North Beach Water District

Memo: Arsenic Exceedance – April, 2015

May 26, 2015

North Beach Water District submitted routine compliance water samples to ALS for Arsenic (A_S) on April 9, 2015. The result of the sample was 12 ug/L A_S. The MCL for A_S. is 10 ug/L.	● In an email dated May 15, 2015, Teresa Walker, ODW Regional Engineer, requested the following: ➢ A schematic showing all active sources in the wellfield, the manifold for wellfield designation, all treatment regimes. ➢ Blending Plan. ● In a letter from Sophia Petro, ODW Water Source Quality Program Manager, dated May 20, 2015. In that letter Ms. Petro informed NBWD : ➢ Required to: collect a monthly Post Treatment Sample from S06 for A_S. ➢ Recommended to: collect pretreatment blended sample for A_S. ➢ Required to: collect monthly samples until Running Annual Average (RAA) are reliably and consistently below the MCL and NBWD has successfully implemented a blending plan to reduce the A_S residuals below the MCL.
Attachments:	● Correspondence ● Schematic showing active sources in wellfield, manifold for wellfield designation, and treatment regimes. ● Table 3-1 NBWD Water Treatment Plant Study, January 2013 ● Table 3-4 NBWD Water Treatment Plant Study, January 2013 ● Clack MTM Data Sheet ● ITS Quick™ II Test Kit and Quick™ Arsenic Scan Information Sheet ● ALS Environmental Report of Analysis of A_S for S04 & S09 - 5/4/15
Blending Plan: The purpose of the blending plan is to demonstrate how NBWD will operate its wells through the four filter trains so as to reduce the A_S residuals to below the MCL with a	The North Wellfield blending plan is based on the following well data:

Source/Well #	Capacity (GPM)	As Raw ug/L	As Fin. ug/L
S01 #1	85	3	4
S02 #2	85	11	4
S03 #3	85	11	7
S04 #4	75	13	10
S05 #5	75	15	15
S07 #6	75	12	6
S08 #7	0	8	8
S09 #8	70	12	6

target level being 8 ug/L or lower.

NBWD operators will operate the wells by:

1st Call S01: 85 GPM

2nd Call S07: 160 GPM

3rd Call S09: 230 GPM

4th Call S04: 305 GPM

5th Call S02: 390 GPM

6th Call S05: 465 GPM

7th Call S03: 550 GPM

8th Call S08: Off Line

Water Use Data:

According to the NBWD Draft 2015 Water System Plan Update:

Average Day Demand (ADD) per ERU:

114 Gallons (pg. 2-13)

Maximum Day Demand (MDD) per ERU:

278 Gallons(pg. 2-13)

Equivalent Residential Unit (ERU):

2,691 (table. 2-8)

Peak Hour Demand (PHD):

897 GPM (pg. 2-14)

Average Day Use in Gallons per Day (GPD):

306,762 Gal. (table 2-8)

306,762 ÷ 1,440 = 213 GPM.

Average Pumping Rate is 213 GPM.

NBWD pumping rate runs from a low of 85 GPM to a high of

The Well capacities identified above are a result of field measurements of well production taken by NBWD operators in March, 2015. The measurements were taken while four or more pumps were in operation at the same time.

The raw and finished water A_S residuals identified above are from the NBWD Water Treatment Plant Study, January 2013 Table 3-4.

Using the above data the production wells will be operated in the following sequence.

First call S01 (well #1) 85 GPM with theoretical average A_S raw water concentration of 3 ug/L and theoretical average finished A_S water concentration of 4 ug/L.

Second call add S07 (well #6) 160 GPM with theoretical average A_S raw water concentration of 7.2 ug/L and theoretical average finished A_S water concentration of 4.9 ug/L.

Note: At a minimum 1st and 2nd call will operate or all pumps off.

