City of Keizer

Stormwater Monitoring Plan

July 2013

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Section 1 – Introduction

1.1. WPCF Permit Requirements

This document outlines the City of Keizer Monitoring Plan, which is a requirement of the Water Pollution Control Facilities (WPCF) permit. In Schedule B.2, the permit states that the submitted Stormwater Monitoring Plan must:

> *a. Propose a sampling program representative of your injection systems based on the results of the System-Wide Assessment that characterizes the stormwater injected below ground so that you can demonstrate compliance with action levels in Schedule A Table 1. You may prioritize the monitoring based on potential risks to groundwater, considering such factors as vehicular traffic and land use.*
>
> *b. Unless otherwise approved by us in writing, the Stormwater Monitoring Plan must include annual sampling of Schedule A, Table 1 constituents.*
>
> *c. Include a list of underground injection system sampling locations.*

1.2. Groundwater Protectiveness Demonstration (Fate and Transport Model)

Keizer plans to select monitoring sites which characterize local stormwater inputs and which also represents the UIC system and various potential risk sub-categories. However, the City has contracted with GSI Water Solutions to perform a Groundwater Protectiveness Demonstration (GWPD) via a local Fate and Transport Model. The process began in July of 2012, and model results (including new Keizer-specific Waste Management Boundaries for UICs) are expected in the fall of 2013.

Because the model results are needed before sites are chosen, the location of the sampling sites may not be known at permit issuance. However, Keizer will submit chosen sample site locations to DEQ once model results are available and have been analyzed. The methodology for selecting sampling sites is included in the document below.

Section 2 – UIC System Overview

2.1. Keizer UIC System Description

The City of Keizer currently owns/operates 86 UICs within the city limits. Most of the UICs are configured as a network of catchbasins connected by horizontal perforated pipe. Of the 86 UICs, 20 are connected downstream to the MS4 system (sometimes with an overflow or weir). The majority of UIC drainage comes from residential, and to a lesser extent, commercial taxlots. There are only 2 UICs in industrially zoned areas.

2.2. Systemwide Assessment Findings

Part of the monitoring strategy includes representing areas at higher risk for certain pollutants, as shown by the results of the Systemwide Assessment. The results of Keizer's Systemwide Assessment are outlined below:

- 25 UICs receiving drainage from roads with greater than 1000 trips per day
- 1 UIC installed in groundwater (City intends to pursue closure)
- 58 UICs within 500 feet of a water well; and 1 additional UIC >500 feet but within a 2 year Time of Travel delineation *
- No prohibited UICs found
- 13 UICs which could receive drainage from Industrial/Commercial properties

The above were required assessment factors from the WPCF permit, and identify areas at higher risk of pollutant loading. In addition to the above factors, the City will also take into consideration areas with high densities of wooden power poles, which are a potential source of Pentachlorophenol (a Table 1 Pollutant).

* *Note on Horizontal Setbacks: Once Keizer's Groundwater Protectiveness Demonstration (GWPD) results are complete, the model will determine a new protective horizontal distance, in the form of a Waste Management Area or WMA setback around each UIC. When the new WMA distances are applied, the 59 UICs currently listed as being within horizontal setbacks will be replaced with the number of UICs with wells within their WMA boundary.*

Section 3 – Sampling Plan

3.1. Choosing Sampling Sites

Sample sites will not be selected until the results of the GWPD Model are available. However, the strategy for choosing sampling sites for Keizer Monitoring Plan is outlined below:

- Sample sites will be chosen to *represent stormwater inputs* (both UIC and MS4)
- Sample sites will *represent possible pollutant source* areas as much as possible (UICs with >1000 TPD, Commercial/Industrial drainage, wooden power pole density, etc.)
- Sample Sites will be chosen predominantly from the "Response Needed" UICs (those *without protectiveness demonstrations*). See Section 3 of the UIC Management Plan (UICMP) for more details.

Sample sites will be chosen to represent overall stormwater inputs, and each category of possible pollutant source areas for Keizer. The sites will also be selected mainly or entirely from UICs which do not have a protectiveness demonstration. In this way, monitoring information will help ensure that UICs which are inherently less protective will be actively monitored for impacts, so that protective steps can be applied as needed.

3.2. Stormwater Sampling Plan

Keizer proposes the following Sampling Plan elements for the first two years of sampling, with a reassessment to follow based on results. Actual sample locations will not be selected until after GWPD model results are complete (in Fall 2013):

- Select 6-8 representative sample sites (see Subsection 3.1)
- Sample two (2) storms per year for each site (proposed Table 1 Pollutants, below)
- Additional sampling may be performed in cases of Action Level exceedance
- Reassess the Sampling Plan after two (2) years, based on sampling results

3.3. Proposed Table 1 Sampling Pollutants

Keizer's proposed Table 1 Pollutants are below, with Action Levels:

TABLE 1 POLLUANTS - Action Levels for Pollutants	
Monitoring Parameter	**Action Level at Injection Point (μg/L)**
Benzo(a)pyrene	2
Di(2-ethylhexyl)phthalate	300
Pentachlorophenol	10
Lead (Total)	500
Zinc (Total)	50,000
Copper (Total)	1300

The City may choose to sample additional pollutants not on the Table 1 Pollutant list, in order to gather information on emerging pollutants or other pollutants of interest. However, the City will include this sampling information on any additional pollutant sampling, when annual reporting takes place.

