FIFTH FIVE-YEAR REVIEW REPORT FOR NORTHSIDE LANDFILL SUPERFUND SITE SPOKANE COUNTY, WASHINGTON

Prepared by

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Region 10
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8/23/2017

Date

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LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
IC	Institutional Control
MCL	Maximum Contaminant Level
µg/L	Micrograms per Liter
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCE	Tetrachloroethylene
PEW	Pilot Extraction Well
PFAS	Per- and Polyfluoroalkyl Substances
POTW	Publicly Owned Treatment Works
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RCW	Revised Code of Washington
ROD	Record of Decision
RPM	Remedial Project Manager
SDWA	Safe Drinking Water Act
TCE	Trichloroethylene
UECA	Uniform Environmental Covenants Act
UU/UE	Unlimited Use and Unrestricted Exposure
VISL	Vapor Intrusion Screening Level
VOC	Volatile Organic Compound
WAC	Washington Administrative Code

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the Fifth FYR for the Northside Landfill Superfund site (the Site). The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of one sitewide operable unit (OU), which will be addressed in this FYR. This OU addresses the groundwater remedy.

In March 1985, EPA and Washington Department of Ecology (Ecology) signed an agreement whereby Ecology assumed the lead responsibility for remedial actions at Northside, and in 1996, the City of Spokane and Ecology signed an agreement whereby the City would fund Ecology's oversight costs. Because this site is listed on the EPA National Priorities List, EPA is conducting the FYR.

EPA led the FYR process. Participants included EPA Remedial Project Manager (RPM) Piper Peterson; Ecology representatives Bill Fees and Cole Carter; City of Spokane represented by multiple parties led by Chuck Conklin and Kelle Vigeland; Spokane Regional Health District representatives Paul Savage and Mike LaScuola; and EPA contractor support staff, Treat Suomi and Sabrina Foster, from Skeo. The review began on August 30, 2016.

Site Background

The Site is located on approximately 345 acres of land in the northwestern part of the City of Spokane, Washington, approximately 1 mile east of the Spokane River. The 345 acres include the entire area within the fenced property, including the capped area and uncapped areas. The uncapped areas primarily include the buffer zone, open municipal solid waste cell and Old Burn Unit. Appendix C includes a site vicinity map. The Site includes closed landfill cells, active landfill cells and land adjacent to the landfill where future landfill cells can be added. The City of Spokane owns the Site and has operated the active municipal solid waste landfill since 1931. A 15-acre portion of the Site has remained in continued use as active landfill cells. As active cells fill and close, new cells on site will be constructed, permitted and opened for use. The City of Spokane plans to continue landfill operations at the Site until all remaining landfill areas are filled. Active cells at the landfill continue to accept demolition waste and serve as an incinerator bypass disposal area for waste that cannot be sent to the incinerator.

Site investigations in the early 1980s revealed that leachate from the landfill's old unlined refuse units had contaminated the groundwater with volatile organic compounds (VOCs) including tetrachloroethylene (PCE), trichloroethylene (TCE) and trichloroethane. The Site's feasibility study states that cleaning solvents from dry cleaners and other small business are probably the major source of the contaminant VOCs. VOCs leached through the landfill and into the aquifer beneath the Site. The Spokane Valley-Rathdrum Prairie Aquifer is the sole source of water supply for the Spokane-Coeur d'Alene area. Land use surrounding the facility includes predominantly residential land. Residential areas border the facility on all sides. In October 1983, the City identified VOCs in private residential wells adjacent to the Site. Residents and businesses within an approximate 1,000-foot buffer of site groundwater contamination were connected to a public water system for drinking water in November 1983.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Northside Landfill		
EPA ID: WAD980511778		
Region: 10	**State:** Washington	**City/County:** Spokane/Spokane
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name: Piper Peterson, with additional support provided by Skeo		
Author affiliation: EPA Region 10		
Review period: 10/1/2016 – 8/23/2017		
Date of site inspection: 10/26/2016		
Type of review: Statutory		
Review number: 5		
Triggering action date: 8/23/2012		
Due date *(five years after triggering action date)*: 8/23/2017		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Under a 1986 agreement with Ecology and a subsequent 1988 consent order with EPA, the City of Spokane completed a remedial investigation/feasibility study in 1988. The study found contamination in groundwater and soil beneath the landfill. Contaminants identified included chloroform, PCE, TCE, 1,1,1-trichloroethane, trans-1,2-dichloroethylene, vinyl chloride and 1,1-dichlorethane. PCE and TCE occurred in groundwater both on site and off site at levels that exceeded EPA's existing or proposed Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs). Exposure pathways of greatest concern included ingestion and inhalation of contaminated groundwater, based on the human health risk assessment (Table 1). EPA's evaluation of risks from exposure to other media, including soil and surface water, concluded that these media did not present unacceptable levels of risk.

Table 1: Contaminants of Concern by Media

Contaminant of Concern	Media
PCE	Groundwater
TCE	
1,1,1-Trichloroethane	
Chloroform	
Trans-1,2-dichloroethylene	
Vinyl chloride	
1,1-Dichloroethane	

Response Actions

After discovery of contamination in private residential wells near the Site in October 1983, the City of Spokane connected residences located near the area of the original contaminated groundwater plume to the public water supply in November 1983. All potentially affected properties were connected to municipal water in 1983 and all subsequent new construction in the area is added to the municipal system. Washington State law (WAC 173-160) restricts the construction of new wells within 1,000 feet of a landfill boundary.

EPA proposed the Site for the National Priorities List (NPL) in 1984. In 1985, EPA identified the City of Spokane as the sole potentially responsible party (PRP) for the Site. In 1986, EPA finalized the Site on the NPL.

EPA issued the Site's Record of Decision (ROD) on September 30, 1989. Although the 1989 ROD did not specify remedial action objectives (RAOs), it did state that EPA selected the remedy to prevent, reduce or control the contaminants leaving the landfill and entering the groundwater. The selected remedy consisted of the following remedial components:

- Closing the landfill, except new landfill units that meet the State Minimum Functional Standards.
- Capping the landfill waste units to reduce infiltration and contaminant migration to groundwater.
- Pumping and off-site treatment of the groundwater to prevent additional migration of contaminated groundwater beyond the landfill boundary.
- Monitoring groundwater.
- Providing alternative water to prevent exposure to contaminated groundwater.
- Implementing institutional controls to protect the cap, monitoring wells, and pumping and treatment system, as well as to restrict the construction of new wells and the use of existing wells in the area of the contaminated plume.
- Controlling landfill gas emissions.

The 1989 ROD states that EPA considered the pumping and treatment system to be an interim measure to control contamination migrating from the landfill until such time as other remedial measures, specifically the cap, became effective in consistently lowering the contaminant levels to below MCLs. The 1989 ROD states that, after two years of meeting groundwater cleanup levels, groundwater extraction and treatment operations shall be suspended for a year of monitoring to evaluate whether contaminant concentrations continue to meet the cleanup levels without treatment. The pumping and treatment system may not be dismantled for an additional five years after monitoring has indicated that treatment can be discontinued; the system must remain operational should it need to be restarted.

In 2009, EPA issued an Explanation of Significant Differences (ESD) to document the following modifications to the remedy selected in the 1989 ROD:

- Confirmed that MCLs are the selected cleanup level for all contaminants of concern (COCs) at the Site; established the more recently promulgated MCLs as groundwater cleanup levels for PCE and trans-1,2-dichloroethylene.
- Changed the groundwater treatment approach from off-site treatment at the publicly owned treatment works (POTW) to on-site treatment by air stripper.
- Clarified that the groundwater point of compliance is the downgradient side of the landfill, not the additional property acquired downgradient of the landfill for infiltration of surface water and treated groundwater.
- Changed the surface water point of compliance from the point where the POTW discharged to surface water (the Spokane River) to the location where treated water enters the on-site infiltration area.
- Clarified the objectives of the institutional controls required in the 1989 ROD, specified that land use restrictions are needed in perpetuity, listed the property parcels that require institutional controls and specified that the preferred and anticipated means of implementation was through a covenant under the Uniform Environmental Covenants Act (UECA –Chapter 64.70 Revised Code of Washington; RCW).

The cleanup levels selected in the 1989 ROD and clarified by the 2009 ESD were the MCLs under the SDWA (Table 2). The 2009 ESD states that in the future, if EPA issues a SDWA MCL for 1,1-dichloroethane, the MCL will also be considered the cleanup level for this COC.

Table 2: Groundwater COC Cleanup Levels

Groundwater COC	1989 ROD Cleanup Level (micrograms per liter; µg/L)	2009 ESD Cleanup Level (µg/L)
PCE	MCL (when promulgated)	5
TCE	5	No change
1,1,1-trichloroethane	200	No change
chloroform	100	No change
trans-1,2-dichloroethylene	MCL (when promulgated)	100
vinyl chloride	2	No change
1,1-dichloroethane	MCL (when promulgated)	No change*
* The MTCA Method B carcinogenic cleanup level is 7.68 µg/L based on an oral exposure slope factor of 5.7 E-03. However, this state cleanup level has not been promulgated as an MCL or as a cleanup level for the Site. In addition, as of the second quarter of 2016 this contaminant was below the detection limit of 0.5 µg/L.		

Status of Implementation

Dates for implementation of remedial design and remedial actions are included in Appendix B. The Site achieved construction completion in September 1993.

On December 31, 1991, the PRP closed all previously used landfill cells to new refuse in accordance with the closure requirements of the ROD and Washington State Minimum Functional Standards for landfills (Chapter 173-304 Washington Administrative Code; WAC). To allow for a future use of the Site, the PRP consolidated the former Sludge Disposal Area into the refuse, which allowed for the construction of a new 15-acre lined landfill waste unit in 1991. This new waste unit remains operating and active in 2017. The open waste unit is used on a limited basis, primarily for bypass when the county's waste to energy plant has its boilers off-line for maintenance. Current estimates are that the open waste unit will reach capacity in the late 2020's or early 2030's.

The landfill closure included capping to minimize infiltration of precipitation into the refuse to reduce leachate production and future contamination of groundwater. The capped area extends over 130 acres of the 345 acre site and meets the requirements of the ROD and State Minimum Functional Standards for Landfills.

In 1992, the PRP constructed a landfill gas collection system, including three flares to destroy recovered gases. In 2001, the PRP modified the gas collection and treatment system to produce energy via methane gas-fired generators. However, prior to the 2007 FYR, the Spokane Regional Clean Air Agency determined that the system did not meet Clean Air Act requirements; energy production terminated and landfill gas emission collection and destruction resumed. In 2017, only one flare continues to operate due to low volume of landfill gas.

The PRP installed a pilot extraction well (PEW) on the western boundary of the Site to remove contaminated groundwater for treatment to prevent further off-site migration of COCs to the northwest. The PRP treated this recovered water at the POTW from 1993 to 2003, and, with Ecology approval, changed the treatment train to passive air stripping on site and discharge of treated water to an infiltration basin adjacent to the landfill.

In 1997, a court order terminated the Consent Decree except for certain ongoing requirements the PRP is responsible for, such as performing operation and maintenance (O&M), monitoring and institutional controls, under oversight by Ecology.

Groundwater monitoring data indicated a reduction in the extent of the plume, and for more than two years (beginning with Quarter 1 2009 sampling event), concentrations of COCs in the landfill boundary monitoring wells (the groundwater point of compliance) were below the cleanup levels. According to the 1989 ROD, once cleanup levels have been achieved for two years, the PEW can be switched to operational standby mode to determine whether contaminant concentrations will rebound without active treatment. If contaminant concentrations remain below the cleanup levels for a period of five years total, the PEW system can be permanently dismantled. Therefore, in accordance with the ROD, the PRP submitted a request to Ecology to begin the active pump-and-treat shutdown period of two years. Ecology approved this request effective December 15, 2012. While active pump-and-treat is shutdown, the system has remained operational should it need to be restarted. Quarterly groundwater sampling has also continued during this period to monitor contaminant concentrations. The PRP completed repairs to the PEW pump in September 2012, to ensure the system remains in an operational standby mode. There have been no exceedances of cleanup levels in the shutdown period, so the system has not needed to be restarted. Table 3 shows the timeline of groundwater cleanup activities.

Table 3: Groundwater Cleanup Timeline

Activity	Date
Design of PEW began	May 1991
Construction of PEW complete	May 1992
PEW began operating	October 1993
Groundwater data first indicated that COC cleanup levels were achieved while PEW continued to operate	February 2009
EPA approved groundwater treatment change from off-site treatment at the POTW to on-site treatment with air stripping and discharge to a surface water infiltration gallery in 2009 ESD	October 21, 2009
PEW operated intermittently due to breakdowns and needed repairs	2010-2012
PEW repairs completed	September 26, 2012
Ecology approved beginning of two-year PEW shutdown period to evaluate whether COCs remain below cleanup levels without active treatment PEW transitioned to operational standby mode	December 15, 2012
Two-year compliance with cleanup levels achieved after PEW shutdown (operational standby mode)	December 15, 2014
EPA proposed the Site for groundwater optimization	January 9, 2017
Five-year compliance target date for maintaining PEW in operational standby mode, should COCs increase above cleanup levels and the system need to be reactivated	December 15, 2017

Institutional Controls Review

On April 27, 2011, EPA, the City of Spokane and the State of Washington executed an environmental covenant under the Washington State UECA to satisfy the institutional controls requirements in the 1989 ROD and 2009 ESD. The covenant, recorded with the Spokane County Assessor's office on June 17, 2011, encumbers the City-owned landfill property by restricting the use of groundwater, prohibiting actions that could affect the integrity of the remedy, and requiring the PRP to notify EPA and Ecology about changes in property ownership.

The environmental covenant applies to the City and all future owners of any part of or operation at the landfill property and carries out the institutional control objectives incorporated into the 2009 ESD (Table 4). As groundwater quality is restored to its intended use for potable water, the PRP or its successors, EPA and Ecology may opt to amend the environmental covenant to allow for access to groundwater, as appropriate.

In addition to the institutional controls recorded in the environmental covenant that are applicable to City-owned landfill property, WAC 173-160 restricts the construction of new wells within 1,000 feet of a landfill boundary. Ecology is authorized to enforce the state law through their "Start Card" program, which requires well drillers to submit well location information prior to initiating drilling. The request goes first to Ecology, which denies the request if the location is within the 1,000-foot landfill boundary buffer zone. If a request is approved by Ecology, the Spokane Regional Health District reviews the request next (see Figure 1).

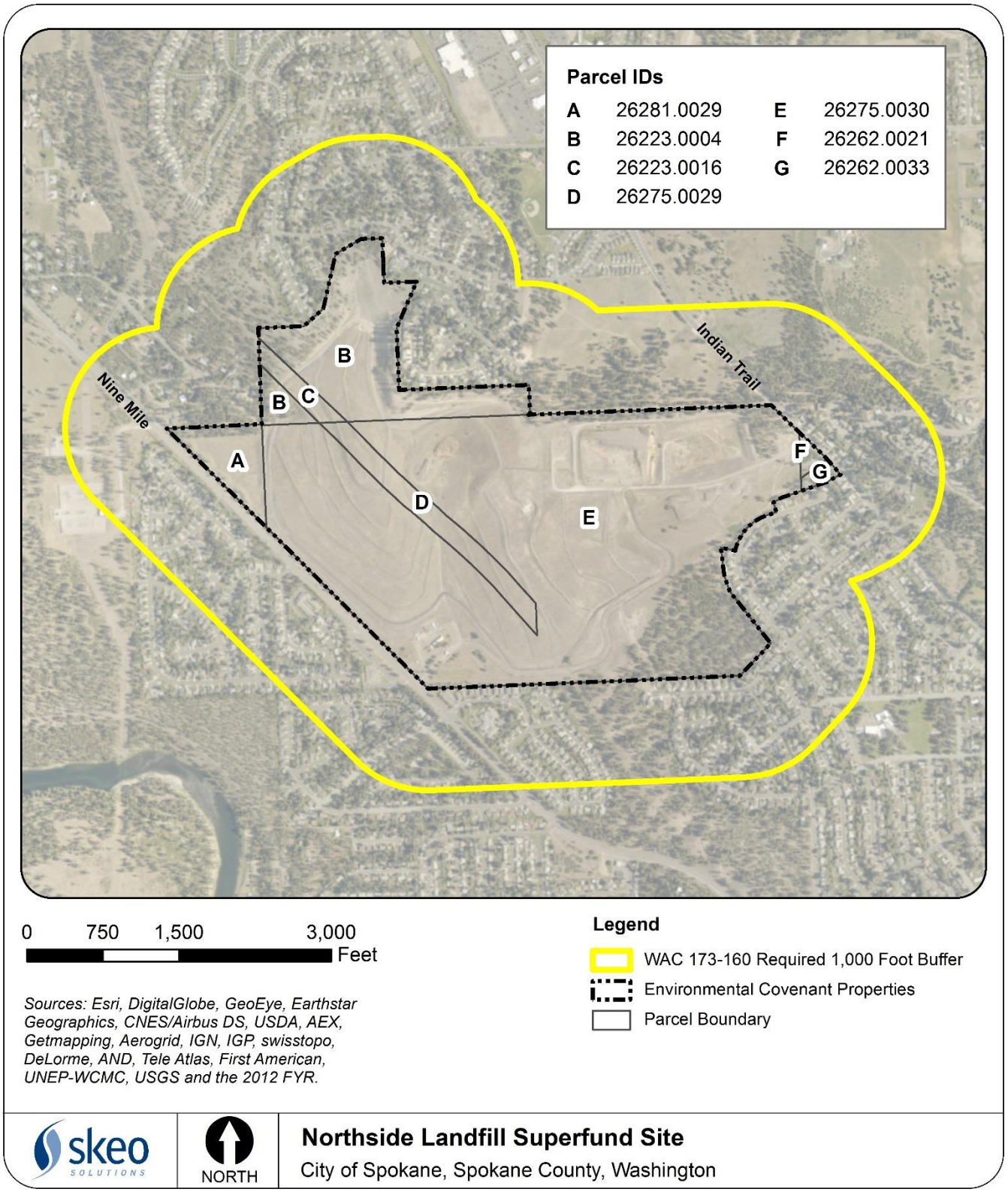
Furthermore, the Spokane County Health District (SCHD) has responsibilities pursuant to WAC 246-290, SCHD does not approve permits for buildings with groundwater wells proposed in the landfill property overlay. Also. SCHD has the authority to require sampling and analysis if a proposed well is near a landfill zone. Permits in a landfill zone require use of municipally supplied water. SCHD also provides information on landfill-related contamination during the new well permitting process.

The Washington Administrative Code ordinances are enforced for all landfills, regardless of Superfund status. Although no groundwater contaminants have exceeded cleanup levels since 2009 (see Data Review in Section IV.), groundwater use restrictions for the 1,000-foot buffer area will likely continue to be enforced at the state level.

Table 4: Summary Implemented Institutional Controls (ICs) from the Environmental Covenant

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents?	Impacted Parcel(s)	IC Objective	Instrument in Place	Notes
Groundwater	No	Yes	26223.0004, 26223.0016, 26275.0029, 26275.0030, 26281.0029, 26262.0021, and 26262.0033	• Prohibit activity on the landfill property that could damage or disturb the integrity or maintenance of the remedy in place. • Prohibit access to groundwater on the landfill property. • Limit well drilling on landfill property including buffer areas	April 2011 environmental covenant	Groundwater cleanup levels for site COCs have been achieved and maintained for several years. Once EPA determines that groundwater has been restored to intended use, institutional controls limiting well drilling in the buffer area surrounding the landfill and access to groundwater may be removed.
Soil	Yes	Yes	26223.0004, 26223.0016, 26275.0029, 26275.0030, 26281.0029, 26262.0021, and 26262.0033	• Prohibit activity on the landfill property that could damage or disturb the integrity or maintenance of the remedy in place. • Ensure long-term cap maintenance. • Ensure that EPA and Ecology are notified of any conveyance of the property. • Ensure sustained institutional controls through conveyance. • Restrict site uses to be compatible with institutional controls. • Provide EPA and Ecology access to the landfill property to inspect and evaluate the remedial action.	April 2011 environmental covenant	Restrictions intended to ensure long-term protectiveness and integrity of remedy in place.

