April 3, 2017

King County Council
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Protecting and Preserving Puget Sound

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Greetings Chair McDermott and fellow Councilmembers,

Puget Soundkeeper Alliance (Soundkeeper) applauds King County Council's decision to move forward with an independent investigation of the February 2017 West Point Sewage Treatment Plant failure. We are very concerned about the potential impacts the untreated and inadequately treated discharges may have on Puget Sound.

To reduce the risk of future failures, it is necessary to understand why this failure occurred, and how it is similar to or different from previous sewage bypass events at the West Point plant.

The primary question is whether the February 2017 overflow resulted from a design failure, a maintenance failure, an operations failure, or some combination of these elements – either of/at the plant itself, or in the operation of the collection/conveyance system.

Soundkeeper urges King County Council to ensure that these overarching questions, as well as the additional detailed questions posed in this letter, are addressed and answered in the independent investigation.

I. Comparisons to 2009 Bypass Event

While the February 2017 bypass event is the largest to occur at West Point to date, it is not the first. It is important to determine if previous bypasses were related to the causes

of the recent event. In June of 2009, ten million gallons of untreated effluent were discharged into Puget Sound when the switch that controlled the emergency bypass gate malfunctioned.

The 2009 event identified the failing float switches and bypass gate issues as vulnerabilities in the design and operation of the West Point facility. As stated in the December 15, 2009 Seattle Times article describing the event, "*The overflow, during a three-hour period ending at 1 a.m. Tuesday, happened when a switch in a tank malfunctioned, opening a gate and diverting all raw sewage arriving at the plant directly into Puget Sound*."[1] Unfortunately, these vulnerabilities in effluent gates and failing switches were again demonstrated in 2017.

Please ensure that the independent investigation answers these questions:

1. How similar was the 2009 event to the 2017 event?
2. Was a post-failure report on the 2009 event produced? If so, please ensure that it is shared with the public as part of the independent investigation report.
3. What changes were made from 2009 to Feb 2017 to the operations of the switches and outfall gates that were reported to have malfunctioned in 2009, and are again suspected of failure in 2017?

Soundkeeper urges King County Council to ensure that the independent investigation specifically investigates operations, design, and activities related to the failing switches and bypass gate.

II. SCADA and Ovation System Designs & Potential Failures

King County Wastewater Treatment Division's (WTD) 2015 annual report notes that it meets EPA Minimum Control 4 (of EPA's 9 required minimum controls) by maintaining the following operational design: "*Operate the POTW treatment plant at maximum treatable flow during all*

[1] http://www.seattletimes.com/seattle-news/10-million-gallons-of-raw-sewage-flow-into-puget-sound-off-magnolia/

wet weather flow conditions to reduce the magnitude, frequency, and duration of CSOs. The Permittee must deliver all flows to the treatment plant within the constraints of the treatment capacity of the POTW."[2]

The WTD also uses its automated Supervisory Control and Data Acquisition (SCADA) system to maximize flow to West Point's secondary treatment plants, *while protecting the biological treatment system*, via operation of regulators and pump stations.

Clearly, in the course of the Feb 2017 bypass emergency event, the design approach of the plant, its control system, and/or the operation of the plant failed to protect the biological treatment system.

The WTD's 2011 annual report described West Point's 'Ovation' control system: "*Each treatment plant has offsite conveyance and pump stations that feed flows to the plant. PLC based control systems at these offsite facilities are connected to the Ovation control system to monitor and, in some cases, control the flow and so optimize conveyance to the plant for treatment and the use of system storage capacity. In the West Point system this will minimize CSOs. Critical alarms and process data are communicated to the plant operators using monitoring systems that report data in independent communication pathways from the control system. WTD installed the OSI PI™process data historian for long-term trending of all key WTD process, operational, and monitoring data (treatment plants, conveyance facilities, CSO control facilities, and offsite pump stations). The system has been in service since 2005*."[3]

Recent events suggest that this system was either improperly designed or operated, as the controls did not protect the treatment facility from catastrophic failure. Though the pump failure in February 2017 was not during normal operating conditions, it must be assumed that a failure and risk analysis of the system exists in the operations protocols of the plant and in the SCADA system.

[2] http://your.kingcounty.gov/dnrp/library/wastewater/cso/docs/AnnualReport/2015_CSO-CD_Annual.pdf
[3] http://your.kingcounty.gov/dnrp/library/wastewater/cso/docs/AnnualReport/2011_CSOAnnual.pdf

Please ensure that the independent investigation answers these questions:

1. Did the SCADA system operate as designed?
2. If the SCADA system operated as designed, was it not programmed appropriately?
3. Why did the SCADA control system fail to trigger a bypass when the situation at the treatment plant was getting out of control?
4. If the float switches failed, why wasn't that failure detected by the ovation and/or SCADA systems – immediately triggering a bypass, and avoiding the flood?
5. How did all eight of the float switches fail simultaneously? Isn't the probabilistic likelihood of simultaneous failure of 8 separate pieces of equipment extremely low?
6. What caused the arms of some of the switches to bend?
7. Could the emergency effluent gate have been opened (mechanically or manually) at any time between the time the effluent pumps were not operating and the flooding occurred? If not, what modifications are necessary to enable this override?
8. Was the decision to divert to the primary clarifiers an automated response of the SCADA system or point of time decision by operators on site?
9. Were the alarms activated when the volumes in the clarifiers were at capacity?
10. Why didn't the alarm systems override the decision/automated response to bypass to the primary settling tanks while the effluent pumps and gates were being reengaged, instead of immediately opening the emergency outfall gate?
11. Soundkeeper has received information that there was an assumed thirty-minute holding capacity in the clarifiers. Is this correct? Should this be adjusted?
12. Reports of the Feb 2017 emergency identify that there was only twelve minutes of holding capacity before the plant was flooded. Was the erroneous thirty minute capacity assumption built into the on-site or automated operational protocols of the plant?
13. What other modifications or contingencies could be put in place as a fail-safe to keep this from happening again?

The independent investigation should be able to answer many of these questions based on the data history. As stated earlier, WTD installed the OSI PI™ process data historian for long-term

trending of all key WTD process, operational, and monitoring data (treatment plants, conveyance facilities, CSO control facilities, and offsite pump stations). King County has published that this system has been in service since 2005.

III. Bypass Gate Vulnerability

The ability to operate the emergency bypass gate at West Point appears to be a proven point of dangerous vulnerability in this facility. Whenever a facility has a recognized point of weakness such as this, a risk management approach should be employed to either modify the design to reduce the vulnerability, or implement an asset management plan to reduce the risk of failure at this vulnerable point.

King County staff members have informed Soundkeeper staff that a regular test or 'exercising' of the system was implemented after 2009, and included testing the bypass gate and the control switches that caused the 2009 failure (and 2017 failure). However, Soundkeeper staff were also told that if the gates had been properly 'exercised' (opened and closed), it would have resulted in a discharge event and permit violation. This information suggests that adequate testing of the gates was impossible given the plant's existing design. Is this information correct?

Soundkeeper urges King County Council to ensure that the independent investigation queries the WTD management staff people directly regarding the 2009 event, gathers all post-2009 event incident reports (and publicizes them), and ascertains whether improvements or changes were made following the 2009 incident. Soundkeeper is concerned that vulnerabilities exposed in 2009 persisted without adequate response, perhaps leading to and/or exacerbating the 2017 incident.

Please note that there is a publicly available video of a training at the West Point facility on the operation of the Whipps Inc. effluent gate where an operator can be heard being questioned about the 'exercising' of the gate, without providing a clear answer.[4]

[4] https://vimeo.com/97728138

Please ensure that the independent investigation answers these questions:

1. Were the warning signs unearthed by the 2009 bypass adequately heeded?
2. Should King County have employed design updates/ corrections as a result of the 2009 incident that could have prevented the 2017 incident?

IV. Worker Safety Risks

King County staff have stated that had this event occurred during the day, multiple workers would have been in the below ground galleries that were flooded – implicating severe worker safety risks. Soundkeeper is very grateful, and sincerely relieved that no injuries or loss of life occurred during this event. Soundkeeper further worries that the potential loss of life associated with the Feb 2017 incident points to a serious facility design flaw. Soundkeeper urges King County Council to ensure that the independent investigation addresses these risks head on, and issues recommendations around whatever design flaws must be corrected to prevent future loss of life or injury.

V. Closing

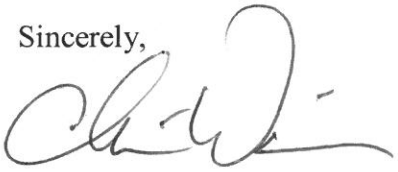
To close, Soundkeeper anxiously awaits the results of the independent investigation into the February 2017 West Point Sewage Treatment Plant failure. We look forward to reviewing the ongoing monitoring and modeling efforts currently underway, and continuing to work with King County staff to improve public access to information necessary to understanding the impacts of the 2017 bypass. We also look forward to continuing to work with King County staff and other community leaders, including solution providers, to evaluate innovative solutions and strategies to prevent industrial discharges from passing through the West Point facility untreated.

Soundkeeper sincerely hopes that King County Council ensures that both design and operations of the West Point facility are examined via the independent investigation. We hope that the technical reason for the treatment plant failure is identified and fixed without delay. We also hope that the Council will ensure that King County takes this opportunity to reflect on current

decision making processes, and make any necessary improvements. As we trust you will agree, it is essential that we never find ourselves in this situation again in the future.

Thank you for taking these comments and questions into consideration. Please feel free to contact me directly at 206-297-7002 to discuss.

Sincerely,



Chris Wilke

Puget Soundkeeper and Executive Director

Puget Soundkeeper Alliance