2nd Call: A_S Raw Water:

S01(85/160) x 3 + **S07**(75/160) x 12 = **7.2 A_S ug/L**

2nd Call: A_S Finished Water:

S01(85/160) x 4 + **S07**(75/160) x 6 = **4.9 A_S ug/L**

Third call add S09 (well #8) 230 GPM with theoretical average A_S raw water concentration of 8.7 ug/L and theoretical average finished A_S water concentration of 5.3 ug/L.

Note: 3rd call will be added if 1st and 2nd call are not able to maintain or add to reservoir level.

3rd Call: A_S Raw Water:

S01(85/230) x 3 + **S07**(75/230) x 12 + **S09**(70/230) x 12 = **8.7 AS ug/L**

3rd Call: A_S Finished Water:

S01(85/230) x 4 + **S07**(75/230) x 6 + **S09**(70/230) x 6 = **5.3 AS ug/L**

Forth call add S04 (well #4) 305 GPM with theoretical average A_S raw water concentration of 9.7 ug/L and theoretical average finished A_S water concentration of 6.4 ug/L.

Note: 4th call will be added if 1st call, 2nd call, and 3rd call are not able to maintain or add to reservoir level.

4th Call: A_S Raw Water:

S01(85/305) x 3 + **S07**(75/305) x 12 + **S09**(70/305) x 12 + **S04**(85/305) x 13 = **9.7 A_S ug/L**

4th Call: A_S Finished Water:

S01(85/305) x 4 + **S07**(75/305) x 6 + **S09**(70/305) x 6 + **S04**(85/305) x 10 = **6.4 A_S ug/L**

Fifth call add S02 (well #2) 390 GPM with theoretical average A_S raw water concentration of 10.0 ug/L and theoretical average finished A_S water concentration of 5.8 ug/L.

Note: 5th call will be added if 1st call, 2nd call, 3rd call, and 4th call are not able to maintain or add to reservoir level.

350 gpm 95% of the year. Water Sampling Routing: Using S06 as the source identification will not provide sufficient identification for the representative sources that are being sampled. NBWD Operators will follow up each S06 sample with a list of the individual sources that were in operation at the time the sample was obtained. I.e. S01 & S06 & S09 are in operation when the sample is obtained. The Operator will identify the sample as S06-01, 06, 09.	**5th Call: A_S Raw Water:** **S01**(85/390) x 3 + **S07**(75/390) x 12 + **S09**(70/390) x 12 + **S04**(75/390) x 13 + **S02**(85/390) x 11 = **10.0 A_S ug/L** **5th Call: A_S Finished Water:** **S01**(85/390) x 4 + **S07**(75/390) x 6 + **S09**(70/390) x 6 + **S04**(75/390) x 10 + **S02**(85/390) x 4 = **5.8 A_S ug/L** **Sixth call add S05 (well #5) 465 GPM with theoretical average A_S raw water concentration of 10.8 ug/L and theoretical average finished A_S water concentration of 7.3 ug/L.** **Note: 6th call will be added if 1st call, 2nd call, 3rd call, 4th call, and 5th call are not able to maintain or add to reservoir level.** **6th Call: A_S Raw Water:** **S01**(85/465) x 3 + **S07**(75/465) x 12 + **S09**(70/465) x 12 + **S04**(75/465) x 13 + **S02**(85/465) x 11 + **S05**(75/465) x 15 = **10.8 A_S ug/L** **6th Call: A_S Finished Water:** **S01**(85/465) x 4 + **S07**(75/465) x 6 + **S09**(70/465) x 6 + **S04**(75/465) x 10 + **S02**(85/465) x 4 + **S05**(75/465) x 15 = **7.3 A_S ug/L** **Seventh call add S03 (well #3) 550 GPM with theoretical average A_S raw water concentration of 10.8 ug/L and theoretical average finished A_S water concentration of 7.2 ug/L.** **Note: 7th call will be added if 1st call, 2nd call, 3rd call, 4th call, 5th call, and 6th call are not able to maintain or add to reservoir level.** **7th Call: A_S Raw Water:** **S01**(85/550) x 3 + **S07**(75/550) x 12 + **S09**(70/550) x 12 + **S04**(75/550) x 13 + **S02**(85/550) x 11 + **S05**(75/550) x 15 + **S03**(85/550) x 11 = **10.8 A_S ug/L** **7th Call: A_S Finished Water:** **S01**(85/465) x 4 + **S07**(75/465) x 6 + **S09**(70/465) x 6 + **S04**(75/465) x 10 + **S02**(85/465) x 4 + **S05**(75/465) x 15 + **S03**(85/550) x 7 = **7.2 A_S ug/L**
Sampling Regimes:	● A Compliance A_S water samples will be collected and submitted to a Washington State approved laboratory the first week of each month. ● A raw water investigative (not for compliance) A_S water sample will be collected at the same time as the compliance A_S water sample and submitted to a Washington State approved laboratory the first week of each month. ● NBWD will sample for A_S regularly using an arsenic test kit. The purpose of the in-house test will be to determine the effectivity of the treatment plant in removing A_S and optimizing treatment plant protocols to ensure optimum A_S removal.
Planned Improvements:	● Background: ➢ Project 12-0803 concluded that A_S removal in well 5 may not be effective due to the lower iron concentration in well 5. A_S(V)