Figure 1: Institutional Control Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Systems Operations/Operation & Maintenance

As PRP for the Site, the City of Spokane continues to perform O&M at the Site in accordance with the 1994 O&M manual, the 2008 Northside Landfill Groundwater Monitoring Plan and the 2011 environmental covenant. Ecology oversees the O&M performed by the City.

The O&M manual specifies inspection frequency and requirements for maintenance and repairs for the cover system, pursuant to the City's Washington State Landfill Permit to maintain the closed landfill for 30 years. O&M personnel at the Site visually inspect the landfill capped area on a monthly basis. The flare area, site perimeter and groundwater discharge areas are inspected weekly.

The O&M personnel also monitor landfill gas data to analyze the effectiveness of the landfill cover. The O&M personnel monitor the gas generation data for system contributions of methane, carbon dioxide and oxygen as the collected gas is burned in the flares. Oxygen concentration data also serve to determine potential leakage through the landfill cap liner. The gas collection system is regularly monitored and repaired as needed. Currently, only one of the three flares are operating based on gas volume produced.

As described above, the pump-and-treat shutdown period has been ongoing since 2012. During that time period, the PEW has been maintained in standby mode and groundwater monitoring has continued.

The ROD estimated total O&M costs would be $75,000 per year. In the past five years, they have fluctuated due to various upgrades and changes in staffing at the Site. Overall the costs to operate and maintain the closed portion of the landfill have averaged $434,957 per year[1]. The annual costs are provided in the site inspection checklist (Appendix D).

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR (Table 5) as well as the recommendations from the last FYR and the status of those recommendations (Table 6).

Table 5: Protectiveness Determinations/Statements from the 2012 FYR

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Short-term Protective	The remedy at the Site currently protects human health and the environment because area residents are connected to municipal water supplies; contaminants have been below cleanup levels at the landfill boundary and downgradient for over two years; access controls and security measures ensure that no unauthorized activity is occurring at the Site that may damage the capped area; the landfill cap is well-maintained and functions to prevent infiltration of surface water; and institutional controls are in place to prohibit land uses that could damage the cap and to prohibit installation of groundwater supply wells on the landfill property. However, in order for the remedy to be protective in the long term, the following actions need to be taken: • Complete necessary repairs to the PEW system. • Complete the needed landfill repairs to ensure the efficient functioning of the gas extraction system.

[1] Costs reported by City of Spokane include all costs associated with maintenance of the closed landfill area. This includes both O&M activities under Superfund, as well as other activities required by Ecology to meet the monitoring and maintenance criteria of applicable permits.

Table 6: Status of Recommendations from the 2012 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
Sitewide	The pump at the extraction well is inoperable.	The PRP will complete planned PEW system repairs to ensure that the system can be reactivated as necessary during and for five years after the year-long shutdown period.	Completed	In July 2012, the PRP retained Specialty Pump Services to repair the PEW system and ensure it remained in operational standby mode. The contractor completed these repairs in September 2012.	9/26/2012
Sitewide	A 2010 engineering assessment identified areas of the closed landfill that are in need of repair.	The PRP will implement repairs according to the recommendations received from CH2M HILL in 2011 and provide a status report to Ecology and EPA upon completion.	Completed	In June 2012, the PRP retained Anderson Environmental to implement repairs according to the recommendations received from CH2M HILL in 2011. Anderson Environmental completed quality control reports verifying the completed repairs in September 2012.	9/27/2012

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available by a newspaper posting in the Spokesman-Review newspaper on October 21, 2016, stating that there was a FYR and inviting the public to submit any comments to EPA. No comments were received. The results of the review and the report will be made available at the Site's information repository, located at Spokane Public Library, 906 W Main, Spokane, Washington.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date**.** The results of these interviews are summarized below. The full interview forms are included in Appendix I.

Interviewees included the previous and current EPA RPM, the former and current project manager for City of Spokane, an O&M contractor and a local resident. All interviewees were pleased with the progress of the Superfund site cleanup. Regulatory agencies had not received any comments or inquiries about the Superfund property in the last five years and the impact on the community appears to be minimal. EPA remains concerned about ensuring that the State's well drilling permit office looks at the clearly delineated "no drill" zones surrounding the landfill, a question raised in the 2007 FYR, and would like to seek resolution. EPA and the PRP expressed interest in site remedy optimization, including the potential decommissioning of the PEW system, closure and proper abandonment of wells that no longer need to be monitored, and operation of only one flare due to reduced landfill gas volume.

Data Review

In 1996, the City began performing routine groundwater monitoring for the Site in accordance with the 1995 Post-Closure Groundwater Monitoring Plan. In September 2008, based on applicable site investigation activities and monitoring program changes that occurred from 2004 through 2008, the City revised the Site's groundwater monitoring plan. The 2008 monitoring plan created separate monitoring programs for the active municipal solid waste landfill cell (not part of O&M for the Site, but a continued use of the city-owned property at the Site) and the closed refuse unit (required by site decision documents). Ecology oversees the O&M performed by the City. The active municipal solid waste landfill is regulated and permitted by the Spokane Regional Health District with

technical assistance from Ecology. The City also routinely monitors groundwater conditions in the immediate vicinity of the Northside Landfill in accordance with the provisions of its operating permit and with applicable state and federal regulations.

After achieving two years where groundwater COC concentrations remained below the cleanup levels (Quarter 1 2009 to 2012), Ecology and EPA authorized the start of the PEW shutdown period on December 15, 2012. The authorization indicated that the PEW shutdown period would last for two years to determine whether the COC concentrations remained below cleanup levels without active treatment. Groundwater monitoring has continued quarterly and, following repairs in September 2012, the PEW system has been maintained in operational standby mode such that it could be re-started, if needed. The PEW shutdown authorization letter stipulated that the PEW system should be maintained in operational standby mode for a period of five years after the shutdown, or until December 15, 2017.

The PRP performed quarterly groundwater monitoring for eight site compliance wells to ensure contamination is not migrating off site. Data for Quarter 3 of 2012 through Quarter 4 of 2016 found that only PCE was detected in monitoring events. A summary of detected concentrations of PCE, all below the cleanup level of 5 micrograms per liter (µg/L), is included in Table 7. Wells that had no detections of PCE in the current FYR review period were excluded from Table 7. One exception is MW-208, which is an upgradient well and had a first time PCE detection of 1.52 µg/L in Quarter 4 2016. The well was resampled twice in 2017 and had no detection of PCE. As this is an upgradient well, this detection is unlikely to have come from the Superfund site, but the well will continue to be monitored in coming sampling events to determine whether this issue persists. Full groundwater data from these sampling events is included in Appendix H.

Table 7: PCE Detections (µg/L) in Site Monitoring Wells, Quarter 3 2012 to Quarter 4 2016

		MW-BB	MW-C	MW-T	MW-M	PEW	MW-J	MW-N
2012	*Quarter 3*	4.72	0.90	1.32	3.54	*NS*	*NS*	*NS*
	Quarter 4	2.91	0.53	1.77	1.48	2.73	*NS*	*NS*
2013	*Quarter 1*	3.45	0.56	1.72	1.88	3.64	*NS*	*NS*
	Quarter 2	3.90	0.60	1.20	3.48	4.05	1.44	1.13
	Quarter 3	4.06	0.55	1.35	3.08	3.87	*NS*	*NS*
	Quarter 4	3.61	0.60	1.73	2.75	3.18	*NS*	*NS*
2014	*Quarter 1*	4.04	*ND*	1.54	2.93	3.74	*NS*	*NS*
	Quarter 2	2.31	*ND*	0.86	1.86	2.38	1.06	0.74
	Quarter 3	2.90	*ND*	1.11	2.27	2.71	*NS*	*NS*
	Quarter 4	2.98	*ND*	1.33	2.31	2.82	*NS*	*NS*
2015	*Quarter 1*	3.20	*ND*	0.94	1.91	2.76	*NS*	*NS*
	Quarter 2	3.45	0.52	1.24	2.63	3.20	1.52	1.01
	Quarter 3	3.30	0.51	1.39	2.48	2.28	*NS*	*NS*
	Quarter 4	3.52	1.34	2.13	3.01	3.54	*NS*	*NS*
2016	*Quarter 1*	3.93	0.53	1.72	0.80	3.12	*NS*	*NS*
	Quarter 2	3.94	0.63	1.09	2.68	4.09	*ND*	*ND*
	Quarter 3	3.02	*NS*	1.05	2.39	2.72	*NS*	*NS*
	Quarter 4	4.20	1.25	0.55	3.60	*ND*	*NS*	*NS*

Notes:
Federal MCL and cleanup level for PCE is 5 µg/L. None of these detected PCE concentrations exceeded that cleanup level.
Duplicate well samples (for quality control) are not included in this table, but can be viewed in Appendix H.
Wells MW-BB, MW-C, MW-T and MW-N are operational wells (part of the pump and treat system), and MW-M, PEW, and MW-J are compliance wells.
ND: Not Detected (< 0.5µg/L)
NS: Not Sampled

PCE continues to be routinely detected in quarterly sampling of MW-BB, MW-T, MW-M and the PEW (range: 0.51 to 4.72 µg/L; cleanup level is 5 µg/L). These wells are all located at the northwestern boundary of the closed landfill, at, or beyond, the groundwater point of compliance, with groundwater flowing toward the northwest (Figure 2). Annual sampling of MW-J and MW-N, both located downgradient of the Site and beyond the groundwater point of compliance, has also detected PCE concentrations. As these PCE detections do not exceed the cleanup level of 5 µg/L, there is no migration of groundwater contamination in excess of cleanup levels off of the site area and into neighboring properties.

Data for the current FYR period included annual sampling events at the private well of Resident 1 from 2013 through 2015 and a one-time sampling event (during the current FYR period) in 2013 at the private well of Resident 2 (Table 8). Resident 1 is located downgradient from the Site and beyond the 1,000-foot no well drilling buffer. The resident opted not to have a municipal water supply connection and continues to use the private well, PW-1, on the property for a water supply. Resident 2 is located immediately downgradient of the Site and was connected to the municipal water supply in 1983; however, an operational private well on the property, PW-2, has continued to be used for irrigation and was sampled as part of groundwater monitoring efforts until 2013. The City of Spokane reported that the pipes at this property burst during cold weather, rendering the well unable to be sampled after this time. The property was then abandoned and has subsequently been acquired by new owners. The 2013 annual groundwater sampling report stated that PCE concentrations in PW-2 had been increasing for the previous 5 years; however, subsequent sampling of this well has not been performed because the PRP has not

been granted access by the new owners to sample the well[2]. It would be prudent to question the new owners regarding their use of the well and any activities in the area of the well that might impact sampling results or plume migration, as well as to ensure they are familiar with the Superfund cleanup. Sampling at all other private wells has been discontinued per the terms for reducing or discontinuing sampling stated in the 2008 Groundwater Monitoring Plan. PCE is the only COC that was detected in residential wells for these dates and the PCE detections were below the cleanup level. PW-1 was sampled in 2013, 2014 and 2015 with results 0.51, < 0.5, and 0.52 µg/L, respectively. Concentrations at PW-1 are consistent with concentrations measured at MW-K, supporting the conclusion that groundwater has attained remedial goals at PW-1. The maximum concentration in PW-2 was 4.6 µg/L in 2013.

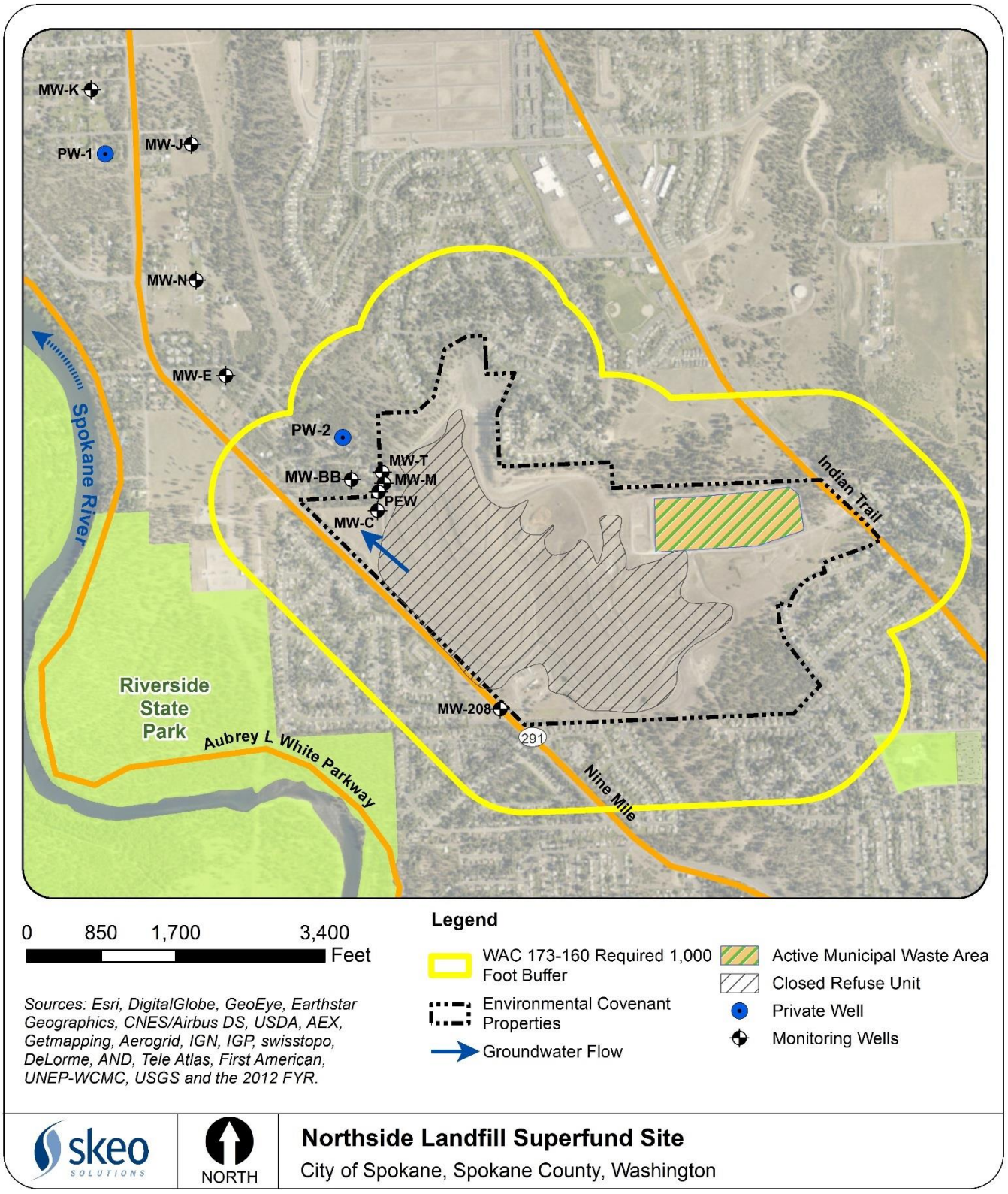
Table 8: PCE Detections (µg/L) in Private Wells, 2013 to 2016

Well	Cleanup Level	2013	2014	2015	2016
PW-1	5	0.51	ND	0.52	NS
PW-2	5	4.60	NS	NS	NS
ND: Not Detected (< 0.5µg/L) NS: Not Sampled					

In addition to groundwater monitoring, the PRP has permits for operation of the on-site system to collect and destroy landfill gas using a system of three flares. The project most recently reported its 2015 annual compliance certification in April 2016 showing the system complies with an active Air Operating Permit, issued in accordance with 40 CFR Part 70, Chapter 70.94 RCW, and Chapter 143-401 WAC. Based on the monthly reports, the landfill gas O&M data indicate that the remedy is functioning within the effective combustion parameters outlined in the 1994 O&M Manual. Starting in 2016, the permit is managed under the Regional Health District.

[2] EPA's guidance entitled Recommended Approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well (OSWER 9283.1-44, August 2014) recommends eight quarterly samples as the basis for determining whether cleanup level attainment has been achieved for each site COC for aquifer restoration to be complete. Current data support attainment for all COCs except PCE due to the lack of sampling in PW-2 since 2013. Confirmatory sampling may be required to determine whether the PCE cleanup goal has been achieved in this last well prior to a decision of whether aquifer quality has been restored.

Figure 2: Detailed Site Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Site Inspection

The site inspection took place on October 26, 2016. In attendance were Piper Peterson, EPA; Bill Fees and Cole Carter, Ecology; Ron Dowers, Rich Hanson, Chuck Conklin, Cadie Olsen, Sarah Scott, Kelle Vigeland, Travis Reilly and Harper Havko, City of Spokane; Paul Savage and Mike LaScuola, Spokane Regional Health District; and EPA contractor support staff, Treat Suomi, Skeo. The purpose of the inspection was to assess the protectiveness of the remedy. The completed site inspection checklist is in Appendix D. Photographs from the site inspection are available in Appendix F.

Site inspection participants met to discuss the current site status, progress toward meeting the recommendations specified in the 2012 FYR and other topics. Site staff have changed over the past five years due to reassignments and retirements, so this was the first opportunity for the full site team to meet and discuss individual roles and responsibilities regarding the Site. After the meeting, a subset of the site inspection participants toured the Site observing access controls, the water treatment system, the landfill gas flare system and the capped landfill. During the inspection, participants noted some areas of ponded water on the landfill cap that suggest erosion or subsidence. The PRP will address these as part of O&M activities for the Site. In addition, site participants viewed a large washout in the outer edge of the buffer area adjacent to the landfill. Although the hillside construction is designed to withstand a ten-year flood event, erosion during a May 2016 storm event cut a deep ravine into the hillside, washing out riprap, soil, geotechnical fabric and webbing. The unpaved access road at the top of the ravine was also damaged in the washout event. While this does not impact the cap itself, it was unclear whether the damage may have had an impact on the landfill gas extraction piping. The PRP had initiated an engineering report regarding the washout and this report will inform repairs needed.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

Yes, the remedy is functioning as intended by the decision documents. Capping of the landfill waste and active PEW treatment of groundwater contamination achieved groundwater COC cleanup levels for the Site. Ecology and EPA have authorized an evaluation period to determine whether COC concentrations will continue to meet cleanup levels without active treatment. The shutdown period began on December 15, 2012, and no exceedances of cleanup levels have been found up to the fourth quarter groundwater monitoring report for 2016. PCE is the only COC that continues to be detected, but all detected concentrations are below the cleanup level. If no cleanup level exceedances are found by December 2017, the PRP will have completed the shutdown phase and will be able to solicit formal decommissioning of the PEW, which has been maintained in standby operational mode during the shutdown period. Decommissioning of the PEW, if no longer needed, will likely reduce O&M costs. PW-2 had a detection of 4.6 µg/L of PCE in 2013 and has not been sampled since, despite monitoring reports noting an increasing trend in PCE concentrations in that well up until 2013. This property has changed hands and the new owners have not granted the PRP access to sample the well. It is recommended the PRP contact the new owners, determine whether and how the new owners are using the well, identify any activities performed in the area of the well, and also secure access to sample to determine the current status of site-related contamination in the well.

The PRP has implemented institutional controls for the Site in an environmental covenant, recorded with the deed records office in 2011. Institutional controls restrict activities that could damage the site remedy, prohibit use of groundwater and obligate the PRP to notify EPA and Ecology about any changes in property ownership. Well permitting currently restricts placement of any new wells within a 1,000-foot buffer surrounding the landfill. As groundwater quality is restored to its intended use as a potable water source, EPA will need to coordinate with Ecology and the PRP to amend the environmental covenant to allow for use of groundwater, as appropriate.

Site inspection participants discussed several maintenance needs during the October 2016 site inspection. These included repairs to areas of the cap that had ponding of water, as well as repairs to the washout area in the buffer zone resulting from the May 2016 10-year storm event. The PRP is currently working to address these needs.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:

Yes, the exposure assumptions, toxicity data and RAO equivalents used at the time of the remedy selection are still valid. The PRP continues to use the Site as an active landfill and coordinates operations with Ecology and state permitting offices. The MCL for chloroform has become more stringent since the 1989 ROD, having been reduced from 100 µg/L to 70 µg/L. However, within the current FYR period, sampling did not detect chloroform in any wells using a minimum detection level of 0.5 µg/L. Additionally, under WAC 173-340-720 (7)(b), Ecology has adjusted the cleanup level for TCE downward from the federal MCL of 5 µg/L to a MTCA Method B level of 4 µg/L to ensure that non-cancer risks from TCE in groundwater will not exceed a hazard quotient of 1. Ecology provided a summary of this change in an email February 6, 2017, and has requested that this more stringent value be used for monitoring purposes at the Site. Again, sampling during the current FYR period did not detect TCE in any wells using a minimum detection level of 0.5 µg/L. However, Ecology and EPA will need to determine a course of action should future sampling detect TCE concentrations between 4 and 5 µg/L.