The Table 1 Pollutant List will be revisited after two years, during the reassessment of the Sampling Plan. At that time, some pollutants may be proposed for addition or removal from the Table 1 Pollutant List, based on sampling results.

Section 4 – Applying Corrective Actions

There are two instances when Corrective Actions may be necessary based on an exceedance of a Table 1 Pollutant sample – exceedances high enough to represent possible 'endangerment' and non-endangerment exceedances.

The WPCF Permit defines 'endangerment' as the following:

> ***Endangerment of health or the environment*** *means that discharge to an underground injection system is reasonably likely to lead to pollutant concentrations at a point of groundwater use that (a) exceed an applicable maximum contaminant level under 40 CFR part 141, or (b) exceed a groundwater quality reference or guideline level under OAR chapter 340, division 040, or (c) otherwise harm the beneficial use of groundwater. An exceedance of a discharge action level does not in itself constitute an endangerment of health or the environment.*

Given an Action Level exceedence event, the City will make a determination (through use of the GWPD model or other means) as to whether the exceedence represents a possible endangerment, and will apply the appropriate Corrective Actions to address the situation.

4.1. Corrective Actions in Cases of Possible Endangerment

In the case of a Table 1 Pollutant Action Level exceedence high enough to constitute a possible endangerment to groundwater, or in the case of a spill or other event which may endanger groundwater, the City will take the following required Corrective Actions:

4.1.1. Immediate DEQ Notification

In the event of a recognized possible endangerment of groundwater, the City will follow the reporting actions as required in the WPCF permit. In Schedule A, condition 4(a), the WPCF permit states, *"If discharges from one or more UICs endanger health or the environment, you must: a. Inform us consistent with Schedule F, condition 4(f)..."* which states:

> **f. Twenty-Four-Hour and Five-Day Reporting.** Unless a different compliance schedule and reporting requirements are otherwise noted in this permit, you must report any non-compliance that endangers health or the environment in accordance with 40 CFR 144.51(1)(6). You must provide any information of non-compliance that endangers health or the environment orally within 24 hours from the time you become aware of the circumstances. You must submit a written report within 5 days of the time you become aware of the circumstances.
> The written report must contain:
> i. A description of the violation and its cause, if known;
> ii. The period of violation, if known;
> iii. The estimated time the violation is expected to continue if it has not been corrected; and
> iv. Steps taken or planned to reduce, eliminate, and prevent recurrence of the violation.

4.1.2. Take Steps to Eliminate Endangerment with DEQ Approved Work Plan

In the event of a reported possible endangerment to groundwater, the City will follow the requirements for eliminating endangerment. In Schedule A, condition 4(b), the WPCF permit outlines the following required actions:

"*Take corrective action to eliminate any endangerment of health or the environment. You must complete all corrective actions as soon as practicable, with DEQ approval of work scope and schedule. You must submit updates regarding progress to us at least annually, and you may include them in annual reports required under Schedule B, condition 4*."

In summary, if a Table 1 Pollutant Action Level exceedance or other recognized event such as a spill occurs which is significant enough to constitute a possible endangerment of groundwater, the City will follow the required reporting and other actions outlined above.

4.2. Corrective Actions in 'Non-Endangerment' Cases

In the case of a Table 1 Pollutant Action Level exceedence which does not present a likely endangerment of groundwater, the City will utilize *the appropriate combination* of Corrective Actions listed below, in any order which best addresses individual exceedence circumstances.

4.2.1. Source Identification

In Schedule A, condition 4(c), the WPCF permit offers the following Corrective Action option in cases of pollutant exceedances, *"Attempt to identify the source(s) of an exceedance of Table 1 action levels"*. Source Identification would tend to be used in cases where the exceedence occurred at a UIC without applicable protectiveness demonstrations.

In the case of an exceedence, the specific pollutant which exceeded Action Levels will have likely sources associated with it. For example, an exceedence of Pentachlorophenol would lead staff to look in the area for a high density of wooden power poles, especially those which have been recently treated with insecticide, or which have bases housed in impervious which drains to a UIC.

In some cases the actual source may be more difficult to identify, such as the case with Di(2-ethylhexyl)phthalate, which comes from plastics, and which tends to be widespread. Exceedances which do not have an apparent source may be good candidates for re-sampling to determine if the cause was a one-time event such as an unreported spill or other temporary situation.

4.2.2. Identify UICs Implicated

In Schedule A, condition 4(d), the WPCF permit offers the following Corrective Action option in cases of pollutant exceedances, *"When source identification efforts are complete, determine the set of UICs that require corrective action, based on the identified source(s) or other factors"*. This Corrective Action would be typically be used in cases of a geometric mean exceedance of a specific pollutant.