(Arsenate) is often removed by coprecipitation with Iron. A_S(III) (Arsenite) is not as easily removed by coprecipitation with Iron. If total Arsenic concentration in the raw water consists of primarily Arsenite then a peroxidation step needs to be added to improve overall treatment efficiency. Generally ambient air is not an effective oxidant for Arsenite. Therefore, NBWD has asked Gray and Osborne to include a potential KMnO4 (Potassium Permanganate) saturator in the DWSRF Source and Treatment Improvement Project design.

- Short Term:
  - By July 31, 2015, NBWD will make modifications to the treatment plant so that treated water from S01, S02, S03, S04, S05, S07, and S09 will be mixed prior to being filtered through trains 1, 2, 3 and 4 aggregately. These modifications will combine the seven active water sources and four separate filter trains into a single treatment unit. These modifications not will require modifications to the mixing plan delineated above. **Estimated Cost: $3,250**

    Description of Modifications:

    Manifold all of the sources

    The four filter trains were designed to filter different combined sources. There have been some modifications over the years. Currently:

    S01 (Well #1) and S02 (Well #2) combine and enter the Treatment Plant through on three inch PVC pipe. The raw water is pretreated with ambient air through a side stream Mazzei and then sent to Filter Train #4.

    S03 (Well #3) enters the Treatment Plant uncombined with any other source through a three inch PVC pipe. The raw water is pretreated with ambient air through a side stream Mazzei and then sent to Filter Trains #1 & #2.