Residents and businesses in the immediate area of site groundwater contamination, within the approximate 1,000-foot buffer area, are connected to a public water system for drinking water, thus direct exposure to groundwater is not a completed exposure pathway. However, indirect exposure to VOCs in indoor air as a result of vapor intrusion has not been previously evaluated on or adjacent to the Site. To determine if vapor intrusion is a concern for residential buildings overlying the groundwater plume, this FYR conducted a screening level risk assessment, using EPA's Vapor Intrusion Screening Level (VISL) calculator. The maximum concentration of PCE detected in a private well during the current FYR period was 4.6 µg/L in PW-2. The maximum detection for the second private well (PW-1) was 0.52 µg/L. The maximum detection for all sampled wells during the current FYR period was 4.72 µ/L in MW-BB. The screening-level vapor intrusion cancer risk for all three of these wells is within EPA's acceptable risk management range and below the noncancer hazard of 1.0 (Table 9). As contaminant concentrations remain below cleanup levels, vapor intrusion does not appear to be an exposure pathway of concern. Sampling during the current FYR period did not detect TCE or vinyl chloride, two other VOC site COCs, using a minimum detection limit of 0.5 µg/L. Confirmatory sampling of PW-2 is also needed to confirm whether any site-related contamination is present and if so, at what concentrations.

Table 9: Screening Level Vapor Intrusion Risk Assessment

COC	Maximum Concentration Detected (µg/L)	2016 VISL Calculator [d] (average groundwater temperature 25° C)	
		Residential Exposure	
		Cancer Risk	Noncancer Hazard Quotient
PW-1 (Private Well)			
PCE	0.52 [a]	$3.5x10^{-8}$	0.009
PW-2 (Private Well)			
PCE	4.6 [b]	$3.1x10^{-7}$	0.080
MW-BB (On-site Monitoring Well)			
PCE	4.72 [c]	3.2×10^{-7}	0.082

a. From the 2013 Quarter 2 Groundwater Report.
b. From the 2015 Annual Groundwater Report.
c. From the 2012 Quarter 3 Groundwater Report.
d. VISL calculator version 3.5.1 using May 2016 Regional Screening Levels at: http://www.epa.gov/oswer/vaporintrusion/guidance.html (accessed 1/27/2017).

Per- and polyfluoroalkyl substances (PFAS) are a group of emerging contaminants that have been found in groundwater downgradient of facilities that used PFAS-containing products and in some landfills that accepted waste from these facilities. There is no indication of any large-scale disposal of wastes containing PFAS in Northside Landfill.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No, no other information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues and Recommendations Identified in the FYR:

OU(s): Sitewide	Issue Category: Operations and Maintenance			
	Issue: Site inspection participants noted areas of ponding on the capped landfill.			
	Recommendation: Implement maintenance activities to ensure the continued integrity of the landfill cap.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	3/1/2018

OU(s): Sitewide	Issue Category: Operations and Maintenance			
	Issue: Erosion from a 100-year storm in May 2016 damaged portions of the elevated, outer edge buffer area and may have impacted the landfill gas collection piping.			
	Recommendation: Complete an assessment of damages and make repairs and modifications to better fortify against future storm events, as needed.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	3/1/2018

OU(s): Sitewide	Issue Category: Monitoring			
	Issue: PW-2 has not been sampled since 2013, despite showing an increasing concentration of PCE up until that point.			
	Recommendation: Obtain access from new owners to continue sampling PW-2 per the 2008 Groundwater Monitoring Plan. Provide new owner with site information and sampling results.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	3/1/2018

OTHER FINDINGS

In addition, the following are recommendations identified during the FYR, but do not affect current and/or future protectiveness:

- The City drafted the O&M plan for the Site in 1994, over 20 years ago. The plan needs updating to reflect current site conditions and O&M requirements.
- Site optimization for groundwater cleanup was proposed in January 2017 and is currently underway. Results from this evaluation are expected in fall 2017. The purpose of the optimization review is to confirm that sufficient groundwater data have been collected to verify that site cleanup levels have been met, the groundwater pump and treat system can be shut down, and groundwater monitoring for Superfund can be discontinued.

VII. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: The remedy at the Site currently protects human health and the environment because the cap has reduced contaminant migration to groundwater; active groundwater treatment has reduced contaminant concentrations to comply with cleanup levels; groundwater contaminant concentrations have remained below cleanup levels for the entirety of the FYR period, even with the active treatment system shut down; landfill gas management has protected the cap and remedial system in place; and institutional controls protect the remedy in place and prevent unacceptable exposure pathways. However, for the remedy to be protective in the long term, issues with ponding and potential erosion of the landfill cap, potential damage to the landfill gas collection system and sampling of private wells per the site's groundwater monitoring plan need to be addressed.

VIII. NEXT REVIEW

The next FYR Report for the Northside Landfill Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

2012 Annual Groundwater Monitoring Report, Northside Landfill Superfund Site, Spokane, Washington. Prepared by Cascadia Technical Services. February 28, 2014.

2012 Landfill Gas Report Data, Northside Landfill Superfund Site, Spokane, Washington. December 2012.

2013 Annual Groundwater Monitoring Report, Northside Landfill Superfund Site, Spokane, Washington. Prepared by Cascadia Technical Services. December 31, 2014.

2013 Landfill Gas Report Data, Northside Landfill Superfund Site, Spokane, Washington. December 2013.

2014 Annual Groundwater Monitoring Report, Northside Landfill Superfund Site, Spokane, Washington. Prepared by Cascadia Technical Services. April 1, 2015.

2014 Landfill Gas Report Data, Northside Landfill Superfund Site, Spokane, Washington. December 2014.

2015 Annual Groundwater Monitoring Report, Northside Landfill Superfund Site, Spokane, Washington. Prepared by Cascadia Technical Services. April 1, 2016.

2015 Landfill Gas Report Data, Northside Landfill Superfund Site, Spokane, Washington. December 2015.

Annual Air Compliance Certification Report, Northside Landfill Superfund Site, Spokane, Washington. Prepared by City of Spokane Solid Waste Disposal. April 20, 2016.

Air Operating Permit, Northside Landfill Superfund Site, Spokane, Washington. Issued by Spokane Regional Clean Air Agency. June 10, 2010.

Certification of Completion Memorandum, Northside Landfill Superfund Site, Spokane, Washington. EPA Region 10. March 15, 1995.

Consent Decree Termination, Northside Landfill Superfund Site, Spokane, Washington. United States District Court for the Eastern District of Washington. January 30, 1997.

Environmental Covenant, Northside Landfill Superfund Site, Spokane, Washington. State of Washington, Department of Ecology. April 27, 2011.

Explanation of Significant Differences, Northside Landfill Superfund Site, Spokane, Washington. EPA Region 10. October 21, 2009.

Final Close Out Report, Northside Landfill Superfund Site, Spokane, Washington. EPA Region 10. March 15, 1995.

First Five-Year Review Report, Northside Landfill Superfund Site, Spokane, Washington. EPA Region 10. September 10, 1997.

First Quarter 2013 Groundwater Monitoring Data, Northside Landfill Superfund Site, Spokane, Washington. City of Spokane. 2013.

First Quarter 2014 Groundwater Monitoring Report, Northside Landfill Superfund Site, Spokane, Washington. City of Spokane. March 24, 2014.

First Quarter 2016 Groundwater Monitoring Report, Northside Landfill Superfund Site, Spokane, Washington. City of Spokane. April 6, 2016.

Fourth Five-Year Review Report, Northside Landfill Superfund Site, Spokane, Washington. Prepared by Skeo Solutions. August 2012.

Fourth Quarter 2012 Groundwater Monitoring Data, Northside Landfill Superfund Site, Spokane, Washington. City of Spokane. 2012.

Fourth Quarter 2014 Groundwater Monitoring Report, Northside Landfill Superfund Site, Spokane, Washington. City of Spokane. December 18, 2014.

Fourth Quarter 2015 Groundwater Monitoring Report, Northside Landfill Superfund Site, Spokane, Washington. City of Spokane. December 23, 2015.

Groundwater Monitoring Plan, Northside Landfill Superfund Site, Spokane, Washington. Prepared by CH2M Hill. September 2008.

Industrial Discharge Agreement, Northside Landfill Superfund Site, Spokane, Washington. Issued by the City of Spokane Wastewater Management Department. October 15, 2016.

O&M Manual, Northside Landfill Superfund Site, Spokane, Washington. Prepared by CH2M Hill. May 1994.

Preliminary Close Out Report, Northside Landfill Superfund Site, Spokane, Washington. EPA Region 10. August 17, 1993.

Record of Decision, Northside Landfill Superfund Site, Spokane, Washington. EPA Region 10. September 30, 1989.

Second Five-Year Review Report, Northside Landfill Superfund Site, Spokane, Washington. EPA Region 10. September 2002.

Second Quarter 2013 Groundwater Monitoring Data, Northside Landfill Superfund Site, Spokane, Washington. City of Spokane. 2013.

Second Quarter 2014 Groundwater Monitoring Report, Northside Landfill Superfund Site, Spokane, Washington. City of Spokane. June 19, 2014.

Second Quarter 2016 Groundwater Monitoring Report, Northside Landfill Superfund Site, Spokane, Washington. City of Spokane. August 9, 2016.

Solid Waste Disposal Site and Facility Permit, Northside Landfill Superfund Site, Spokane, Washington. Issued by City of Spokane. January 1, 2016.

Third Five-Year Review Report, Northside Landfill Superfund Site, Spokane, Washington. Prepared by EPA Region 10 and US Army Corps of Engineers. September 2007.

Third Quarter 2012 Groundwater Monitoring Data, Northside Landfill Superfund Site, Spokane, Washington. City of Spokane. 2012.

Third Quarter 2013 Groundwater Monitoring Report, Northside Landfill Superfund Site, Spokane, Washington. City of Spokane. 2013.

Third Quarter 2014 Groundwater Monitoring Report, Northside Landfill Superfund Site, Spokane, Washington. City of Spokane. September 16, 2014.

Second Quarter 2016 Groundwater Monitoring Report, Northside Landfill Superfund Site, Spokane, Washington. Prepared by GeoEngineers. October 21, 2016.

APPENDIX B – SITE CHRONOLOGY

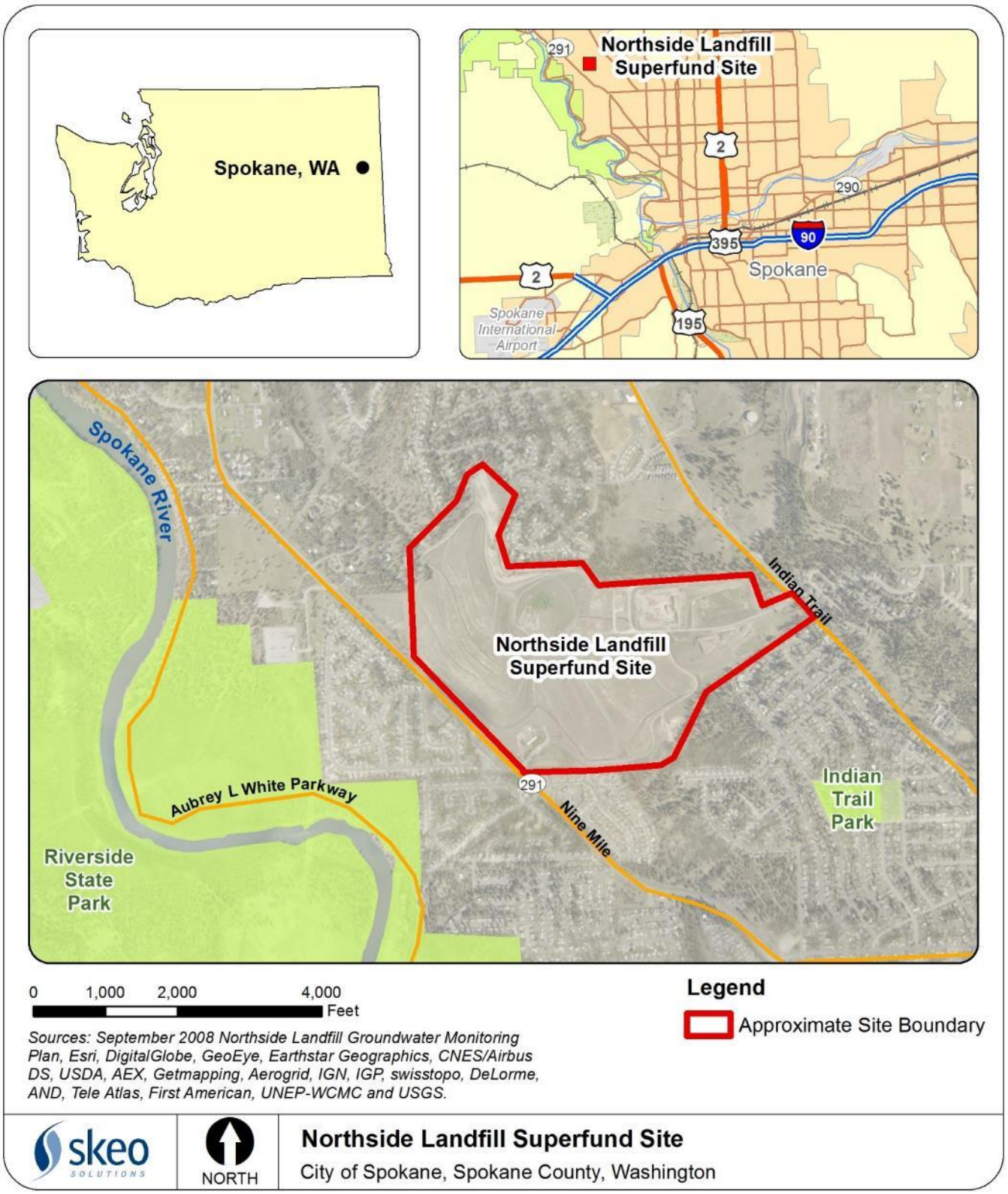
Table B-1: Site Chronology

Event	Date
Initial discovery of contamination	February 1, 1980
Initial site investigation for groundwater contamination	1981
City of Spokane identified groundwater contamination	October 1983
City of Spokane extended the public water supply to affected residents	November 1983
State completed preliminary assessment	August 28, 1984
EPA proposed the Site for listing on the NPL	October 15, 1984
EPA completed site inspection	April 2, 1985
EPA finalized listing of the Site on the NPL	June 10, 1986
City of Spokane began remedial investigation/feasibility study under an agreement with Ecology	1986
EPA issued Administrative Order on Consent for the City of Spokane to complete the remedial investigation/feasibility study	March 16, 1988
Remedial investigation/feasibility study completed EPA signed ROD	September 30, 1989
EPA, Ecology and City of Spokane signed Consent Decree	January 23, 1991
PRP began remedial design	February 11, 1991
PRP began design of PEW	May 1991
PRP completed remedial design	March 10, 1992
PRP began remedial action	March 16, 1992
Construction of PEW complete	May 1992
PRP completed remedial action	March 15, 1993
EPA prepared Preliminary Close-Out Report	August 17, 1993
Site achieved Construction Completion	September 2, 1993
PEW began operating PRP began discharging treated groundwater to POTW	1993
EPA conducted a final inspection of the Site	April 1, 1994
Site operations and maintenance (O&M) manual developed	May 1994
EPA issued Remedial Action Close-Out Report	March 17, 1995
Consent Decree Termination Order required City of Spokane to implement institutional controls	1997
EPA signed first FYR	September 19, 1997
EPA signed second FYR	September 30, 2002
PRP conducted pilot test to transition from POTW treatment to passive air stripping and discharge to infiltration gallery on site Ecology approved treatment train change to on-site treatment rather than through POTW	2003
EPA signed third FYR	September 28, 2007
Site groundwater monitoring plan finalized	September 2008
Groundwater data first indicated that COC cleanup levels were achieved while PEW continued to operate	February 2009
EPA issued ESD, including changing groundwater treatment from off-site treatment at the POTW to on-site treatment with air stripping and discharge to a surface water infiltration gallery in 2009 ESD	October 21, 2009
PEW operated intermittently due to breakdowns and needed repairs	2010-2012
EPA, the City of Spokane and Ecology signed an environmental covenant to restrict uses of the landfill property	April 27, 2011
The environmental covenant was recorded in Spokane County	June 17, 2011
EPA determined the Site had achieved the Sitewide Ready for Anticipated Use performance measure	April 26, 2012

Event	Date
EPA signed fourth FYR	August 23, 2012
PEW repairs completed	September 2012
Ecology approved beginning of two-year PEW shutdown period to evaluate whether COCs remain below cleanup levels without active treatment PEW transitioned to operational standby mode	December 15, 2012
Two-year compliance with cleanup levels achieved after PEW shutdown (operational standby mode)	December 15, 2014
EPA proposed the Site for groundwater optimization	January 2017
Five-year compliance target date for maintaining PEW in operational standby mode, should COCs increase above cleanup levels and the system need to be reactivated	December 15, 2017

APPENDIX C – SITE MAPS

Figure C-1: Site Vicinity Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

APPENDIX D – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: Northside Landfill	**Date of Inspection:** 10/26/2016
Location and Region: Spokane, Washington 10	**EPA ID: WAD980511778**
Agency, Office or Company Leading the Five-Year Review: EPA Region 10	**Weather/Temperature:** Sunny 60s

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other: _____
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **Previous O&M Site Manager** — Rich Hanson (Name) | Professional Engineer (Title) | 11/9/2016 (Date)
   Interviewed ☐ at site ☐ at office ☒ by email Phone: _____
   Problems, suggestions ☒ Report attached: Appendix I

2. **Current O&M Site Manager** — Kelle Vigeland (Name) | Environmental Manager (Title) | 12/13/2016 (Date)
   Interviewed ☐ at site ☐ at office ☒ by email Phone: _____
   Problems, suggestions ☒ Report attached: Appendix I

3. **O&M Staff** — Travis Reilly (Name) | Lab Technician (Title) | 11/3/2016 (Date)
   Interviewed ☐ at site ☐ at office ☒ by phone Phone: _____
   Problems/suggestions ☒ Report attached: Appendix I

4. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

5. **Other Interviews** (optional) ☒ Report attached: Appendix I

Previous EPA RPM Ellen Hale

Current EPA RPM Piper Peterson

Area Resident 1

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

   ☒ O&M manual ☒ Readily available ☐ Up to date ☐ N/A

	☒ As-built drawings	☒ Readily available	☐ Up to date	☐ N/A
	☒ Maintenance logs	☒ Readily available	☐ Up to date	☐ N/A
	Remarks: _____			
2.	**Site-Specific Health and Safety Plan**	☒ Readily available	☐ Up to date	☐ N/A
	☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: The plan is part of the Operating Plan for the municipal solid waste cell, but covers health and safety for both the open and closed portions of the landfill. It is out of date and not as complete as the City's broader Solid Waste Disposal Department's Waste to Energy Health and Safety Program. Although the Site is not currently part of a waste-to-energy project, this broader City guidance is the most complete health and safety program available and includes all solid waste disposal sites. Work will continue to integrate landfill personnel into the Waste to Energy/Solid Waste Disposal Department Health and Safety Program.			
3.	**O&M and OSHA Training Records**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: _____			
4.	**Permits and Service Agreements**			
	☒ Air discharge permit	☒ Readily available	☒ Up to date	☐ N/A
	☒ Effluent discharge	☒ Readily available	☒ Up to date	☐ N/A
	☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☐ N/A
	☒ Other permits: Regional Health District permitting for solid waste disposal.	☐ Readily available	☐ Up to date	☐ N/A
	Remarks: _____			
5.	**Gas Generation Records**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: _____			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: _____			
7.	**Groundwater Monitoring Records**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: _____			
8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: _____			
9.	**Discharge Compliance Records**			
	☒ Air	☒ Readily available	☒ Up to date	☐ N/A
	☒ Water (effluent)	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: Semiannual and annual reports provided to the Regional Air District in compliance with permit requirements. City also uses EPA's Electronic Greenhouse Gas Reporting tool (e-GGRT) to report on greenhouse gas emissions.			
10.	**Daily Access/Security Logs**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: _____			
	IV. O&M COSTS			
1.	**O&M Organization**			

☐ State in-house ☐ Contractor for state

☒ PRP in-house ☐ Contractor for PRP

☐ Federal facility in-house ☐ Contractor for Federal facility

☐ _____

2. **O&M Cost Records**

☒ Readily available ☒ Up to date

☐ Funding mechanism/agreement in place ☐ Unavailable

Original O&M cost estimate: $75,000 per year ☐ Breakdown attached

Total annual cost by year for review period if available

From: 01/01/2012 Date	To: 12/31/2012 Date	$808,059 Total cost	☐ Breakdown attached
From: 01/01/2013 Date	To: 12/31/2013 Date	$480,060 Total cost	☐ Breakdown attached
From: 01/01/2014 Date	To: 12/31/2014 Date	$294,382 Total cost	☐ Breakdown attached
From: 01/01/2015 Date	To: 12/31/2015 Date	$399,512 Total cost	☐ Breakdown attached
From: 01/01/2016 Date	To: 12/31/2016 Date	$192,771 Total cost	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: 2012 had higher than average costs due to the repair of the PEW system.

