and raising water levels upstream in the river, and they dredged a large sump at the mouth of the river. The intent of the sump was to increase the velocity of flow in the river just upstream to scour sediment and deposit it into the sump. That theory failed to work. Controlling sediment in the Cowlitz River has not yet been successful, and assuming that it will be in the future is risky.

Conclusions and Recommendations:

The City's decision to install the Mint Farm well field was an extremely bad idea, and avoided adequate warning and cautionary information provided in several meetings, letters and testimony in 2009 and 2010 from many concerned scientists, engineers and health professionals.

The City's consultant ignored or overlooked information on significant potential contamination risks from the existence of thousands of pilings driven into the aquifer, and completely overstated any potential protection of the aquifer from overlying silts/sediments, thus misleading the City to conclude there was minimal risk.

The groundwater modeling by the consultant shows the drinking water originates in the Columbia River and recharges the aquifer near the old Reynolds dock area. Any contaminants that have leached into the aquifer from the industrial zone, either via old piling holes, from Creosote pilings directly, or other pathways, will enter the aquifer and reach the new wells in the

future (perhaps within the coming year according to the modeling report's time of travel estimates). Semi-annual sampling of the Sentry wells is inadequate to provide early-warning signs, and show contamination may be "on the way" already. Monthly sampling would be a minimum in my view.

The Cowlitz River intake and drinking water plant should be restored to provide the city's primary source of drinking water, and to keep Lake Sacajawea refreshed, as before. A full engineering study (by a competent, new, non-local firm) should be commissioned as soon as possible to determine the cost and path forward to making that happen. This should include the installation of two or three piling jetties in the Cowlitz to assist in keeping sediments from accumulating. Fear of potential agency approvals and permitting should not be an excuse for launching the restoration effort. Nor, should the potential cost of the restoration be a deterrent, since the cost of LITIGATION of a class-action law suit for health impacts to the citizens by the present (and future) well water quality problems may be orders of magnitude higher. In fact, many citizens have already begun to suffer skin rashes and other health effects from exposure to the new drinking water, and many other complaints as reported in recent TDN articles and social media websites.

The risks of significant negative impacts to the community from the Mint Farm well system are the same as I and many other professionals presented before the City installed the wells. Except, now the citizens are already suffering from the first prediction: high hardness effects, with no end in sight or affordable remedy available to the city. The basic water chemistry of the well water will not change over time and will have the same impacts forever! The larger, more significant impacts from toxic contaminants in the well water may already be flowing toward the wellheads within the coming year or so. What then? There is no backup! We'd have been better off to drill wells in the garbage dump on Tennant Way, or haul our drinking water from wells at Hanford! It's time for a new direction and decisive action. The Right Direction is to return to the Cowlitz River!

Response:

Mr. Fisher overstates the risk to the groundwater supply, alleges the project team ignored information, and simplifies and understates the challenges associated with continued use of the Cowlitz River. The project team thoroughly evaluated water supply options and the risks to the groundwater supply from existing and potential future contamination, and rejects Mr. Fisher's contention that the evaluation and recommendations were flawed.

Thank you for this opportunity to provide comments on this issue.

Sincerely,

Jim Fisher, CPEA, CHMM

Mint Farm Regional Water Supply Project
Response to Jim Fisher Letter Dated December 11, 2013

Attachments:

.Testimony at City Council Meeting Public Hearing, February 10, 2011.
.Letter of Comment to City Council and City Staff, January 25, 2010.
.Discussion materials for City Staff comment meeting, February 4, 2009.