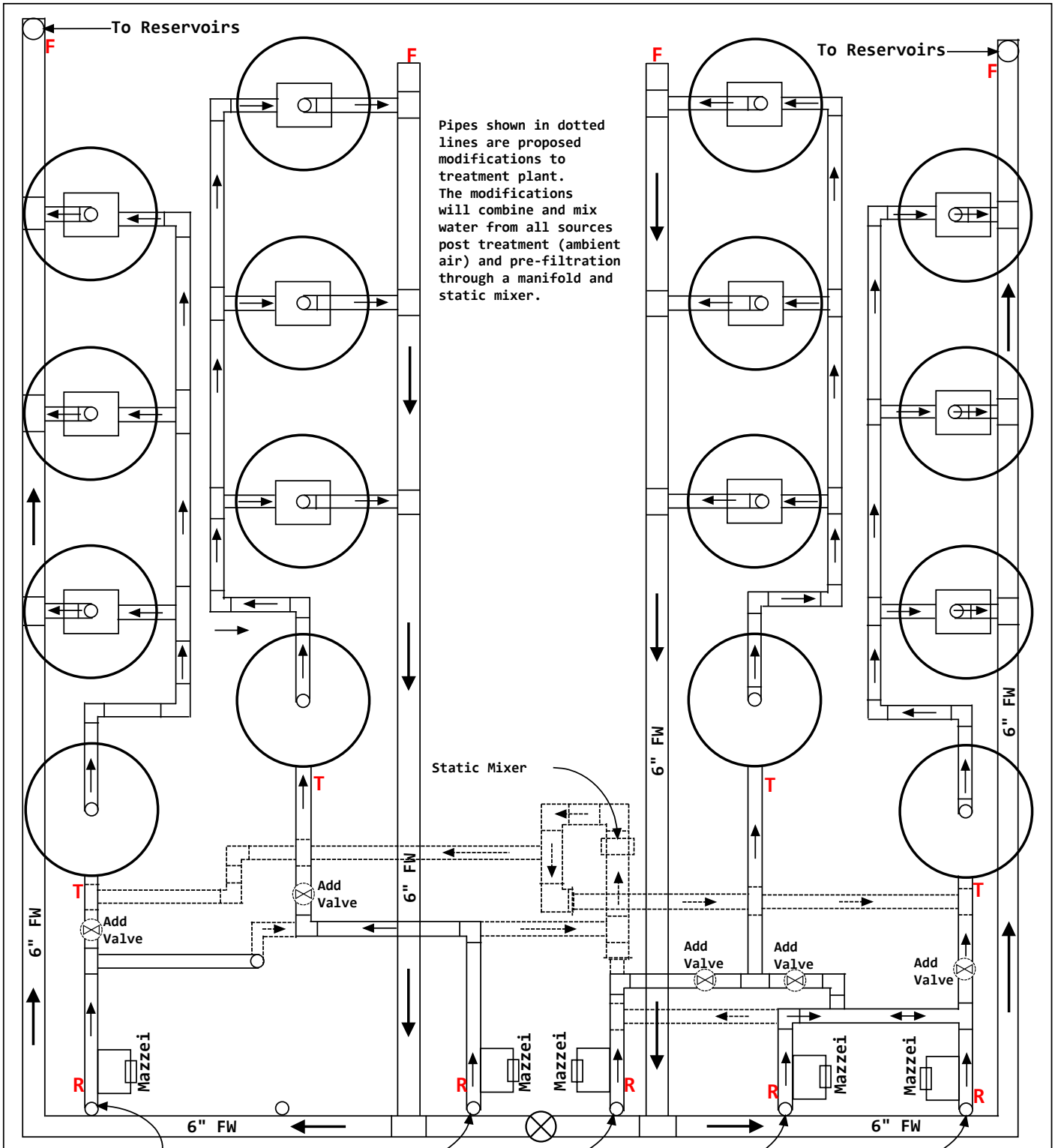
    S04 (Well #4) and S05 (Well #5) combine and enter the Treatment Plant through on three inch PVC pipe. The raw water is pretreated with ambient air through a side stream Mazzei and then sent to Filter Trains #1 & #2.

    S07 (Well #6) and S09 (Well #8) combine and enter the Treatment Plant through on three inch PVC pipe. The raw water is pretreated with ambient air through a side stream Mazzei and then sent to Filter Trains #3.

    S08 (Well #7) enters the Treatment Plant uncombined with any other source through a three inch PVC pipe. The raw water is pretreated with ambient air through a side stream Mazzei and then sent to Filter Trains #1. Currently well number seven is off-line due to reduced production. The production has reduced to below 25 GPM. The well is a 6-inch cased well with no reliable well log. The District will evaluate the possibility of redeveloping or replacing Well #7 in 2016.