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: The Site is secured at all times and there is staff on site at least Monday through Thursday each week. .

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by): Self-reporting

Frequency: Daily awareness of institutional control implementation by on-site staff.

Responsible party/agency: PRP

Contact	Kelle Vigeland	City of Spokane	10/25/2016	_____
	Name	Title	Date	Phone no.

Reporting is up to date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A

Violations have been reported ☐ Yes ☒ No ☐ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks: _____

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☐ No vandalism evident

Remarks: Section of fencing damaged by an adjacent homeowner has since been repaired.

2. **Land Use Changes On Site** ☒ N/A

Remarks: _____

3. **Land Use Changes Off Site** ☒ N/A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: Road at the area of the washout in the outer edge of the buffer area needs repair.

B. Other Site Conditions

Remarks: The Site is well-maintained. A 10-year storm event in May 2016 caused erosion in a section of the outer edge of the landfill buffer area. Photos are included in Appendix F.

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (low spots) ☐ Location shown on site map ☒ Settlement not evident

Arial extent: _____ Depth: _____

Remarks: _____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident

Lengths: _____ Widths: _____ Depths: _____

Remarks: _____

3.	**Erosion**	☐ Location shown on site map	☒ Erosion not evident
	Arial extent: _____		Depth: _____
	Remarks: _____		
4.	**Holes**	☐ Location shown on site map	☒ Holes not evident
	Arial extent: _____		Depth: _____
	Remarks: _____		
5.	**Vegetative Cover**	☐ Grass	☒ Cover properly established
	☐ No signs of stress	☐ Trees/shrubs (indicate size and locations on a diagram)	
	Remarks: _____		
6.	**Alternative Cover** (e.g., armored rock, concrete)		☒ N/A
	Remarks: _____		
7.	**Bulges**	☐ Location shown on site map	☒ Bulges not evident
	Arial extent: _____		Height: _____
	Remarks: _____		
8.	**Wet Areas/Water Damage**	☐ Wet areas/water damage not evident	
	☐ Wet areas	☐ Location shown on site map	Arial extent: _____
	☒ Ponding	☒ Location shown on site map	Arial extent: _____
	☐ Seeps	☐ Location shown on site map	Arial extent: _____
	☐ Soft subgrade	☐ Location shown on site map	Arial extent: _____
	Remarks: One small area of ponding was visible. The City is repairing.		
9.	**Slope Instability**	☐ Slides	☐ Location shown on site map
	☒ No evidence of slope instability		
	Arial extent: _____		
	Remarks: _____		
B. Benches		☐ Applicable	☒ N/A
	(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
1.	**Flows Bypass Bench**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
2.	**Bench Breached**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
3.	**Bench Overtopped**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
C. Letdown Channels		☒ Applicable	☐ N/A
	(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		

1.	**Settlement** (Low spots)	☐ Location shown on site map	☒ No evidence of settlement
	Arial extent: _____		Depth: _____
	Remarks: _____		
2.	**Material Degradation**	☐ Location shown on site map	☒ No evidence of degradation
	Material type:_____		Arial extent: _____
	Remarks: _____		
3.	**Erosion**	☐ Location shown on site map	☒ No evidence of erosion
	Arial extent: _____		Depth: _____
	Remarks: _____		
4.	**Undercutting**	☐ Location shown on site map	☒ No evidence of undercutting
	Arial extent: _____		Depth: _____
	Remarks: _____		
5.	**Obstructions**	Type: _____	☒ No obstructions
	☐ Location shown on site map	Arial extent: _____	
	Size: _____		
	Remarks: _____		
6.	**Excessive Vegetative Growth**	Type: _____	
	☒ No evidence of excessive growth		
	☐ Vegetation in channels does not obstruct flow		
	☐ Location shown on site map	Arial extent: _____	
	Remarks: _____		
D. Cover Penetrations	☒ Applicable	☐ N/A	
1.	**Gas Vents**	☒ Active	☐ Passive
	☒ Properly secured/locked	☒ Functioning	☒ Routinely sampled	☒ Good condition
	☐ Evidence of leakage at penetration	☐ Needs maintenance	☐ N/A	
	Remarks: _____			
2.	**Gas Monitoring Probes**			
	☒ Properly secured/locked	☒ Functioning	☒ Routinely sampled	☒ Good condition
	☐ Evidence of leakage at penetration	☐ Needs maintenance	☐ N/A	
	Remarks: _____			
3.	**Monitoring Wells** (within surface area of landfill)			
	☒ Properly secured/locked	☒ Functioning	☒ Routinely sampled	☒ Good condition
	☐ Evidence of leakage at penetration	☐ Needs maintenance	☐ N/A	
	Remarks: _____			
4.	**Extraction Wells Leachate**			
	☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☒ N/A

Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☒ N/A

Remarks: _____

E. Gas Collection and Treatment ☒ Applicable ☐ N/A

1. **Gas Treatment Facilities**

☒ Flaring ☐ Thermal destruction ☐ Collection for reuse

☐ Good condition ☐ Needs maintenance

Remarks: One of three flares is functional. There is not enough gas to run the other flares.

2. **Gas Collection Wells, Manifolds and Piping**

☒ Good condition ☐ Needs maintenance

Remarks: At the time of writing this FYR, the PRP is performing an engineering assessment of the washout area, which will include a determination of whether the gas collection piping incurred any damage during the May 2016 washout event.

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

☒ Good condition ☐ Needs maintenance ☐ N/A

Remarks: _____

F. Cover Drainage Layer ☒ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A

Remarks: _____

2. **Outlet Rock Inspected** ☒ Functioning ☐ N/A

Remarks: _____

G. Detention/Sedimentation Ponds ☒ Applicable ☐ N/A

1. **Siltation** Area extent: _____ Depth: _____ ☐ N/A

☒ Siltation not evident

Remarks: Detention pond has large capacity but there is very little water and instead has grass and small trees.

2. **Erosion** Area extent: _____ Depth: _____

☒ Erosion not evident

Remarks: _____

3. **Outlet Works** ☒ Functioning ☐ N/A

Remarks: _____

4. **Dam** ☒ Functioning ☐ N/A

Remarks: _____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident

Horizontal displacement: _____ Vertical displacement: _____

Rotational displacement: _____

Remarks: _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident

Remarks: _____

I. Perimeter Ditches/Off-Site Discharge ☒ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☒ Siltation not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A

☒ Vegetation does not impede flow

Area extent: _____ Type: _____

Remarks: Small vegetative growth is regulary removed but was evident.

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident

Area extent: _____ Depth: _____

Remarks: _____

4. **Discharge Structure** ☒ Functioning ☐ N/A

Remarks: _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Performance Monitoring** Type of monitoring: _____

☐ Performance not monitored

Frequency: _____ ☐ Evidence of breaching

Head differential: _____

Remarks: _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☐ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing and Electrical**

☒ Good condition ☒ All required wells properly operating ☐ Needs maintenance ☐ N/A

Remarks: PEW is operational but not currently operating per the PEW shutdown authorized in December 2012.

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☒ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers

☐ Filters: _____

☐ Additive (e.g., chelation agent, flocculent): _____

☐ Others: _____

☐ Good condition ☐ Needs maintenance

☐ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☐ Equipment properly identified

☐ Quantity of groundwater treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:**

☒ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions).

The remedy was designed to restore groundwater downgradient of the Site and to prevent human exposure to contaminated groundwater. EPA is currently exploring remedy optimization for the Site based on all groundwater COC concentrations having been maintained below MCLs for a period of approximately eight years.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

O&M activities include quarterly groundwater sampling, annual private well sampling and monthly review of landfill gas generated at the Site, in addition to routine inspections and maintenance, as needed. Given the decline in groundwater COC concentrations below respective cleanup levels since the first quarter of 2009, EPA, Ecology and the City could potentially discuss a reduction in the frequency of groundwater monitoring for the Superfund cleanup, as appropriate.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

During the site inspection, participants visited a washout in the outer edge of the buffer area. The washout was approximately 10 to 40 feet deep. The cut at the top and bottom of a washout carved by water on the steep buffer hillside was approximately 10 feet deep. The area in the middle of this washout could be approximately 40 feet deep. The washout occurred during a May 2016 storm. The soils were a loose, coarse sand in the area where the washed out materials came to reside. There was not much cohesion to the washed out material. The road at the top of the buffer area was also damaged, with cuts and ruts resulting from the high volume of water flow in that area. The riprap, geotechnical fabric and geowebbing that had been placed in this area to protect against a 10-year storm event (City of Spokane, personal communication) was also damaged. Most of the rock was carried down the washout. The filter fabric was ripped and had been torn away in places. And there were many areas of geowebbing that had been carried down the hill.

D.	Opportunities for Optimization
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Permanent shutdown of the PEW system, which has been maintained in operational standby mode since December 2012, but not used, may provide opportunities to reduce O&M costs related to operation of the remedy.

Site Inspection Participants
Piper Peterson, EPA
Bill Fees, Ecology
Cole Carter, Ecology
Ron Dowers, City of Spokane
Rich Hanson, City of Spokane
Chuck Conklin, City of Spokane
Cadie Olsen, City of Spokane
Sarah Scott, City of Spokane
Kelle Vigeland, City of Spokane
Travis Reilly, City of Spokane
Harper Havko, City of Spokane
Paul Savage, Spokane Regional Health District
Mike LaScuola, Spokane Regional Health District
Treat Suomi, Skeo

APPENDIX E – PRESS NOTICE

EPA United States Environmental Protection Agency

Cleanup Measures Reviewed for Northside Landfill Superfund Site, Spokane

We Want to Hear From You

As someone living close to the site we want to keep you informed. Also you may know of or have observed things that can help our review team. If you have questions about the site or would like to participate in a community interview, ***the review team will be in Spokane on October 25, 2016****.*

Contact Information:

Piper Peterson, EPA Project Manager
(206) 553-4951
Peterson.Piper@epa.gov

To Submit Written Comments:

E-Mail to: Peterson.Piper@epa.gov

Mail to:
Piper Peterson, ECL-122
U.S. EPA Region 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101

More Information Is Available

Prior Five-Year Reviews, site information, and other documents are available.

Online:

https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=1000836

And at these locations:

Spokane Public Library
906 West Main
Spokane, WA 99201
Or
City of Spokane Engineering Services
West 808 Spokane Fall Blvd, Room 318
Spokane, WA 99201

What and Why

The U.S. Environmental Protection Agency has started the fifth Five-Year Review of the environmental cleanup at the Northside Landfill. EPA is required to review sites regularly when contaminants remain to ensure that cleanup actions continue to protect human health and the environment.

Site Background

The Northside Landfill covers 345 acres in northwest Spokane about one-half mile east of the Spokane River. It opened as the city landfill in 1931 and continued to operate until 1991. Waste disposal and open burning contaminated soil and groundwater with hazardous chemicals.

Northside Landfill Cleanup

The EPA began a long-term cleanup for the Northside Landfill in March 1992 and completed cleanup measures in September 1993. The cleanup included:

- closing, capping and landscaping the landfill;
- reducing and monitoring groundwater contamination;
- collecting and controlling landfill gas ;
- and restricting access to and use of the site.

On-going site activities include groundwater monitoring as well as operation and maintenance.

Five-Year Reviews

The previous 2012 Five-Year Review confirmed that conditions remain safe, and past cleanup measures continue to be effective. The Fifth Five-Year Review Report is scheduled to be completed and available to the public after August 2017.

TDD and/or TTY users may call the Federal Relay Service at 800-877-8339. Give the operator number (206) 553-4951.

APPENDIX F – SITE INSPECTION PHOTOS

Three landfill gas flares on site; only one operates due to low gas volumes.

View of the on-site office for maintenance of the landfill, with gas flares in the background.

Monitoring well with capped landfill visible in background.

View of PEW, which has been shut down and is in operational standby mode since December 2012.

Two views of the washout area in the outer edge of the landfill buffer zone. Left image shows material and geowebbing carried to the bottom by the water flow. Right image shows site RPM standing in washout for scale.

Damage to the access road at the top of the washout area.

Secured site access gates.

Ponding on the capped landfill.

During the October 2016 FYR site inspection, the City turned on the PEW system temporarily to show it is operational. This image shows pumped water discharging to the infiltration gallery.

APPENDIX G – DETAILED APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) REVIEW TABLES

This FYR included a review of relevant site-related documents, including the ROD and recent monitoring data. Appendix A provides a complete list of the documents reviewed.

Groundwater ARARs

The 1989 ROD and 2009 ESD, established cleanup levels for all groundwater COCs based on the Safe Drinking Water Act MCLs. When EPA signed the ROD in 1989, MCLs had not been promulgated for PCE, trans-1,2-dichloroethylene or 1,1-dichloroethane. The 2009 ESD documented the now-promulgated MCLs for PCE and trans-1,2-dichloroethylene as the cleanup levels for these COCs. An MCL for 1,1-dichloroethane has not yet been promulgated. For the COCs with MCL cleanup levels, only the MCL for chloroform has changed. The 2017 MCL for chloroform is now 70 µg/L and is more stringent than the original 100 µg/L cleanup level. See Table G-1 for reference.

Table G-1: Groundwater ARARs Review

Contaminant	1989 ROD MCLs (µg/L)	2009 ESD MCLs (µg/L)	Current MCLs [a] (µg/L)	Change
PCE	Not promulgated	5	5	None
TCE	5	5	5 [b]	None
1,1,1-trichloroethane	200	200	200	None
Chloroform	100[b]	100	70[c]	More stringent
Trans-1,2-dichloroethylene	Not promulgated	100	100	None
Vinyl Chloride	2	2	2	None
1,1-dichloroethane[d]	Not promulgated	Not promulgated	Not promulgated	None

a. 2017 National Primary Drinking Water MCLs are available at: https://www.epa.gov/ground-water-and-drinking-water/table-regulated-drinking-water-contaminants (accessed 1/15/2017).
b. Based on toxicity data, Ecology has revised their state-promulgated cleanup level for TCE to 4 µg/L to meet Method B criteria and not exceed the hazard quotient of 1.
c. Criterion for total trihalomethanes.
d. The Washington Model Toxics Control Act Method B (https://fortress.wa.gov/ecy/clarc/FocusSheets/Soil%20Methods%20B%20and%20A%20unrestricted.pdf; accessed 1/25/2016) groundwater target cleanup level for 1,1-dichloroethane in groundwater is 7.68 µg/L. However, this COC has not been detected in quarterly groundwater monitoring reports at concentrations above 0.5 µg/L.

APPENDIX H – GROUNDWATER MONITORING DATA FOR QUARTER 3 2012 THROUGH QUARTER 3 2016

Table H-1: Groundwater Monitoring Results from Quarter 3, 2012*

Northside Landfill Groundwater Monitoring Results
Third Quarter 2012

Location	NMW208	NMWBB	NMWC	NMWM	NMWT	T-Dupe
Date	7/11/2012	7/11/2012	7/10/2012	7/11/2012	7/10/2012	7/10/2012
Time	9:39	11:35	11:40	8:30	10:05	8:45
SWL (ft)	71.67	114.86	81.94	125.76	135.27	
Temp (deg F)	56.7	60.8	57	62.6	52.3	
pH	7.72	7.15	7.51	7.1	7.58	
Conductivity (uS/cm)	520	830	550	850	480	
CONVENTIONAL PARAMETERS						
Bicarbonate (mg/L)	130	422	228		249	248
Chloride (mg/L)	16.6	14.2	16.8		0.861	0.875
COD (mg/L)	5 U	5 U	5 U		5 U	5 U
Conductivity (µmhos/cm)	564	908	578		490	488
Depth ()	71.67	114.86	81.94	125.76	135.27	
Hardness (mg/L)	228	413	222		209	217
NH3-N (mg/L)	0.02 U	0.02 U	0.02 U		0.02 U	0.02 U
NO2/N (mg/L)	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U
NO3/N (mg/L)	3.54	8.43	4.19		2.02	2.03
Sulfate (mg/L)	26	27	35.3		5.99	6.19
TOC (mg/L)	0.829	0.898	0.814		1.99	2.09
Total Coliform (MPN/100mL)	2 U	2 U	2 U		2 U	2 U
METALS						
dissolved calcium (mg/L)	42.6	85.6	46.7		48.9	39.1
dissolved iron (mg/L)	0.01 U	0.01 U	0.0186		0.01 U	0.01 U
dissolved magnesium (mg/L)	26.8	41	24.9		18.3	17
dissolved manganese (mg/L)	0.001 U	0.001 U	0.00451		0.001 U	0.001 U
dissolved zinc (mg/L)	0.00763	0.0055	0.00968		0.00924	0.00979
calcium (mg/L)	44.9	92.5	47.5		52.3	54.2
magnesium (mg/L)	28.2	44.1	25		19.1	19.8
potassium (mg/L)	4.13	5.7	3.49		4.42	4.52
sodium (mg/L)	6.52	7.74	7.16		2.03	2.1
VOLATILE ORGANIC COMPOUNDS						
1,1,1,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

1,2,3-Trichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane(DBCP) (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-dibromoethane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromoethane (EDB) (µg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VOLATILE ORGANIC COMPOUNDS						
2-butanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-hexanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
4-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
acetone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
acrylonitrile (µg/L)	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
benzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromodichloromethane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
bromoform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon disulfide (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon tetrachloride (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
chlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
isopropylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl isobutyl ketone (MIBK) (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
methylene chloride (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl-t-butyl ether (MTBE) (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-propylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-isopropyltoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
styrene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	0.5 U	4.72	0.9	3.54	1.32	1.33

toluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichlorofluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
hexachlorobutadiene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
naphthalene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