If an exceedence is such that corrective actions must take place to mitigate or reduce a pollutant, the number of UICs implicated in the exceedence should be identified. In some cases, only the UIC with the exceedence will be implicated. But *if more than one exceedence takes place such that the geomean of the pollutant samples* exceeds Action Levels, then other UICs may be require attention.

In such cases, other UICs in the system *with similar pollutant source characteristics* should be identified. For instance, if a geomean exceedence of Pentachlorophenol is noted at a UIC which has a certain density of wooden power poles housed in impervious, it would be prudent to identify any other UICs with a similar density of these poles, and determine if they may also need corrective actions to reduce or mitigate the pollutant source.

4.2.3. BMP Assessment

In Schedule A, condition 4(e), the WPCF permit offers the following Corrective Action option in cases of pollutant exceedances, *"Assess whether best management practices need adjustment to eliminate or reduce influent concentrations and make appropriate, practicable changes"*. This corrective action would tend to be used in cases where the exceedence occurred at a UIC(s) without applicable protectiveness demonstrations.

In such cases, the pollutant which exceeded Action Levels will be associated with certain pollutant source conditions, which will naturally guide the assessment of BMPs to reduce the pollutant. For example, if a geometric mean of Benzo(a)pyrene samples exceed Action Levels, the most common source of this pollutant in stormwater would be vehicle related (especially from diesel engines).

Incomplete engine combustion can deposit Benzo(a)pyrene on roadways, to be picked up by stormwater runoff. Benzo(a)pyrene is also deposited from the atmosphere, a result of any combustion (residential wood burning, cigarettes). Therefore, a BMP like street sweeping may be implemented, or existing street sweeping increased in frequency, to reduce the source of Benzo(a)pyrene.

4.2.4. Resample

In Schedule A, condition 4(f), the WPCF permit offers the following Corrective Action option in cases of pollutant exceedances, *"Resample the discharge to UICs that had exceedances of Table 1 action levels to allow for calculation of a geometric mean that verifies or invalidates the original influent concentration".*

This corrective action would tend to be used in cases where the exceedence occurred at a UIC(s) without applicable protectiveness demonstrations. It may also take place for exceedances in which it is not clear whether the source(s) involved are consistently in effect, or based on a one-time event.

In these cases, a second sample would be taken, in order to determine a geometric mean of the pollutant level at that UIC. If the second sample does not exceed the Action Level, then no further action would be necessary. If the geometric mean of the two samples still exceeds Action Level, then other Corrective Actions would be implemented to determine the source(s) and whether protective measures are required.

4.2.5. Demonstrate Protectiveness

In Schedule A, condition 4(g), the WPCF permit offers the following Corrective Action option in cases of pollutant exceedances: *"Demonstrate that groundwater is protected through modeling or other approved approach".* This corrective action is one of the first things that should be considered in the event of an exceedence.

Protectiveness demonstrations, via the GWPD model results, or through other demonstrations, show that the exceedence in question will not affect groundwater beneficial uses (drinking water, irrigation, etc.). The first demonstration source would be

the GWPD model, which not only defines the WMA around UICs, but also can be run for specific pollutants.

For example, the protective WMA distance around Keizer UICs is based on ALL Table 1 Pollutants, including the most prevalent and most mobile. If a pollutant exceedence is for a less mobile pollutant, such as lead, the UIC may be protective within a much shorter distance. The GWMD model would be run for the pollutant(s) which exceeded, and if all water wells fall outside of the pollutant-specific WMA(s), the situation is still protective of groundwater.

There are other protective situations which, if defined, can constitute a protectiveness demonstration apart from model results. For example, if only municipal well(s) were within range of the UIC with the exceedence, municipal wells are deep and cased such that they are protected from shallow groundwater effects. Or in another example, additional information may lead to the determination that water well(s) near the UIC may in fact be abandoned, or located farther than previously thought. Any protectiveness demonstrations would be submitted to DEQ and subject to approval.

4.2.6. Retrofit

In Schedule A, condition 4(h), the WPCF permit offers the following Corrective Action option in cases of pollutant exceedances, *"Retrofit the affected UIC(s) so that groundwater is protected".* This corrective action would tend to be used in cases where the exceedence occurred at a UIC(s) without applicable protectiveness demonstrations, and which are found to have ongoing pollutant source issues which are well understood and difficult to remove or mitigate with other BMPs.

If a UIC has pollutant sources which are expected to present an ongoing issue, and which are not easily removed or mitigated, retrofitting is an option for reducing pollutants before they are injected into groundwater. Retrofits tend to be costly and time intensive to implement, and will usually be considered only after other measures are analyzed.

4.2.7. Close the UIC

In Schedule A, condition 4(i), the WPCF permit offers the following Corrective Action option in cases of pollutant exceedances, *"Decommission the UIC".* This corrective action would be used in cases where all other options have been exhausted, and the pollutant sources cannot be mitigated to the extent necessary to protect groundwater and beneficial uses.

If closure is the option selected, the City will follow procedures as outlined in the UIC Decommissioning Plan (included as part of the UICMP).