    Each filter train consists of One contact tank (36” diameter by 72” high) and three filter vessels (36” diameter by 72” high) containing MTM® Filtration Media. MTM® Filtration Media has a rated continuous service flow rate of 2 to 5 gpm/sq.ft. of bed area and an intermittent

	flow up to 10 GPM/sq.ft. of bed area. The continuous flow rate of the aggregate filter trains will be from 170 to 424 gpm with intermittent operations of up to 848 gallons per minute. ● Advantages of aggregating the sources and filter trains: ➢ Mixing the raw water from all sources will improve the efficacy of Arsenate coprecipitation with Iron prior to filtration. This measure could significantly reduce the need to add a ferric chloride feed system in the future. ➢ Aggregating the individual trains into a single treatment train will improve the treatment efficiency by decreasing the service flow rate of the water through the MTM® media to within its rated service rate. Currently it is not uncommon to operate filter trains at 7 GPM/sq.ft. of bed area. Although the Iron and Manganese residuals in the finished water at those higher service rates have been well below the SMCL's, there may be a noted improvement in the efficacy of A_S removal operating the lower service rates. ● Long Term: ➢ The District will be making extensive improvements to the treatment plant at the north and south wellfield in 2016 and 2017 as part of a DWSRF loan project. These improvements are being designed at this time be Gray and Osborne. The District expects the designs to be submitted to the Office of Drinking Water for review and approval in the near future.
Additional District Actions Related to this Arsenic Exceedance:	● Perform arsenic speciation test on each source. (EPA Method 1632 total Inorganic Arsenic, A_S(III), and A_S(V). **Estimated cost: $ 850.00** ● Purchase Arsenic testing kits. Industrial Test Systems (ITS) Arsenic Low Range Quick™II Test Kit and a Quick™ Arsenic Scan (image to right). This equipment will allow NBWD operators to monitor the efficiency of the treatment plant in removing A_S and in establishing and modifying treatment plant protocols to ensure optimum A_S reduction. **Estimated Equipment Cost $ 825.00. Cost per test $ 4.00**  



Treatment Plant Entrance Points

Raw Water Sample Points: R
Treated Water Sample Points: T
Filtered Water Sample Points: F

Raw Water Sample Points at Each Well Head
Filtered Water Sample Point for Mixed Filtered Water in Vault at South West Corner of Treatment Plant

Title: North Wellfield Treatment Plant Schematic	
Author: William "Bill" Neal	
Date: May, 29, 2015	Sheet: 1 0f 1
Revision:	Not To Scale

From: Walker, Teresa (DOH)
To: Bill Neal (bneal@northbeachwater.com)
Cc: Petro, Sophia M (DOH)
Subject: arsenic at northwellfield
Date: Friday, May 15, 2015 2:28:49 PM

Hi Bill,

The pilot study using ambient air as an oxidant and removing ozone was approved in 2013. The recommendations also called for blending sources in the wellfield to reduce arsenic concentrations. As I understand these recommendations have been implemented. Please submit the following in order for us to document what treatment modifications have been implemented:

1. A schematic showing all active sources in the wellfield, the manifold for the wellfield designation, all treatment regiemes (ie where ambient air is injected, greensand filters, pre-treatment sample tap and post treatment sample taps.)
2. A blending plan consisting of what sources will be used to reduce arsenic concentrations, the flow rates of these different sources, the theoretical arsenic concentrations and how sources will be monitored and alternated.

Let me know if you have any questions regarding this request.

Thanks Bill.