*Source: City of Spokane. LFGW3412 2012-Q3 GW Spreadsheet-Closed Cell.xls

Table H-2: Groundwater Monitoring Results from Quarter 4, 2012*

Northside Landfill Groundwater Monitoring Results
Fourth Quarter 2012

Location	NMW208	NMWBB	BB-Dup	NMWC	NMWT	NMWM	PEW
Date	10/3/12	10/4/12	10/4/12	10/4/12	10/3/12	10/3/12	10/3/12
Time	11:35	11:00	8:25	9:40	8:55	9:40	10:35
SWL (ft)	74.57	116.71		84.16	138.02	128.38	133.08
Temp (deg F)	56.5	60.8		55.4	52.3	60.1	58.3
pH	7.78	7.15		7.59	7.42	7.3	7.17
Conductivity (uS/cm)	510	710		480	630	700	740
CONVENTIONAL PARAMETERS							
Bicarbonate (mg/L)	215	321	324	199	316		
Chloride (mg/L)	15.5	14.1	14	13.4	2.94		
COD (mg/L)	5 U	5 U	5 U	5 U	13.7		
Conductivity (µmhos/cm)	538	733	750	504	635		
Depth (ft)	74.57	116.71		84.16	138.02	128.38	133.08
Hardness (mg/L)	243	360	363	229	326		
NH3-N (mg/L)	0.02 U	0.05 U	0.05 U	0.05 U	0.02 U		
NO2/N (mg/L)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		
NO3/N (mg/L)	3.69	5.2	5.18	3.24	3.9		
Sulfate (mg/L)	25.4	29.7	29.7	26.2	12.4		
TOC (mg/L)	1	0.961	1.16	1.03	7.36		
Total Coliform (MPN/100mL)	2 U	2 U	2 U	2 U	2 U		
METALS							
dissolved calcium (mg/L)	48.3	81.8	82.4	49.7	81.4		
dissolved iron (mg/L)	0.01 U	0.01 U	0.01 U	0.0231	0.01 U		
dissolved magnesium (mg/L)	29.7	37.8	38.1	25.5	29.9		
dissolved manganese (mg/L)	0.00112	0.001 U	0.001 U	0.0104	0.001 U		
dissolved potassium (mg/L)	4.58	5.66	5.68	3.78	5.99		
dissolved sodium (mg/L)	8.04	8.41	8.45	7.98	3.72		
dissolved zinc (mg/L)	0.0155	0.00812	0.0115	0.0105	0.0061		
calcium (mg/L)	45	75.1	73.9	45.3	78.8		
magnesium (mg/L)	30.8	38.9	38.4	25.9	32.2		
potassium (mg/L)	4.59	5.68	5.58	3.76	6.33		
sodium (mg/L)	8.27	8.68	8.61	8.12	4.04		
VOLATILE ORGANIC COMPOUNDS							
1,1,1,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

1,2,4-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane(DBCP) (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-dibromoethane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromoethane (EDB) (µg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-butanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-hexanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
4-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
acetone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
acrylonitrile (µg/L)	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
benzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromodichloromethane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
bromoform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon disulfide (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon tetrachloride (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
chlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
isopropylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl isobutyl ketone (MIBK) (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
methylene chloride (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl-t-butyl ether (MTBE) (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-propylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-isopropyltoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
styrene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	0.5 U	2.91	2.91	0.53	1.77	1.48	2.73
toluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichlorofluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
hexachlorobutadiene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
naphthalene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

*Source: City of Spokane. LFGW3412 2012-Q4 GW Spreadsheet-Closed Cell.xls

Table H-3: Groundwater Monitoring Results from Quarter 1, 2013*

Northside Landfill Groundwater Monitoring
First Quarter 2013

Location	NMW208	NMWBB	NMWC	C-Dup	NMWM	NMWT	PEW
Date	2/26/13	2/26/13	2/26/13	2/26/13	2/27/13	2/27/13	2/27/13
Time	13:30	11:50	10:20	8:50	11:30	10:30	11:55
SWL (ft)	72.93	115.26	82.62		126.81	136.41	126.52
Temp (deg F)	56.4	59.5	56.1		59.9	51.3	59.7
pH	7.69	7.18	7.49		7.28	7.49	7.04
Conductivity (uS/cm)	530	750	540		660	470	830
CONVENTIONAL PARAMETERS							
Bicarbonate (mg/L)	220	362	212	214		238	
Chloride (mg/L)	14.7	9.35	15	15.1		1.7	
COD (mg/L)	5 U	5 U	5 U	5 U		5 U	
Conductivity (µmhos/cm)	549	782	567	554		486	
Depth (ft)	72.93	115.26	82.62		126.81	136.41	126.52
Hardness (mg/L)	271	442	354	283		260	
NH3-N (mg/L)	0.05 U	0.0465	0.104	0.0349		21.1	
NO2/N (mg/L)	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U	
NO3/N (mg/L)	3.8	5.77	3.75	3.75		2.01	
Sulfate (mg/L)	25.4	19.4	32.3	31.4		5.57	
TOC (mg/L)	0.74	0.988	0.685	0.762		2.09	
Total Coliform (MPN/100mL)	2 U	2 U	2 U	2 U		2 U	
METALS							
dissolved iron (mg/L)	0.01 U	0.01 U	0.0278	0.0288		0.01 U	
dissolved manganese (mg/L)	0.00122	0.00105	0.00321	0.00329		0.001 U	
dissolved zinc (mg/L)	0.0126	0.0154	0.0129	0.0128		0.0161	
calcium (mg/L)	54.1	98	52.1	50.7		64	
magnesium (mg/L)	33.2	48.1	27.7	27.1		24.7	
potassium (mg/L)	5.05	6.48	4.02	3.88		5.52	
sodium (mg/L)	7.71	8.08	7.72	7.51		2.12	
VOLATILE ORGANIC COMPOUNDS							
1,1,1,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane(DBCP	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-dibromoethane (µg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-butanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-hexanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U

Northside Landfill Groundwater Monitoring
First Quarter 2013

Location	NMW208	NMWBB	NMWC	C-Dup	NMWM	NMWT	PEW
4-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
acetone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
acrylonitrile (µg/L)	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
benzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromodichloromethane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
bromoform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon disulfide (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon tetrachloride (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
chlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
isopropylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl isobutyl ketone (MIBK) (µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
methylene chloride (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl-t-butyl ether (MTBE) (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-propylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-isopropyltoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
styrene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	0.5 U	3.45	0.56	0.58	1.88	1.72	3.64
toluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichlorofluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
hexachlorobutadiene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
naphthalene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

*Source: City of Spokane. LFGW3412 2013-Q1 GW Spreadsheet-Closed Cell.xls

Table H-4: Groundwater Monitoring Results from Quarter 2, 2013*

Analyte Groups: VOC, P, MFS+, S							
Location	**NMWT**	**NMWBB**	**NMW208**	**208-Dup**	**NMWE**	**NMWK**	**NMWC**
Date	5/7/13	5/7/13	5/7/13	5/7/13	5/8/13	5/8/13	5/8/13
Time	9:35	11:45	10:50	8:30	10:40	11:35	8:50
FIELD PARAMETERS							
FieldSWLInitial*	134.12	113.5	70.16		53.05	59.36	80.83
FieldTemp	51.1	60.1	56.3		55	57.1	56.3
FieldPH	7.5	7.13	7.73		7.72	7.71	7.54
FieldConductivity	475	798	504		459	530	514
CONVENTIONAL PARAMETERS							
Bicarbonate (mg/L)	226	394	214	218	194	234	212
Chloride (mg/L)	2.85	12.2	16.4	16.6	12.6	13.9	15.9
COD (mg/L)	5 U	5 U	5 U	5.34	5 U	5 U	5 U
Conductivity (µmhos/cm)	531	906	572	572	518	597	582
Depth (ft)	134.12	113.5	70.16		53.05	59.36	80.83
Fluoride (mg/L)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Hardness (mg/L)	214	364	221	211	196	234	220
NH3-N (mg/L)	0.252	0.306	0.253	0.522	0.332	0.233	0.189
NO2/N (mg/L)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NO3/N (mg/L)	2.9	7.24	4.06	4.05	3.2	3.9	3.99
Sulfate (mg/L)	9.66	26.1	26.3	26.4	23.9	26	32.9
TDS (mg/L)	294 J	504 J	356 J	332 J	284 J	288 J	218 J
TOC (mg/L)	1.78	0.993	0.822	0.768	0.706	0.861	0.763
Total Coliform (MPN/100mL)	2 U	2 U	2 U	2 U	2 U	2 U	2 U
METALS							
dissolved calcium (mg/L)	45.1	69.8	33	36.2	42.5	47.4	40.3
dissolved iron (mg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
dissolved magnesium (mg/L)	17.5	35.2	20.9	23.1	19.2	21.5	22.3
dissolved manganese (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00106	0.00339
dissolved potassium (mg/L)	4.03	4.64	3.23	3.57	2.6	2.85	3.17
dissolved sodium (mg/L)	2.89	7.01	5.82	6.41	6.37	6.66	7.05
dissolved zinc (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.00683	0.001 U	0.001 U
arsenic (mg/L)	0.00155	0.0014	0.00421	0.00434	0.00238	0.00275	0.00265
barium (mg/L)	0.024	0.0621	0.072	0.0677	0.0556	0.0612	0.058
cadmium (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
calcium (mg/L)	54.8	83.4	45.8	43.9	46.9	56.6	48.7
chromium (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
copper (mg/L)	0.00135	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
iron (mg/L)	0.0193	0.0178	0.0913	0.108	0.051	0.107	0.126
lead (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
magnesium (mg/L)	19	38.1	26.2	25	19.3	22.7	24.2
manganese (mg/L)	0.001 U	0.001 U	0.00239	0.00288	0.001 U	0.0015	0.0043
mercury (µg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
potassium (mg/L)	4.41	5.06	4.04	3.9	2.64	3.04	3.44
selenium (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
silver (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
sodium (mg/L)	2.14	6.66	6.19	5.91	5.5	6.15	6.72

zinc (mg/L)	0.00768	0.00551	0.00856	0.0103	0.0066	0.00792	0.00977
VOCs							
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	1.2	3.9	0.5 U	0.5 U	0.5 U	0.5 U	0.6
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

Analyte Group: VOCs only

Location	**NMWJ**	**J-Dup**	**NMWM**	**NMWN**	**PEW***	**PW-1**	**PW-2**
Date	5/9/13	5/9/13	5/9/13	5/9/13	5/9/13	5/9/13	5/9/13
Time	10:53	8:05	8:57	9:58	14:05	12:30	11:55
FIELD PARAMETERS							
FieldSWLInitial	73.54		124.4	45.57	115.7		
FieldTemp	55.6		60.8	55.8	60.6	57.9	54.3
FieldPH	7.59		7.09	7.69	7.08	7.24	7.79
FieldConductivity	607		830	509	831	751	447
VOCs							
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	1.44	1.64	3.48	1.13	4.05	4.6	0.51
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

*** Water level taken while pump was off.**

*Source: City of Spokane. LFGW3412 2013-Q2 GW Spreadsheet-Closed Cell.xls

Table H-5: Groundwater Monitoring Results from Quarter 3, 2013*

Table 1 **Northside Landfill Groundwater Monitoring**
Third Quarter 2013

Location	NMW208	NMWBB	NMWC	NMWT	T-Dup	NMWM	PEW
Date	7/1/2013	7/1/2013	7/2/2013	7/1/2013	7/1/2013	7/2/2013	7/2/2013
Time	11:10	12:07	11:15	10:05	8:45	13:25	13:10
FIELD PARAMETERS							
SWL (ft)	72.65	115.16	82.54	137.23		126.08	117.45
Temp (deg F)	56.7	61.2	56.5	53.2		61.9	61.5
pH	7.77	7.18	7.66	7.5		7.22	7.05
Conductivity (uS/cm)	514	829	519	597		828	843
CONVENTIONAL PARAMETERS							
Bicarbonate (mg/L)	224	406	218	282	285		
Chloride (mg/L)	15.3	12.8	15.8	7.34	7.38		
COD (mg/L)	5 U	5 U	5.73	5.73	5 U		
Conductivity (µmhos/cm)	568	921	578	658	664		
Depth (ft)	72.65	115.16	82.54	137.23		126.08	117.45
Hardness (mg/L)	240	407	242	278	292		
NH3-N (mg/L)	0.0279	0.05 U	0.0752	0.0625	0.0288		
NO2/N (mg/L)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		
NO3/N (mg/L)	3.44	7.39	3.93	4.5	4.51		
Sulfate (mg/L)	23.8	27.1	32.4	16.4	16.5		
TOC (mg/L)	0.843	0.95	1.29	1.31	1.38		
Total Coliform (MPN/100mL)	2 U	2 U	2 U	2 U	2 U		
METALS							
dissolved iron (mg/L)	0.01 U	0.01 U	0.0336	0.01 U	0.01 U		
dissolved manganese (mg/L)	0.001 U	0.001 U	0.00573	0.001 U	0.001 U		
dissolved zinc (mg/L)	0.00987	0.0085	0.0105	0.011	0.00937		
calcium (mg/L)	46.5	90	51	67	71.8		
magnesium (mg/L)	30.2	44.5	28.1	27.1	27.6		
potassium (mg/L)	4.61	6.02	4.01	5.74	5.87		
sodium (mg/L)	7.2	8.1	7.84	3.89	3.98		
VOLATILE ORGANIC COMPOUNDS							
1,1,1,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane(DBCP	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-dibromoethane (µg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-butanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-hexanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U

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Table 1 **Northside Landfill Groundwater Monitoring**
Third Quarter 2013

Location	NMW208	NMWBB	NMWC	NMWT	T-Dup	NMWM	PEW
4-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
acetone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
acrylonitrile (µg/L)	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
benzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromodichloromethane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
bromoform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon disulfide (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon tetrachloride (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
chlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
isopropylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl isobutyl ketone (MIBK) (µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
methylene chloride (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl-t-butyl ether (MTBE) (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-propylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-isopropyltoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
styrene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	0.5 U	4.06	0.55	1.35	1.42	3.08	3.87
toluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichlorofluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (µg/L)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
hexachlorobutadiene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
naphthalene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

*Source: City of Spokane. LFGW3412 2013-Q3 GW Report-Closed Cell.pdf

Table H-6: Groundwater Monitoring Results from Quarter 4, 2013*

Table 1 **Northside Landfill Groundwater Monitoring**
Fourth Quarter 2013

Location	NMW208	NMWBB	BB-Dupe	NMWC	NMWM	NMWT	PEW
Date	10/10/13	10/9/13	10/9/13	10/10/13	10/11/13	10/9/13	10/11/13
Time	11:30	11:30	8:45	10:30	11:51	10:15	12:25
FIELD PARAMETERS							
SWL (ft)	75.49	118.95		85.35	128.41	139.22	119.69
Temp (deg F)	56.3	61		55.8	61.2	53.8	59.4
pH	7.63	7.13		7.49	7.03	7.35	7.09
Conductivity (uS/cm)	515	822		543	805	695	836
CONVENTIONAL PARAMETERS							
Bicarbonate (mg/L)	222	404	402	226		344	
Chloride (mg/L)	15.1	11.9	11.9	16.1		9.28	
COD (mg/L)	5 U	7.14	8.21	5 U		7.68	
Conductivity (µmhos/cm)	527	846	849	562		716	
Depth (ft)	75.49	118.95		85.35	128.41	139.22	119.69
Hardness (mg/L)	242	414	406	250		366	
NH3-N (mg/L)	0.0871	0.05 U	0.05 U	0.0722		0.05 U	
NO2/N (mg/L)	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U	
NO3/N (mg/L)	3.55	7.03	7.02	4.01		5.29	
Sulfate (mg/L)	24.8	24.9	24.8	34.4		17.9	
TOC (mg/L)	0.794	0.964	0.83	0.802		1.08	
Total Coliform (MPN/100mL)	2	2 U	2 U	2 U		2 U	
METALS							
dissolved iron (mg/L)	0.01 U	0.01 U	0.01 U	0.031		0.01 U	
dissolved manganese (mg/L)	0.00106	0.00114	0.00116	0.00424		0.001 U	
dissolved zinc (mg/L)	0.0068	0.007	0.00768	0.0129		0.0084	
calcium (mg/L)	48.8	92.9	91.2	53.9		90.6	
magnesium (mg/L)	29.5	44.5	43.6	28.2		34.2	
potassium (mg/L)	4.39	5.93	5.82	3.8		6.7	
sodium (mg/L)	6.96	8.1	7.98	7.4		6.25	
VOLATILE ORGANIC COMPOUNDS							
1,1,1,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane(DBCP	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-dibromoethane (µg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-butanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-hexanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U

Table 1 **Northside Landfill Groundwater Monitoring**
Fourth Quarter 2013

Location	NMW208	NMWBB	BB-Dupe	NMWC	NMWM	NMWT	PEW
4-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
acetone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
acrylonitrile (µg/L)	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
benzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromodichloromethane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
bromoform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon disulfide (µg/L)	0.5 U	0.5 U	0.58	0.5 U	0.5 U	0.5 U	0.5 U
carbon tetrachloride (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
chlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
isopropylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl isobutyl ketone (MIBK) (µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
methylene chloride (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl-t-butyl ether (MTBE) (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-propylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-isopropyltoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
styrene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	0.5 U	3.61	3.43	0.6	2.75	1.73	3.15
toluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichlorofluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (µg/L)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
hexachlorobutadiene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
naphthalene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

*Source: City of Spokane. LFGW3212 2013 Closed Cell Annual Groundwater Monitoring Report.pdf

Table H-7: Groundwater Monitoring Results from Quarter 1, 2014*

Table 1 **Northside Landfill Groundwater Monitoring**
First Quarter 2014

Location	PEW	NMWM	NMWBB	NMWC	MWC-du	NMWT	NMW208
Date	1/16/14	1/16/14	1/14/14	1/14/14	1/14/14	1/15/14	1/15/14
Time	12:30	11:45	11:15	12:45	9:55	10:55	11:50
FIELD PARAMETERS							
SWL (ft)	117.88	126.54	115.63	83.07		136.29	73.42
Temp (deg F)	58.8	61	61.2	55.8		54.9	56.1
pH	7.04	7.11	7.11	7.54		7.32	7.77
Conductivity (uS/cm)	802	760	798	512		645	497
CONVENTIONAL PARAMETERS							
Bicarbonate (mg/L)			384	216	212	301	212
Chloride (mg/L)			13.3	15	14.9	9.53	14.3
COD (mg/L)			5 U	5 U	5 U	6.1	6.87
Conductivity (µmhos/cm)			885	574	570	710	547
Depth (ft)	117.88	126.54	115.63	83.07		136.29	73.42
Hardness (mg/L)			408	251	248	324	245
NH3-N (mg/L)			0.05 U	0.116	0.0323	0.0742	0.0889
NO2/N (mg/L)			0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NO3/N (mg/L)			7.06	3.92	3.89	5.31	3.56
Sulfate (mg/L)			28.7	32.1	31	19.4	24.8
TOC (mg/L)			0.706	0.676	0.603	0.721	0.641
Total Coliform (MPN/100mL)			2 U	2 U	2 U	2 U	2 U
METALS							
dissolved iron (mg/L)			0.01 U	0.0247	0.0252	0.01 U	0.01 U
dissolved manganese (mg/L)			0.00112	0.00325	0.00339	0.001 U	0.00109
dissolved zinc (mg/L)			0.0116	0.0126	0.0118	0.0122	0.00928
calcium (mg/L)			88.8	52	51.5	76.3	47.1
magnesium (mg/L)			45.6	29.7	29.2	32.6	31.1
potassium (mg/L)			6.01	4	3.93	6.43	4.56
sodium (mg/L)			8.39	7.9	7.77	6.05	7.22
VOLATILE ORGANIC COMPOUNDS							
1,1,1,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane(DBCP	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-dibromoethane (µg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-butanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-hexanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U

Table 1, Page1

Table 1 **Northside Landfill Groundwater Monitoring**
First Quarter 2014

Location	PEW	NMWM	NMWBB	NMWC	MWC-du	NMWT	NMW208
4-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
acetone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
acrylonitrile (µg/L)	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
benzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromodichloromethane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
bromoform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon disulfide (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon tetrachloride (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
chlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
isopropylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl isobutyl ketone (MIBK) (µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
methylene chloride (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl-t-butyl ether (MTBE) (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-propylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-isopropyltoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
styrene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	3.74	2.93	4.04	0.5 U	0.51	1.54	0.5 U
toluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichlorofluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (µg/L)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
hexachlorobutadiene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
naphthalene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

*Source: City of Spokane. LFGW3212 2014 NSLF Closed Cell Annual GW Report.pdf

Table H-8: Groundwater Monitoring Results from Quarter 2, 2014*

Table 1 **Northside Landfill Groundwater Monitoring**
Second Quarter 2014

Location	208-dup	NMW208	NMWBB	NMWC	NMWE	NMWK	NMWT
Date	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14
Time	8:30	11:40	11:00	9:30	12:45	12:05	13:40
FIELD PARAMETERS							
SWL (ft)		70.29	112.89	80.25	52.36	58.8	133.48
Temp (deg F)		56.1	59.7	55.8	54.7	53.6	51.6
pH		7.71	7.14	7.49	7.69	7.66	7.5
Conductivity (uS/cm)		497	751	512	456	502	429
CONVENTIONAL PARAMETERS							
Bicarbonate (mg/L)	206	208	364	212	193	200	209
Chloride (mg/L)	16.8	16.9	11.6	15.9	12.5	16.2	1.58
COD (mg/L)	5 U	5.02	5 U	7.66	5.55	7.92	5 U
Conductivity (µmhos/cm)	520	525	794	544	479	529	455
Depth (ft)		70.29	112.89	80.25	52.36	58.8	133.48
Fluoride (mg/L)	0.224	0.193	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Hardness (mg/L)	251	260	412	274	238	260	234
HCO3 (mg/L)		253	443	258			254
NH3-N (mg/L)	0.12	0.112	0.0383	0.0234	0.0314	0.0522	0.114
NO2/N (mg/L)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NO3/N (mg/L)	3.96	4.02	7.19	3.95	3.16	4.04	2.46
Sulfate (mg/L)	24.7	24.9	22.3	33	22.5	22.8	6.64
TDS (mg/L)	252	260	412	280	224	222	212
TOC (mg/L)	0.876	0.94	1.11	0.874	0.779	0.813	2.34
Total Coliform (MPN/100mL)	2 U	2 U	2 U	2 U	2 U	2 U	2 U
DISSOLVED METALS							
dissolved calcium (mg/L)	47.9	47.5	84.1	51.7	49	54.9	47.9
dissolved iron (mg/L)	0.0146	0.0153	0.01 U	0.0399	0.01 U	0.0177	0.01 U
dissolved magnesium (mg/L)	28.8	28.4	41.8	28.3	22.4	24.3	18.4
dissolved manganese (mg/L)	0.00148	0.00151	0.00113	0.00444	0.00128	0.0028	0.00108
dissolved potassium (mg/L)	4.38	4.33	5.57	3.88	2.92	3.24	4.13
dissolved sodium (mg/L)	7.07	6.92	7.34	7.88	6.27	6.94	1.95
dissolved zinc (mg/L)	0.013	0.014	0.00791	0.0171	0.0139	0.0206	0.0124
arsenic (mg/L)	0.00441	0.00421	0.00125	0.00273	0.00201	0.00307	0.00134
barium (mg/L)	0.0771	0.0784	0.0658	0.0617	0.0608	0.0628	0.0252
cadmium (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
calcium (mg/L)	48.1	48.7	84.5	54	51.8	57.6	57.4
chromium (mg/L)	0.001 U	0.001 U	0.00111	0.001 U	0.001 U	0.001 U	0.001 U
copper (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.00446	0.001 U	0.001 U
iron (mg/L)	0.037	0.0366	0.01 U	0.116	0.0485	0.372	0.01 U
lead (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
magnesium (mg/L)	29.3	29.6	42.4	29.9	24	25.6	21.4
manganese (mg/L)	0.00156	0.00163	0.001 U	0.00221	0.001 U	0.0055	0.001 U
mercury (µg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
potassium (mg/L)	4.43	4.46	5.6	4.07	3.09	3.41	4.87
selenium (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
silver (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
sodium (mg/L)	6.87	6.98	7.21	8.11	6.46	7.11	2
zinc (mg/L)	0.00674	0.00666	0.00834	0.0175	0.00564	0.007	0.00848

Table 1, Page1

Table 1 **Northside Landfill Groundwater Monitoring**
Second Quarter 2014

VOLATILE ORGANIC COMPOUNDS							
Location	**208-dup**	**NMW208**	**NMWBB**	**NMWC**	**NMWE**	**NMWK**	**NMWT**
Date	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14
Time	8:30	11:40	11:00	9:30	12:45	12:05	13:40
VOCs							
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	0.5 U	0.5 U	2.31	0.5 U	0.5 U	0.5 U	0.86
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

Analyte Group: VOC's only

Location	Gruver	J-dup	NMWJ	NMWM	NMWN	PEW*
Date	4/22/14	4/22/14	4/22/14	4/23/14	4/23/14	4/23/14
Time	11:39	11:00	12:20	10:15	12:32	10:50
FIELD PARAMETERS						
FieldSWLInitial			72.78	123.74	44.83	115.1
FieldTemp	52.9		55.4	60.6	55.2	59.7
FieldPH	7.81		7.56	7.14	7.68	7.04
FieldConductivity	446		613	811	509	832
VOCs						
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	0.5 U	1.09	1.06	1.86	0.74	2.38
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

*** Water level taken while pump was off.**

*Source: City of Spokane. LFGW3212 2014 NSLF Closed Cell Annual GW Report.pdf

Table H-9: Groundwater Monitoring Results from Quarter 3, 2014*

Table 1 **Northside Landfill Groundwater Monitoring**
Third Quarter 2014

Location	PEW	NMWM	NMW208	NMWBB	NMWC	NMWT	T-Dup
Date	7/17/14	7/17/14	7/16/14	7/16/14	7/15/14	7/15/14	7/15/14
Time	11:00	10:15	8:45	10:05	9:05	10:40	7:49
FIELD PARAMETERS							
SWL (ft)	117.63	126.28	72.91	115.29	82.61	137.25	
Temp (deg F)	60.4	61.9	56.5	61.3	56.1	54	
pH	7.09	7.15	7.72	7.09	7.48	7.43	
Conductivity (uS/cm)	844	817	513	823	519	607	
CONVENTIONAL PARAMETERS							
bicarbonate (mg/L)			220	402	216	288	286
Chloride (mg/L)			15.2	13.1	15.4	8.37	8.33
COD (mg/L)			5 U	5 U	5 U	5 U	6.2
Conductivity (µmhos/cm)			568	909	577	672	673
Depth (ft)	117.63	126.28	72.91	115.29	82.61	137.25	
HCO3 (mg/L)			268	490	263	351	
NH3-N (mg/L)			0.0618	0.05 U	0.05 U	0.05 U	0.05 U
NO2/N (mg/L)			0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NO3/N (mg/L)			3.44	7.39	3.86	4.9	4.88
Sulfate (mg/L)			23.2	26.5	30.8	17	17
TOC (mg/L)			0.866	0.802	0.666	1.15	1.04
Total Coliform (MPN/100mL)			2 U	2 U	2 U	2 U	2 U
METALS							
dissolved calcium (mg/L)			49.1	91.3	52.9	74.2	73.7
dissolved iron (mg/L)			0.01 U	0.01 U	0.021	0.01 U	0.01 U
dissolved magnesium (mg/L)			31.4	46.5	29.1	28.9	29.2
dissolved manganese (mg/L)			0.00128	0.00118	0.00559	0.00109	0.00108
dissolved potassium (mg/L)			4.78	6.45	4.13	6.01	6.06
dissolved sodium (mg/L)			7.66	8.77	8.38	4.83	4.9
dissolved zinc (mg/L)			0.0108	0.0086	0.0126	0.00907	0.00966
VOLATILE ORGANIC COMPOUNDS							
1,1,1,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane(DBCP	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-dibromoethane (µg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-butanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-hexanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U

Table 1, Page1

Table 1 **Northside Landfill Groundwater Monitoring**
Third Quarter 2014

Location	PEW	NMWM	NMW208	NMWBB	NMWC	NMWT	T-Dup
4-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
acetone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	128 J
acrylonitrile (µg/L)	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
benzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromodichloromethane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
bromoform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon disulfide (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon tetrachloride (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
chlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-dichloropropene (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
dibromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
isopropylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl isobutyl ketone (MIBK) (µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
methylene chloride (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl-t-butyl ether (MTBE) (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-propylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-isopropyltoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
styrene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	2.71	2.27	0.5 U	2.9	0.5 U	1.11	1.54
toluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-dichloropropene (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichlorofluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (µg/L)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
hexachlorobutadiene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
naphthalene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

*Source: City of Spokane. LFGW3212 2014 NSLF Closed Cell Annual GW Report.pdf

Table H-10: Groundwater Monitoring Results from Quarter 4, 2014*

Table 1 **Northside Landfill Groundwater Monitoring**
Fourth Quarter 2014

Location	NMW208	NMWBB	BB-Dup	NMWC	NMWT	NMWM	PEW
Date	10/8/14	10/7/14	10/7/14	10/8/14	10/7/14	10/9/14	10/9/14
Time	11:30	11:50	8:30	9:55	10:15	9:45	10:30
FIELD PARAMETERS							
SWL (ft)	75.86	118.19		85.57	138.78	129.05	120.41
Temp (deg F)	56.3	61.5		55.9	54.9	60.9	59.4
pH	7.74	7.09		7.51	7.34	7.02	6.97
Conductivity (uS/cm)	510	816		516	680	803	844
CONVENTIONAL PARAMETERS							
Bicarbonate (mg/L)	214	397	399	213	318		
Chloride (mg/L)	16.6	12	12	15.3	10		
COD (mg/L)	5 U	5 U	5 U	5 U	5 U		
Conductivity (µmhos/cm)	563	917	917	568	765		
Depth (ft)	75.86	118.19		85.57	138.78	129.05	120.41
HCO3 (mg/L)	260	484		259	387		
NH3-N (mg/L)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		
NO2/N (mg/L)	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U		
NO3/N (mg/L)	3.93	7.34	7.34	3.71	5.16		
Sulfate (mg/L)	25	24.2	24.1	30.6	18.3		
TOC (mg/L)	0.635	0.744	0.697	0.703	0.937		
Total Coliform (MPN/100mL)	2 U	2 U	2 U	2 U	2 U		
METALS							
dissolved calcium (mg/L)	45.5	86.5	86.3	49.5	76.8		
dissolved iron (mg/L)	0.01 U	0.01 U	0.01 U	0.0247	0.01 U		
dissolved magnesium (mg/L)	27.9	41.5	41.9	25.9	30.6		
dissolved manganese (mg/L)	0.00126	0.0011	0.001 U	0.00572	0.001 U		
dissolved potassium (mg/L)	4.34	5.86	5.88	3.74	6.02		
dissolved sodium (mg/L)	7.3	7.97	8.02	7.45	5.74		
dissolved zinc (mg/L)	0.0113	0.0103	0.00898	0.0126	0.0127		
VOLATILE ORGANIC COMPOUNDS							
1,1,1,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane(µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-dibromoethane (µg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-butanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-hexanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U

Table 1, Page1

Table 1 **Northside Landfill Groundwater Monitoring**
Fourth Quarter 2014

Location	NMW208	NMWBB	BB-Dup	NMWC	NMWT	NMWM	PEW
4-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
acetone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
acrylonitrile (µg/L)	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
benzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromodichloromethane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
bromoform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon disulfide (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon tetrachloride (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
chlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-dichloropropene (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
dibromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
isopropylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl isobutyl ketone (MIBK) (µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
methylene chloride (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl-t-butyl ether (MTBE) (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-propylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-isopropyltoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
styrene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	0.5 U	2.98	2.88	0.5 U	1.33	2.31	2.82
toluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-dichloropropene (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichlorofluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (µg/L)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
hexachlorobutadiene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
naphthalene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

*Source: City of Spokane. LFGW3212 2014 NSLF Closed Cell Annual GW Report.pdf

Table H-11: Groundwater Monitoring Results from Quarter 1, 2015*

Table 1 **Northside Landfill Groundwater Monitoring**
First Quarter 2015

Location	NMW208	NMWBB	NMWC	C-Dup	NMWT	NMWM	PEW
Date	1/21/15	1/20/15	1/21/15	1/21/15	1/20/15	1/22/15	1/22/15
Time	9:00	11:45	10:45	8:05	10:15	10:45	11:15
FIELD PARAMETERS							
SWL (ft)	73.2	115.35	82.57		135.93	126.15	117.47
Temp (deg F)	55.9	61.2	55.4		52.5	61	59.2
pH	7.71	7.07	7.47		7.51	7.15	7.1
Conductivity (uS/cm)	483	757	504		451	705	792
CONVENTIONAL PARAMETERS							
bicarbonate (mg/L)	198	360	208	212	230		
Chloride (mg/L)	15.8	11.6	15.4	15.5	1.02		
COD (mg/L)	5 U	5.51	5 U	12.5	5 U		
Conductivity (µmhos/cm)	522	820	549	550	495		
Depth (ft)	73.2	115.35	82.57		135.93	126.15	117.47
HCO3 (mg/L)	241	438	253		280		
NH3-N (mg/L)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		
NO2/N (mg/L)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		
NO3/N (mg/L)	3.93	6.92	3.75	3.77	3.27		
Sulfate (mg/L)	23.9	24.6	29.9	30.8	6.43		
TOC (mg/L)	0.633	0.97	0.582	0.578	2.63		
Total Coliform (MPN/100mL)	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U		
METALS							
dissolved calcium (mg/L)	46.2	87.4	51.5	51.2	57.5		
dissolved iron (mg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U		
dissolved magnesium (mg/L)	28.5	42.4	27.6	27.1	21		
dissolved manganese (mg/L)	0.001 U	0.001 U	0.00178	0.0018	0.001 U		
dissolved potassium (mg/L)	4.48	6	3.92	3.92	4.86		
dissolved sodium (mg/L)	7.36	8.11	8.5	8.27	2.35		
dissolved zinc (mg/L)	0.00854	0.00684	0.0129	0.0142	0.00698		
VOLATILE ORGANIC COMPOUNDS							
1,1,1,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane(DBCP	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-dibromoethane (µg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-butanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-hexanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U

Table 1, Page1

Table 1 **Northside Landfill Groundwater Monitoring**
First Quarter 2015

Location	NMW208	NMWBB	NMWC	C-Dup	NMWT	NMWM	PEW
4-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
acetone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
acrylonitrile (µg/L)	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
benzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromodichloromethane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
bromoform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon disulfide (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon tetrachloride (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
chlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-dichloropropene (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
dibromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
isopropylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl isobutyl ketone (MIBK) (µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
methylene chloride (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl-t-butyl ether (MTBE) (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-propylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-isopropyltoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
styrene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	0.5 U	3.2	0.5 U	0.5 U	0.94	1.91	2.76
toluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-dichloropropene (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichlorofluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (µg/L)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
hexachlorobutadiene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
naphthalene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

*Source: City of Spokane. LFGW3212 2015 NSLF Closed Unit Monitoring Report_optimized.pdf

Table H-12: Groundwater Monitoring Results from Quarter 2, 2015*

Table 1 **Northside Landfill Groundwater Monitoring**
Second Quarter 2015

Location	208-Dup	NMW208	NMWBB	NMWC	NMWE	NMWK	NMWT
Date	4/8/2015	4/8/2015	4/7/2015	4/8/2015	4/7/2015	4/8/2015	4/7/2015
Time	8:00	10:40	13:05	9:10	10:40	12:15	9:45
FIELD PARAMETERS							
SWL (ft)		70.99	113.71	81.04	53.22	59.69	134.15
Temp (deg F)		55.9	59.2	55.8	54.3	54.1	51.8
pH		7.72	7.2	7.47	7.75	7.68	7.55
Conductivity (uS/cm)		495	754	511	445	463	448
CONVENTIONAL PARAMETERS							
bicarbonate (mg/L)	210	206	364	214	194	206	230
Chloride (mg/L)	17.1	16.8	11.7	16.3	12.7	12.2	1.1
COD (mg/L)	5 U	5 U	6.4	5 U	6.4	5 U	7.18
Conductivity (µmhos/cm)	569	568	863	584	508	521	503
Depth (ft)		70.99	113.71	81.04	53.22	59.69	134.15
Fluoride (mg/L)	0.143	0.147	0.1 U	0.1 U	0.1 U	0.1 U	0.131
Hardness (mg/L)	256	252	408	270	236	236	246
HCO3 (mg/L)		251	443	260			280
NH3-N (mg/L)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
NO2/N (mg/L)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NO3/N (mg/L)	4.18	4.17	6.8	3.87	3.05	3.6	2.73
Sulfate (mg/L)	24.3	24.4	23.4	15.7	21.7	21.5	6.43
TDS (mg/L)	276	296	405	312	223	268	33
TOC (mg/L)	0.882	0.772	0.907	0.757	0.676	0.831	2.49
Total Coliform (MPN/100mL)	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
DISSOLVED METALS							
dissolved calcium (mg/L)	52.6	49	94.4	59.7	50.8	56.3	59.4
dissolved iron (mg/L)	0.01 U	0.01 U	0.01 U	0.0154	0.01 U	0.0109	0.01 U
dissolved magnesium (mg/L)	28.8	27	41.4	29.2	21.3	22.1	20
dissolved manganese (mg/L)	0.001 U	0.001 U	0.001 U	0.00251	0.001 U	0.00134	0.001 U
dissolved potassium (mg/L)	4.6	4.3	5.85	4.27	2.94	3.31	4.77
dissolved sodium (mg/L)	7.01	6.57	7.02	8.24	5.86	6.54	1.9
dissolved zinc (mg/L)	0.0125	0.0108	0.00769	0.0125	0.01	0.00839	0.0115
TOTAL METALS							
arsenic (mg/L)	0.00412	0.00413	0.00114	0.00247	0.00205	0.00265	0.0014
barium (mg/L)	0.0754	0.0736	0.0622	0.0614	0.0556	0.0556	0.0232
cadmium (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
calcium (mg/L)	57.5	51.3	45.5	61.7	53.7	59.8	61.7
chromium (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
copper (mg/L)	0.00147	0.00117	0.001 U	0.001 U	0.001 U	0.001 U	0.00161
iron (mg/L)	0.0437	0.0412	0.01 U	0.191	0.0469	0.0638	0.01 U
lead (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
magnesium (mg/L)	31.8	28.2	19.3	30.2	22.6	23.5	20.8
manganese (mg/L)	0.00198	0.00203	0.001 U	0.00341	0.001 U	0.0018	0.001 U
mercury (ug/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
potassium (mg/L)	5.02	4.48	2.64	4.39	3.11	3.5	4.95
selenium (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
silver (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
sodium (mg/L)	7.73	6.88	5.33	8.53	6.25	6.96	2.02
zinc (mg/L)	0.0102	0.00957	0.00633	0.012	0.00803	0.00807	0.0101

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Table 1 **Northside Landfill Groundwater Monitoring**
Second Quarter 2015

VOLATILE ORGANIC COMPOUNDS							
Location	**208-dup**	**NMW208**	**NMWBB**	**NMWC**	**NMWE**	**NMWK**	**NMWT**
Date	4/8/2015	4/8/2015	4/7/2015	4/8/2015	4/7/2015	4/8/2015	4/7/2015
Time	8:00	10:40	13:05	9:10	10:40	12:15	9:45
VOCs							
1,1,1-Trichloroethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (ug/L)	0.5 U	0.5 U	3.45	0.52	0.5 U	0.5 U	1.24
trans-1,2-dichloroethene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichloroethene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (ug/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

Analyte Group: VOC's only

Location	**Gruver**	**NMWJ**	**M-Dup**	**NMWM**	**NMWN**	**PEW***
Date	4/9/2015	4/9/2015	4/9/2015	4/9/2015	4/9/2015	4/9/2015
Time	11:20	12:05	7:45	8:35	13:25	9:15
FIELD PARAMETERS						
FieldSWLInitial		74.03		124.72	46.02	116.1
FieldTemp	52.7	55.8		60.4	55.2	59.5
FieldPH	7.78	7.54		7.12	7.66	7.15
FieldConductivity	462	607		771	492	801
VOCs						
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	0.52	1.52	2.36	2.63	1.01	3.2
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

*** Water level taken while pump was off.**

* Source: City of Spokane. LFGW3212 2015 NSLF Closed Unit Monitoring Report_optimized.pdf

Table H-13: Groundwater Monitoring Results from Quarter 3, 2015*

Table 1 **Northside Landfill Groundwater Monitoring**
Third Quarter 2015

Location	NMW208	NMWBB	NMWC	NMWT	T-Dupe	NMWM	PEW
Date	7/22/15	7/21/15	7/22/15	7/21/15	7/21/15	7/23/15	7/23/15
Time	10:45	10:20	9:00	9:10	8:05	9:21	10:00
FIELD PARAMETERS							
SWL (ft)	74.41	116.2	83.62	136.79		127.08	120.58
Temp (deg F)	56.5	59.7	55.9	52.9		59.9	59.2
pH	7.73	7.18	7.49	7.44		7.03	7.01
Conductivity (uS/cm)	506	777	515	583		819	792
CONVENTIONAL PARAMETERS							
bicarbonate (mg/L)	213	368	212	283	277		
Chloride (mg/L)	17.1	14	15.3	6.21	6.24		
COD (mg/L)	5.43	5 U	5 U	5 U	5.85		
Conductivity (µmhos/cm)	529	645	534	631	633		
Depth (ft)	74.41	116.2	83.62	136.79		127.08	120.58
HCO3 (mg/L)	259	448	258	345			
NH3-N (mg/L)	0.05 U	0.27	0.0658	0.146	0.05 U		
NO2/N (mg/L)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		
NO3/N (mg/L)	3.68	6.32	3.65	4.52	4.51		
Sulfate (mg/L)	22.8	31.6	29.3	14	14		
TOC (mg/L)	0.788	0.801	0.661	1.54	1.4		
Total Coliform (MPN/100mL)	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U		
METALS							
dissolved calcium (mg/L)	44.4	83.6	49.4	68.4	69.2		
dissolved iron (mg/L)	0.01 U	0.01 U	0.0119	0.01 U	0.01 U		
dissolved magnesium (mg/L)	27	39	25.5	25.2	25.6		
dissolved manganese (mg/L)	0.001 U	0.001 U	0.00142	0.001 U	0.001 U		
dissolved potassium (mg/L)	4.14	5.45	3.65	5.27	5.33		
dissolved sodium (mg/L)	6.57	8.08	7.08	3.29	3.38		
dissolved zinc (mg/L)	0.00894	0.009	0.0129	0.00849	0.00887		
VOLATILE ORGANIC COMPOUNDS							
1,1,1,2-Tetrachloroethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane(DBCP	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-dibromoethane (ug/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-dichloropropane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-butanone (ug/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-chlorotoluene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-hexanone (ug/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U

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Table 1 **Northside Landfill Groundwater Monitoring**
Third Quarter 2015

Location	NMW208	NMWBB	NMWC	NMWT	T-Dupe	NMWM	PEW
4-chlorotoluene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
acetone (ug/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
acrylonitrile (ug/L)	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
benzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromobenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromochloromethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromodichloromethane (ug/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
bromoform (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromomethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon disulfide (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon tetrachloride (ug/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
chlorobenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloromethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-dichloroethene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-dichloropropene (ug/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
dibromochloromethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromomethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ethylbenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
isopropylbenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl isobutyl ketone (MIBK) (ug/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
methylene chloride (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl-t-butyl ether (MTBE) (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-butylbenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-propylbenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-xylene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-isopropyltoluene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-butylbenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
styrene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-butylbenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (ug/L)	0.5 U	3.3	0.51	1.39	1.44	2.48	2.28
toluene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-dichloroethene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-dichloropropene (ug/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trichloroethene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichlorofluoromethane (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (ug/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (ug/L)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
hexachlorobutadiene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
naphthalene (ug/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

* Source: City of Spokane. LFGW3212 2015 NSLF Closed Unit Monitoring Report_optimized.pdf

Table H-14: Groundwater Monitoring Results from Quarter 4, 2015*

Table 1 Northside Landfill Groundwater Monitoring
Fourth Quarter 2015

Location	NMW208	NMWBB	NMWC	C-Dup	NMWT	NMWM	PEW
Date	10/1/15	10/1/15	10/2/15	10/2/15	10/1/15	10/2/15	10/2/15
Time	11:30	10:20	10:05	8:15	9:05	11:10	11:45
FIELD PARAMETERS							
SWL (ft)	74.67	116.52	84.33		137.08	127.69	119.6
Temp (deg F)	56.3	60.3	55.9		53.8	61	60.1
pH	7.64	7.06	7.46		7.25	7.02	6.98
Conductivity (uS/cm)	501	767	505		670	790	809
CONVENTIONAL PARAMETERS							
bicarbonate (mg/L)	212	367	209	210	327		
Chloride (mg/L)	17.1	14.2	15.8	15.8	9.74		
COD (mg/L)	25 U	5 U	25 U	25 U	5 U		
Conductivity (µmhos/cm)	497	775	480	481	660		
Depth (ft)	74.67	115.35	84.33		135.93	127.69	119.6
HCO3 (mg/L)	258.47	447.45	254.82		258.47		
NH3-N (mg/L)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		
NO2/N (mg/L)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		
NO3/N (mg/L)	3.75	6.54	3.62	3.62	5.12		
Sulfate (mg/L)	24.1	29.6	29.5	29.6	18.5		
TOC (mg/L)	0.688	0.723	0.677	0.739	0.935		
Total Coliform (MPN/100mL)	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U		
METALS							
dissolved calcium (mg/L)	48.9	91.7	53.4	53.6	87		
dissolved iron (mg/L)	0.01 U	0.01 U	0.131	0.132	0.01 U		
dissolved magnesium (mg/L)	30	43.4	28.4	28.4	33		
dissolved manganese (mg/L)	0.001 U	0.001 U	0.0116	0.0115	0.001 U		
dissolved potassium (mg/L)	4.82	6.4	4.21	4.22	6.71		
dissolved sodium (mg/L)	8.83	9.06	8.43	8.49	5.44		
dissolved zinc (mg/L)	0.00226	0.0018	0.00516	0.00525	0.00322		
VOLATILE ORGANIC COMPOUNDS							
1,1,1,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane(DBCP	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-dibromoethane (µg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-butanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-hexanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U

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Table 1 **Northside Landfill Groundwater Monitoring**
Fourth Quarter 2015

Location	NMW208	NMWBB	NMWC	C-Dup	NMWT	NMWM	PEW
4-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
acetone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
acrylonitrile (µg/L)	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
benzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromodichloromethane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
bromoform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon disulfide (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon tetrachloride (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
chlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-dichloropropene (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
dibromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
isopropylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl isobutyl ketone (MIBK) (µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
methylene chloride (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl-t-butyl ether (MTBE) (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-propylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-isopropyltoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
styrene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	0.5 U	3.52	1.34	1.36	2.13	3.01	3.54
toluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-dichloropropene (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichlorofluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (µg/L)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
hexachlorobutadiene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
naphthalene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

* Source: City of Spokane. LFGW3212 2015 NSLF Closed Unit Monitoring Report_optimized.pdf

Table H-15: Groundwater Monitoring Results from Quarter 1, 2016*

Table 1 Northside Landfill Groundwater Monitoring
First Quarter 2016

Location	NMW208	NMWBB	NMWC	208-Dup	NMWT	NMWM	PEW
Date	1/26/16	1/28/16	1/26/16	1/26/16	1/26/16	1/28/16	1/26/16
Time	11:06	10:00	12:15	9:30	12:56	11:00	11:37
FIELD PARAMETERS							
SWL (ft)	73.35	115.45	82.6		137.3	126.3	119.6
Temp (deg F)	54.9	56.7	55.6		51.6	52.3	54.5
pH	7.42	7.32	7.56		7.48	7.7	7.29
Conductivity (uS/cm)	500	730	506		474	404	705
CONVENTIONAL PARAMETERS							
bicarbonate (mg/L)	208	348	210	207	237		
Chloride (mg/L)	16.7	9.55	15.9	16.5	1.13		
COD (mg/L)	5 U	5 U	5 U	5 U	8.33		
Conductivity (µmhos/cm)	469	621	489	722	458		
Depth (ft)	73.35	115.45	82.6	73.35	137.3	126.3	121.6
HCO3 (mg/L)	253	424	256		288		
NH3-N (mg/L)	0.05 U	0.0271	0.05 U	0.05 U	0.05 U		
NO2/N (mg/L)	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U		
NO3/N (mg/L)	3.88	6.88	3.73	3.83	4.53		
Sulfate (mg/L)	22.8	18.6	28.6	22.5	5.45		
TOC (mg/L)	0.784	1.56	0.853	0.783	3.06		
Total Coliform (MPN/100mL)	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U		
METALS							
dissolved calcium (mg/L)	49.5	89.7	55.8	49.9	65.8		
dissolved iron (mg/L)	0.01 U	0.01 U	0.0115	0.01 U	0.01 U		
dissolved magnesium (mg/L)	30	43.7	28.7	30.1	23.3		
dissolved manganese (mg/L)	0.001 U	0.00117	0.00279	0.001 U	0.001 U		
dissolved potassium (mg/L)	4.71	6.27	4.19	4.78	5.39		
dissolved sodium (mg/L)	8.33	9.17	9.36	9	3.13		
dissolved zinc (mg/L)	0.0144	0.00972	0.0164	0.0162	0.0154		
VOLATILE ORGANIC COMPOUNDS							
1,1,1,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane(DBCP	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-dibromoethane (µg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-butanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-hexanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U

Table 1, Page1

Table 1 **Northside Landfill Groundwater Monitoring**
First Quarter 2016

Location	NMW208	NMWBB	NMWC	208-Dup	NMWT	NMWM	PEW
4-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
acetone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
acrylonitrile (µg/L)	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
benzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromodichloromethane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
bromoform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon disulfide (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon tetrachloride (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
chlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-dichloropropene (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
dibromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
isopropylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl isobutyl ketone (MIBK) (µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
methylene chloride (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl-t-butyl ether (MTBE) (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-propylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-isopropyltoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
styrene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	0.5 U	3.93	0.53	0.5 U	1.72	0.8	3.12
toluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-dichloropropene (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichlorofluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (µg/L)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
hexachlorobutadiene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
naphthalene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

* Source: City of Spokane. LFGW3412 2016-Q1 GW Report-Closed Cell.pdf

Table H-16: Groundwater Monitoring Results from Quarter 2, 2016*

Table 1 Northside Landfill Groundwater Monitoring
Second Quarter 2016

Location	NMW208	NMWBB	NMWC	MWM-Du	NMWT	NMWM	PEW
Date	5/12/2016	5/25/2016	5/19/2016	10/2/15	5/12/2016	5/12/2016	5/19/16
Time	13:36	12:31	14:55		14:40	14:10	15:02
FIELD PARAMETERS							
SWL (ft)	74.67	116.52	84.33		137.08	127.69	119.6
Temp (deg F)	56.3	60.3	55.9		53.8	61	60.1
pH	7.64	7.06			7.25	7.02	6.98
Conductivity (uS/cm)	501	767	505		670	790	809
CONVENTIONAL PARAMETERS							
bicarbonate (mg/L)	210	372	220	225	327	225	121.25
Chloride (mg/L)	19.5	12.3	15.1	2.12	9.74	2.12	16.20
COD (mg/L)	25 U	5 U	25 U	25 U	5 U	25 U	6.94
Conductivity (µmhos/cm)	495	771	511	452	660	452	822.00
Depth (ft)	71.85	115.02	82.31	125.43	136.51	125.43	121.25
HCO3 (mg/L)	256.04	453.00	268.00	243.00	274.00		
NH3-N (mg/L)	0.05 U	0.139	0.05 U	0.05 U	0.05 U	0.05 U	
NO2/N (mg/L)	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
NO3/N (mg/L)	4.01	6.68	3.57	3.7	3.71	3.7	
Sulfate (mg/L)	24.7	22.4	27.5	8.24	18.5	8.24	
TOC (mg/L)	0.899	1.1	0.736	2.02	0.935	2.02	
Total Coliform (MPN/100mL)	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U		
METALS							
dissolved calcium (mg/L)	57.5	84.3	40.5	64.4	60.2	64.4	
dissolved iron (mg/L)	0.01 U	0.01 U	0.0194	0.0104	0.01 U	0.0104	
dissolved magnesium (mg/L)	34.6	49.6	21.6	23.9	22.2	23.9	
dissolved manganese (mg/L)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
dissolved potassium (mg/L)	5.36	6.55	3.1	5.58	5.24	5.58	
dissolved sodium (mg/L)	8.78	8.47	6.3	2.6	2.44	2.6	
dissolved zinc (mg/L)	0.0105	0.001 U	0.00633	0.00735	0.00706	0.00735	
VOLATILE ORGANIC COMPOUNDS							
1,1,1,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane(DBCP	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-dibromoethane (µg/L)	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-dichloropropane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-butanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 1, Page1

Table 1 **Northside Landfill Groundwater Monitoring**
Second Quarter 2016

Location	NMW208	NMWBB	NMWC	MWM-Du	NMWT	NMWM	PEW
2-hexanone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
4-chlorotoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
acetone (µg/L)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
acrylonitrile (µg/L)	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
benzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromodichloromethane (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
bromoform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
bromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon disulfide (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
carbon tetrachloride (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
chlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloroform (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
chloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-dichloropropene (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
dibromochloromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
dibromomethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ethylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
isopropylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl isobutyl ketone (MIBK) (µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
methylene chloride (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
methyl-t-butyl ether (MTBE) (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-propylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-xylene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-isopropyltoluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
styrene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-butylbenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tetrachloroethene (µg/L)	0.5 U	3.94	0.63	2.78	1.09	2.68	4.09
toluene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-dichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-dichloropropene (µg/L)	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trichloroethene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trichlorofluoromethane (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
vinyl chloride (µg/L)	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (µg/L)	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
hexachlorobutadiene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
naphthalene (µg/L)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

* Source: City of Spokane. LFGW3412 2016-Q2 GW Report-Closed Cell.pdf

Table H-17: Groundwater Monitoring Results from Quarter 3, 2016*

Table 4

Summary of Chemical Analytical Results - Groundwater [1]
Northside Landfill Closed Refuse Unit
Spokane, Washington

Analysis	Project Standard [2]	Monitoring Well and Date of Sampling						
		MW-C 7/27/2016	MW-T 7/27/2016	MW-20B 7/27/2016	MW-20B (Duplicate) 7/27/2016	MW-BB 7/27/2016	MW-M 7/22/2016	PEW 7/26/2016
Standard Method 4500-NH3G (mg/L)								
Ammonia (as N)	NE	<0.05	<0.05	<0.05	<0.05	<0.05	NT	NT
Standard Method 9221 B (MPN/100 mL)								
Total Coliform	1	**<1.8**	**<1.8**	**<1.8**	**<1.8**	**<1.8**	NT	NT
Standard Method 2320 B (mg/L)								
Bicarbonate (as $CaCO_3$)	NE	204	293	217	215	390	NT	NT
Method EPA 300 (mg/L)								
Chloride	250	15.1	4.83	16.7	17.2	12.2	NT	NT
Sulfate	250	27.4	11.0	22.1	22.7	22.8	NT	NT
Nitrate (as N)	10	3.54	4.07	3.46	3.56	6.95	NT	NT
Nitrite (as N)	1	<0.2	<0.1	<0.1	<0.1	<0.1	NT	NT
Method EPA 410.4 (mg/L)								
Chemical Oxygen Demand	NE	8.32	7.03	7.03	7.29	7.03	NT	NT
Standard Method 2510 B (µmhos/cm)								
Conductivity	700	472	572	493	490	**762**	NT	NT
Standard Method 5310C (mg/L)								
Total Organic Carbon	NE	0.827	1.67	0.844	0.828	0.824	NT	NT
Method EPA 200.8 (mg/L)								
Dissolved Calcium	NE	53.1	77.3	50.2	49.9	95.2	NT	NT
Dissolved Iron	0.3	0.0133	<0.01	<0.01	<0.01	<0.01	NT	NT
Dissolved Magnesium	NE	28.0	27.8	30.8	30.8	44.3	NT	NT
Dissolved Manganese	0.05	0.00154	<0.001	<0.001	<0.001	<0.001	NT	NT
Dissolved Potassium	NE	4.03	5.88	4.75	4.73	6.39	NT	NT
Dissolved Sodium	NE	8.03	3.25	7.62	7.66	7.97	NT	NT
Dissolved Zinc	5	0.0137	0.00959	0.00945	0.00946	0.00783	NT	NT
Method EPA 8260C [3] (µg/L)								
Methylene Chloride	5	–	–	–	–	–	–	–
Tetrachloroethene	0.8	–	**1.05**	–	–	**3.02**	**2.39**	**2.72**
Field Measurements [4]								
pH	6.5 to 8.5	7.46	7.50	7.66	–	7.08	7.09	6.92
Specific Conductivity (µS/cm)	NE	508	595	525	–	814	799	842
Temperature (degrees Celsius)	NE	14.2	12.4	13.9	–	17.7	17.1	16.9

Notes:

[1] Samples were collected by the City of Spokane and chemical analyses were conducted by Anatek Labs, Inc. of Spokane, Washington.

[2] Project standards are as specified in Table A-3 of CH2MHill (2008). Where not specified, the standard is designated as NE (not established).

[3] The suite of volatile organic compounds (VOCs) were analyzed under Environmental Protection Agency (EPA) Method 8260C. To view the entire dataset, see the laboratory reports provided in Appendix B. In this table, only compounds that meet the following criteria are listed:

- Those compounds that were detected.
- Those compounds that were not detected but had detection limits higher than the reporting limits specified in Table A-3 of CH2MHill (2008). No compounds met this second criterion during third quarter 2016.

[4] Field measurements were obtained by the City of Spokane during sampling activities.

Bold font indicates an exceedance of the project standard or a detection limit higher than the project standard.

mg/L = milligrams per liter; MPN/100 mL = most probable number per 100 milliliters; µg/L = micrograms per liter; µS/cm = microSiemens per centimeter; µmhos/cm = micromhos per centimeter; NE = not established; – = not applicable; NT = not tested.

* Source: City of Spokane. LFGW3412 2016-Q3 GW Report-Closed Cell.pdf

Table H-17: Groundwater Monitoring Results from Quarter 4, 2016*

TABLE 6.

Groundwater Quality Results for Closed Refuse Unit

2016 Annual Groundwater Monitoring Report for Closed Refuse Unit – City of Spokane Northside Landfill

Analysis	Project Standard [2]	Monitoring Well and Date of Sampling						
		MW-C 11/9/2016	MW-T 11/9/2016	MW-208 11/9/2016	MW-5B 11/10/2016	MW-5B (Duplicate) 11/10/2016	MW-N 11/9/2016	PEW 11/9/2016
Standard Method 4500-NH3G (mg/L)								
Ammonia (as N)	NE	<0.05	<0.05	<0.05	<0.05	<0.05	NT	NT
Standard Method 9221 B (MPN/100 mL)								
Total Coliform	1	<1.8	<1.8	<1.8	<1.8	<1.8	NT	NT
Standard Method 2320 B (mg/L)								
Alkalinity (as $CaCO_3$)	NE	207	344	212	371	375	NT	NT
Bicarbonate (as $CaCO_3$)	NE	207	344	212	371	375	NT	NT
Method EPA 300 (mg/L)								
Chloride	250	14.8	1.19	16.0	10.5	10.1	NT	NT
Sulfate	250	27.9	5.41	23.1	21.0	20.3	NT	NT
Nitrate (as N)	10	3.59	3.54	3.53	6.25	6.03	NT	NT
Standard Method 2540 D (mg/L)								
Total Suspended Solids	NE	<1	<1	<1	<1	<1	NT	NT
Standard Method 2540 C (mg/L)								
Total Dissolved Solids	500	209	290	236	370	378	NT	NT
Method EPA 410.4 (mg/L)								
Chemical Oxygen Demand	NE	<5	<5	<5	<5	<5	NT	NT
Standard Method 5310C (mg/L)								
Total Organic Carbon	NE	0.688	1.76	0.655	1.20	0.728	NT	NT
Method EPA 200.8 (mg/L)								
Dissolved Antimony	NE	<0.001	<0.001	<0.001	<0.001	<0.001	NT	NT
Dissolved Arsenic	0.05	0.00278	0.00160	0.00457	0.00125	0.00123	NT	NT
Dissolved Barium	1	0.0646	0.0380	0.0665	0.0718	0.0715	NT	NT
Dissolved Beryllium	NE	<0.001	<0.001	<0.001	<0.001	<0.001	NT	NT
Dissolved Cadmium	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	NT	NT
Dissolved Calcium	NE	51.9	88.0	48.3	92.5	88.0	NT	NT
Dissolved Chromium	0.05	<0.001	<0.001	<0.001	0.00100	0.00101	NT	NT
Dissolved Cobalt	NE	<0.001	<0.001	<0.001	<0.001	<0.001	NT	NT
Dissolved Copper	1	<0.001	0.00236	<0.001	<0.001	<0.001	NT	NT
Dissolved Iron	0.3	0.0432	<0.01	0.0138	<0.01	<0.01	NT	NT
Dissolved Lead	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	NT	NT
Dissolved Magnesium	NE	26.9	29.4	29.7	42.8	40.8	NT	NT
Dissolved Manganese	0.05	0.00464	<0.001	0.00132	<0.001	<0.001	NT	NT
Dissolved Nickel	NE	<0.001	<0.001	<0.001	0.00157	0.00168	NT	NT
Dissolved Potassium	NE	3.90	6.03	4.59	6.31	6.00	NT	NT
Dissolved Selenium	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	NT	NT
Dissolved Silver	NE	<0.001	<0.001	<0.001	<0.001	<0.001	NT	NT
Dissolved Sodium	NE	8.26	3.01	8.28	8.61	8.22	NT	NT
Dissolved Thallium	NE	<0.001	<0.001	<0.001	<0.001	<0.001	NT	NT
Dissolved Vanadium	NE	0.00170	0.00159	0.00274	0.00309	0.00311	NT	NT
Dissolved Zinc	5	0.0169	0.0172	0.0164	0.00973	0.00893	NT	NT

Source: GeoEngineers

Analysis	Project Standard[2]	Monitoring Well and Date of Sampling						
		MW-C 11/9/2016	MW-T 11/9/2016	MW-20B 11/9/2016	MW-5S 11/10/2016	MW-5S (Duplicate) 11/10/2016	MW-M 11/9/2016	PEW 11/9/2016
Method EPA 8260C[3] (µg/L)								
Tetrachloroethene	0.8	1.25	0.55	**1.52**	**4.20**	**4.00**	**3.68**	–
Field Measurements[4]								
pH	6.5 to 8.5	7.51	7.29	7.70	7.10	–	7.32	7.04
Specific Conductance (µS/cm)	NE	502	656	510	776	–	553	796
Temperature (degrees Celsius)	NE	14.0	12.7	13.9	17.3	–	13.7	14.8

Notes:

[2]Project standards are as specified in Table A-3 of CH2MHill (2008). Where not specified, the standard is designated as NE (not established).

[3]The suite of volatile organic compounds (VOCs) were analyzed under Environmental Protection Agency (EPA) Method 8260C. To view the entire dataset, see the laboratory reports provided in Appendix B. In this table, only compounds that meet the following criteria are listed:

-Those compounds that were detected.

-Those compounds that were not detected but had detection limits higher than the reporting limits specified in Table A-3 of CH2MHill (2008). No compounds met this second criterion during third quarter 2016.

[4]Field measurements were obtained by the City of Spokane during sampling activities.

Bold font indicates an exceedance of the project standard or a detection limit higher than the project standard.

mg/L = milligrams per liter; MPN/100 mL = most probable number per 100 milliliters; µS/cm = microSiemens per centimeter; NE = not established; – = not applicable. NT = not tested.

GeoEngineers

* Source: City of Spokane. LFGW3211 2016 CRU Annual Report.pdf

Note: Table lists PCE cleanup level as 0.8 µg/L. The cleanup level for PCE per EPA site documents is 5.0 µg/L.

APPENDIX I – INTERVIEW FORMS

Northside Landfill Superfund Site Five-Year Review Interview Form

Site Name: Northside Landfill **EPA ID No.:** WAD980511778

Interviewer Name: First Name Last Name **Affiliation:** Skeo/ EPA / Other Name
Subject Name: ELLEN HALE **Affiliation:** Skeo/ EPA / Other Name
Subject Contact Information: 206 553-1215, hale.elly@epa.gov

Time: 11:00 a.m. **Date:** 11/16/2016
Interview Location: DESK

Interview Format (circle one): In Person Phone Mail Other: email

Interview Category: EPA Remedial Project Manager –Prior

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?
    a. This is an odd site with a long, but distant, story. Exposure to contaminated drinking water was addressed long before my involvement, and construction of the remedy was completed in 1993. The logic of the Consent Decree termination and the Ecology–EPA relationship eludes me, but it affects our role.
    b. Monitoring hasn't shown contamination above the ROD cleanup levels for several years. On its face it seems like a success story.
    c. But with each five year review, a few additional question or issues have emerged, such as the lack of effective institutional controls, new MCLs, when to discontinue groundwater treatment (using the "pilot extraction well") and when to dismantle, monitoring well abandonment, documentation, cap maintenance and the role of gas collection.
    d. Project turnover can lead to lost connections; reduced risk can lead to less attention from regulators and project managers. But now, over 20 years after construction, maintenance and monitoring and institutional controls are most critical. So I'm glad the five-year review provides an opportunity to set up systems that will keep the site protective.
    e. In my tenure, I hoped we could do remedy optimization to make sure we are confident that the monitoring is appropriate for the site hydrology. I also hoped the City would use the site for solar power generation. The only other issue that has periodically arisen is what uses should be allowed in the buffer area between the landfill boundary and the property boundary.
    f. Provided vapor intrusion is not an issue, I think site deletion may be next.

2. What have been the effects of this Site on the surrounding community, if any?
    a. During my tenure, I heard from locals who saw the landfill as something that provides nice open views, as a waste of good land, as an attractive nuisance, or as a black mark that affects property values. I think for most people it's just a familiar backdrop that is not of concern.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities since the implementation of the cleanup?
    a. I periodically got calls from people concerned about or inquiring about the active landfill. I am not aware of complaints related to the Superfund site and groundwater contamination.

4. What is your assessment of the current performance of the remedy in place at the Site?
    a. The site was slipping in importance with the prior site manager, who seemed overstretched.

5. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?

a. I think the issue is always: who even knows to look for information about the ICs? The city project manager and the county records should have and be aware of this info. Thank goodness for five year reviews.

6. Are you aware of any community concerns regarding the Site or the operation and management of its remedy? If so, please provide details.
    a. See above. No.

7. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?
    a. No. I think it would be helpful to work with Ecology on setting up ANNUAL check in meetings of the project team.
    b. I think a hydro should review the site – via optimization?

8. Are you aware of any changes to state laws or local regulations (e.g., land use, contamination standards, other) that might affect the protectiveness of the Site's remedy?
    a. No, but it has always been a concern that new wells can be installed and that pumping could pull groundwater from the site in a different direction. If that happens (or happened?) the monitoring wells would not be representative of downgradient conditions.

9. What Site activities were on you "to-do" list if you remained the PM of the Site based on previous five year reviews and/or familiarity with the Site?
    a. Ensure that the state's well drilling permit office included clear delineation of "no well" zones around this (and other) landfills.
    b. Do optimization, with a hydrogeologist involved. We are making assumptions about the direction and volume of groundwater flow.

Northside Landfill Superfund Site — Five-Year Review Interview Form

Site Name: Northside Landfill **EPA ID No.:** WAD980511778

Interviewer Name: Sabrina Foster/Treat Suomi **Affiliation:** Skeo/ EPA

Subject Name: Piper Peterson **Affiliation:** EPA RPM

Subject Contact Information:

Time: 11:00 a.m. **Date:** 11/17/16

Interview Location: email

Interview Format (circle one): In Person Phone Mail Other: email

Interview Category: EPA Remedial Project Manager –Prior and Current

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?
   There currently isn't any re-use of the site. There was an effort to build a baseball field a number of years ago, but that project didn't move forward. Currently there are no other projects being considered, but Catherine Olsen at the City of Spokane has asked for Site Reuse information and potential funding mechanisms and grants. The EPA provided this information to her.

   The site tour on 10/25/16 was cool and dry. The site is covered with a cap and high desert grasses. A small portion of the site (MFS area) is open and receives garbage now and again. Otherwise, the remainder of the site, which is behind a locked gate/fence is intact. We noticed 2-3 low spots that appeared wet/moist and requested that the City fill these areas in so they weren't low spots collecting rain water or snow melt.

   There was a washout along the buffer area that occurred in May 2016. The "crack" along the hillside was up to 40 feet deep in the center and approximately 10 feet deep on the upper and lower reaches of it. An unusually 200+ year storm occurred in this area. Water accumulated in the adjacent neighborhood and was funneled toward the site between houses and natural depressions. Damage also occurred in the neighborhood. The City of Spokane did not alert the EPA or Ecology to this situation. EPA and Ecology have requested copies of the design reports when available. This area is anticipated to be fixed in spring 2017. After the site visit I sent emails to the City (Kelle V) and the state (Bill F) indicating my concerns about potential failure of this slope and possible impacts to nearby residents

2. What have been the effects of this Site on the surrounding community, if any?
   From an aerial map in the site file, it appears that the neighborhood on the top of the buffer area had been there since the 1960's and there are previous reports that the neighbors like the views across this open area. The contamination to the groundwater has impacted the surrounding neighbors on the edge of the landfill because they are no longer able to drink or use the groundwater and their homes have been hooked up to city water.

   We did speak to a nearby resident and he is still using his well for drinking and irrigation/lawn watering and said his neighbor was as well. This raised concerns about the prohibition of people using wells within the 1000 ft perimeter of the site, and potentially this well was located outside of that zone. I suggest that we determine where the 1000-foot perimeter line is and how to assess if existing or new wells (after the 199X cleanup) have been installed.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities since the implementation of the cleanup?
   No.

4. What is your assessment of the current performance of the remedy in place at the Site?
   The EPA needs to review the groundwater quarterly and annual reports for the past 5 years. It is my sense that potentially the cleanup standards have been met and the site can potentially be delisted if so. This will be determined during the development of the 2017 FYR.

5. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?
   Yes. Treat Suomi, Skeo, confirmed that the UECA is still in place.

6. Are you aware of any community concerns regarding the Site or the operation and management of its remedy? If so, please provide details.
   There are no community concerns. There is an issue of the gas extraction lines near the washout area being damaged, and only 1 of 3 flares appear to be operational. The FYR reviewers will determine if the lines need to be fixed, and if more flares are necessary. I believe someone from the City stated that there isn't enough gas to operate more than 1 flare.

7. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?
   Approximately 50+% of the local staff are new due to retirements or job changes. The EPA has not been receiving the groundwater quarterly reports in 2016 or the 2015 annual report. Also, I believe there may be some confusion about when documents are sent to the EPA and when they are sent only to Ecology (lead at the site due to a Letter of Agreement (November 30, 1996). However, this is still a Superfund site, so the EPA is required to conduct the five year reviews. We will develop a "communication flow chart" for reports, issues, other on the project. We will also develop a decision matrix for determining if and when the site can be delisted from Superfund and what it is required to comply with as per the State and County requirements since the MFS area still receives waste (e.g., Air Discharge Plan, Effluent Plan, Regional Health Department permit, Discharge Compliance Report)

8. Are you aware of any changes to state laws or local regulations (e.g., land use, contamination standards, other) that might affect the protectiveness of the Site's remedy?
   Need to do a Vapor Intrusion analysis because there are multiple lines of evidence that need to be considered since the last FYR.

9. What Site activities were on you "to-do" list if you remained the PM of the Site based on previous five year reviews and/or familiarity with the Site?
   See the spreadsheet that was developed after the 10/25/16 site visit.

Northside Landfill Superfund Site — Five-Year Review Interview Form

Site Name: Northside Landfill **EPA ID No.:** WAD980511778

Interviewer Name: Piper Peterson **Affiliation:** EPA
Subject Name: Resident 1 **Affiliation:** Area Resident
Time: 1:00 p.m. **Date:** 10/25/2016
Interview Location: Resident's Home

Interview Format (circle one): In Person Phone Mail Other:

Interview Category: Residents

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?
   Yes.

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?
   I only have one issue. Along the highway, there were lots of ponderosa pines in their prime. They put in flowers and planted tons of things but they never took care of it. Doesn't anyone hold them accountable? I think there is a sprinkler system over there.

3. What have been the effects of this Site on the surrounding community, if any?
   I kind of liked the dump. It was very convenient. No real impacts except when the big scare of the information came out about the site, but nothing since then.

4. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?
   No, there have been no problems.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?
   I do not recollect getting any info for a few years. On my side of the street we are zip code 99026 for Nine Mile Falls, but across the street they are part of the "city."

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?
   Yes, it is the oldest well out here and has been here since 1953. I have been here for 36 years. We use our domestic well. There is a municipal system here but we are not connected. They test the well regularly but mine has been well below the limits on anything that is detectable. There was a guy who used to come out and kept me informed, but he retired and I have not received results in a while.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?
   It would be good to get the results from the well sampling. I have a neighbor that asks me occasionally.

Northside Landfill Superfund Site **Five-Year Review Interview Form**

Site Name: Northside Landfill **EPA ID No.:** WAD980511778

Interviewer Name: First Name Last Name **Affiliation:** Skeo/ EPA / Other Name
Subject Name: Kelle Vigeland **Affiliation:** City of Spokane
Subject Contact Information: 509-625-6541 kvigeland@spokanecity.org
Time: 3:00pm **Date:** 12/13/2016
Interview Location: Written Response

Interview Format (circle one): ~~In Person~~ ~~Phone~~ ~~Mail~~ **Other:**

Interview Category: **Potentially Responsible Parties (PRPs)**

1. What is your overall impression of the remedial activities at the Site? I have only recently become involved with the facility. But in preparing for the EPA 5-year review, I was pleased with the knowledge of the landfill staff and their professionalism related to responding to issues, requests, etc…

2. What have been the effects of this Site on the surrounding community, if any? My impressions from reviewing the monitoring data and discussions with staff is that effects on the surrounding community have been addressed with approaches that are effective and timely – for instance providing city water early in the process for those whose wells were impacted and putting in place effective mitigation measure (extraction system) that now has reduced off-site impacts.

3. What is your assessment of the current performance of the remedy in place at the Site? Are there any standard sampling practices that have been modified in the past five years? If so, what are they? Were they approved by the State and/or the EPA? What date were these practices implemented? Since the remedy is in the shutdown phase, after having achieved the necessary groundwater quality, I would think the performance speaks for itself. I have not come across anything indicating changes in sampling practices for the closed portion of the landfill over the last 5 years. There is a newer (2013) groundwater monitoring plan for the active portion of the landfill site which was approved by the permitting agency (Spokane Regional Health District).

4. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup? I have asked whether staff have received complaints from residents and was told that the only complaints relate to issues other than environmental issues and/or the site cleanup activities.

5. Do you feel well-informed regarding the Site's long-term monitoring progress? If not, how might EPA convey site-related information in the future? The landfill has extensive records of monitoring, making it relatively easy to review past to present data. This is my first time

participating in a 5-Year review, but it seems like an effective method of communicating between affected parties.

6. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy? Systems should be developed to ensure that as personnel changes are made there is continuity in operating and maintaining the site.

7. Are you aware of the follow-up activities required in the last five-year review? Yes.

8. Did you complete these activities? If not, why not? Records for the landfill show that the activities in Table 10 of the 5-Year Report were completed. One of the two additional items at the end of Section 9.0 is complete (approval to begin shutdown phase of the PEW). Some progress has been made on the second, but it is not complete. My history with the site is very limited, having only become involved as of October of this year.

9. Are you aware if the UECA covenant is still in place for the institutional controls on this site? If so, when did you confirm that they are still in place? Information discussed during the site visits and documents reviewed since then, indicate covenants are in place.

10. Are there any modified land uses for this Site that you anticipate in the next five years? If so, what are they? I am not aware of anything specific. I believe that both City personnel and EPA are interested in future use of the property that would provide public benefit while ensuring any needed protections remain in place.

Northside Landfill Superfund Site **Five-Year Review Interview Form**

Site Name: Northside Landfill **EPA ID No.:** WAD980511778

Interviewer Name: First Name Last Name **Affiliation:** Skeo/ EPA / Other Name
Subject Name: Rich Hanson, PE **Affiliation:** City of Spokane
Subject Contact Information: Optional Line – Delete This Text if Not Available
Time: 11:00 a.m. **Date:** 11/9/2016
Interview Location: Location Information Here

Interview Format (circle one): In Person Phone Mail Other: email

Interview Category: EPA Remedial Project Manager –Prior and Current

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?
   My impression is that the project has been a good one. To this point in time, the treatment system has accomplished the intended results. The prescribed "pump and treat" system has been maintained and monitored in a reasonable manner.

2. What have been the effects of this Site on the surrounding community, if any?
   The City of Spokane has sought to minimize the impacts of the Northside Landfill on the adjacent property owners and neighborhood and to provide community assistance on the site as deemed appropriate. This has been accomplished through proper maintenance of our site buffer areas, posting of operations information and contact information for citizens who have questions, and onsite operations that take into consideration the privacy and other needs of the neighbors.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities since the implementation of the cleanup?
   I am unaware of any complaints. We have worked with adjacent residences to resolve issues regarding buffer area landscaping and have worked with the appropriate City of Spokane Departments to address and resolve these issues.

4. What is your assessment of the current performance of the remedy in place at the Site?
   The prescribed "pump and treat" system is performing as desired for the remedy of the site conditions. In fact, due to the effectiveness of the system for treatment and monitoring purposes, we have entered into a period of time when the system has been shut off to determine if the original public safety issues remain. During this period of time, the system is being maintained and operated periodically to ensure operational integrity.

5. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?
   I am comfortable with the status of the institutional controls.

6. Are you aware of any community concerns regarding the Site or the operation and management of its remedy? If so, please provide details.
   I am not aware of any community concerns regarding the site or the operation and management of the remedy.

7. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?
   I have no comments, suggestions or recommendations about the Site remedy.

8. Are you aware of any changes to state laws or local regulations (e.g., land use, contamination standards, other) that might affect the protectiveness of the Site's remedy?
   I am not aware of any changes.

9. What Site activities were on you "to-do" list if you remained the PM of the Site based on previous five year reviews and/or familiarity with the Site?
   I would plan on performing the following:
   1. Repair the buffer zone washout damage at the north end of the landfill.
   2. Develop and administer a training program for the new technicians as a means to ensure they are qualified to perform all required duties.
   3. Review the Site Specific Audit recommendations from the 2011 CH2M Hill study and strategize a next step repairs for the remainder of the malfunctioning, or sub-performing, gas collection wells, depressions, and surface erosion.
      a. A further study may be necessary to determine the subsurface gas production before concluding that the wells are sub-performing.
      b. Conduct an aerial survey, topographic and infrared, of the surface and compare to the last survey to determine potential problem areas.
   4. Identify all groundwater wells no longer needed for sampling. Budget and properly abandon these wells.
   5. Complete road maintenance site wide.
   6. Replace flare station valves, gaskets, connectors, and other ancillary items as part of removal of redundant flare train equipment. The removed equipment could have some salvaged value to offset the cost. This would result in a remaining 2 trains of equipment for one remaining flare. The other two flares would be removed along with the one train of equipment.

Northside Landfill Superfund Site **Five-Year Review Interview Form**

Site Name:	**Northside Landfill**	**EPA ID No.:**	**WAD980511778**
Interviewer Name:	**First Name Last Name**	**Affiliation:**	**Skeo/ EPA / Other Name**
Subject Name:	**Travis Reilly**	**Affiliation:**	**Skeo/ EPA / Other Name**
Subject ContactInformation:	**Optional Line – Delete This Text if Not Available 5096256905**		
Time:	**11:00 a.m.**	**Date:**	**11/3/16**
Interview Location:	**Location Information Here**		

Interview Category: O&M Contractor/Personnel

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)? Good

2. What is your assessment of the current performance of the remedy in place at the Site? Good

3. What are the findings from the monitoring data? What are the key trends in contaminant levels that are being documented over time at the Site? Methane levels are slowly decreasing over time. I have not observed any offsite methane migration.

4. Is there a continuous on-site O&M presence? If so, please describe staff responsibilities and activities. Alternatively, please describe staff responsibilities and the frequency of site inspections and activities if there is not a continuous on-site O&M presence. The site is staffed 4 days a week. There are weekly inspections of the flare area, perimeter, discharge areas, and grounds in general. The cover is inspected in more detail once a month. I walk or use a 4- wheeler to inspect areas that are not accessible by truck.

5. Have there been any significant changes in site O&M requirements, maintenance schedules or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts. Not that I am aware of.

6. Have there been unexpected O&M difficulties or costs at the Site since start-up or in the last five years? If so, please provide details. Not that I am aware of.

7. Have there been opportunities to optimize O&M activities or sampling efforts? Please describe changes and any resulting or desired cost savings or improved efficiencies. Not that I am aware of.

8. Do you have any comments, suggestions or recommendations regarding O&M activities and schedules at the Site? The O&M plan is over 20 years old, and needs to be updated. Some things in the manual may no longer be relevant.

9. What have the annual O&M costs been for the last 5 years? Were there any unusual increases or decreases in costs over the last 5 years? Unknown