Teresa Walker, P.E., Regional Engineer
DOH Office of Drinking Water: SW Regional Operations, Environmental Health Division
Phone: 360-236-3032, Fax: 360-664-8058
After Hours Emergency Line: 877-481-4901
<<http://www.doh.wa.gov/ehp/dw/>>
Public Health - Always Working for a Safer and Healthier Washington

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
SOUTHWEST DRINKING WATER REGIONAL OPERATIONS
PO Box 47823, Olympia, Washington 98504-7823
TDD Relay 1-800-833-6388

May 20, 2015

William Neal III
Post Office Box 618
Ocean City, Washington 98640

Subject: North Beach Water System, ID #63000C, Pacific County; Increased Monthly Monitoring Requirement for Arsenic on Source S06

Dear William Neal III:

We received a copy of the arsenic monitoring results for source S06 well field collected on April 9, 2015. The result is 0.012 milligrams per liter (mg/L), which is the same as 12 parts per billion (ppb). This level exceeds the Maximum Contaminant Level (MCL) of 10 ppb and as a result, you must collect a monthly post-treatment sample for arsenic from source S06.

While the monthly sample is required, since you also blend as part of your mitigation, I recommend you also collect a quarterly pre-treatment blended sample for arsenic as well to determine where you are finding success in reducing arsenic in the source water.

Compliance with the MCL is based on the Running Annual Average (RAA) of the quarterly post-treatment arsenic results. Once you begin monthly monitoring, the RAA will be determined each quarter. The monthly results are averaged to determine each quarterly value. This single result is not a water quality violation. A source will have a water quality violation if the arsenic RAA exceeds, or will exceed, the MCL.

If your RAA remains less than or equal to the MCL, there is no violation of the water quality standard. In this case, you must continue to monitor for arsenic monthly. If the RAA for the quarterly pre-treatment results are reliably and consistently below the MCL, and you are successfully implementing a blending plan to reduce arsenic below the MCL, post-treatment monitoring may reduce to quarterly.

If you have any questions, please contact me at (360) 236-3046 or by e-mail at sophia.petro@doh.wa.gov or Teresa Walker at (360) 236-3032 or by e-mail at teresa.walker@doh.wa.gov.

Sincerely,

Sophia Petro
Office of Drinking Water, Source Water Quality Program Manager

cc: Pacific County Health Department
Teresa Walker, ODW

Filtration Media

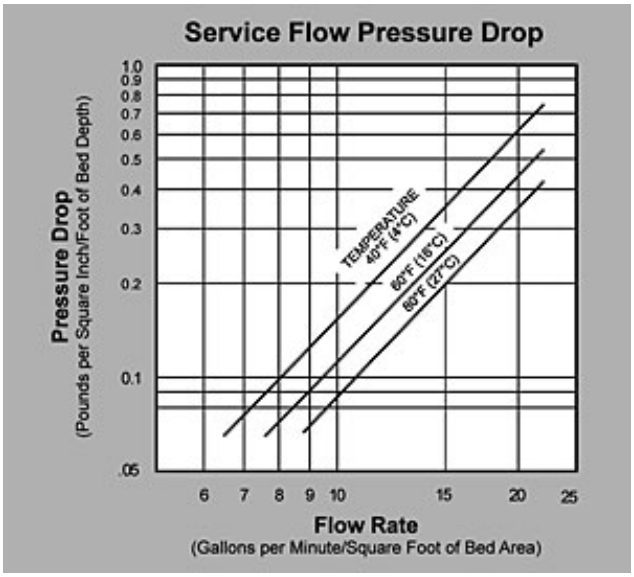
MTM® FILTRATION MEDIA

MANGANESE GREENSAND EQUIVALENT

FILTRATION MEDIA INDEX | DOWNLOAD PDF

MTM® (P/N MTM) is a granular manganese dioxide filtering media used for reducing iron, manganese, and hydrogen sulfide from water. Its active surface coating oxidizes and precipitates soluble iron and manganese. Hydrogen sulfide is oxidized to a sulfur. The precipitates are filtered out in the granular bed and removed by backwashing.

MTM consists of a light weight granular core with a coating of manganese dioxide. The coating provides an example of contact filtration where the media itself provides the oxidizing potential. This allows for a much broader range of operation than many other iron removal medias. A pH level as low as 6.2 can be treated. Dissolved oxygen is not essential. The media's light weight reduces backwash water requirements.



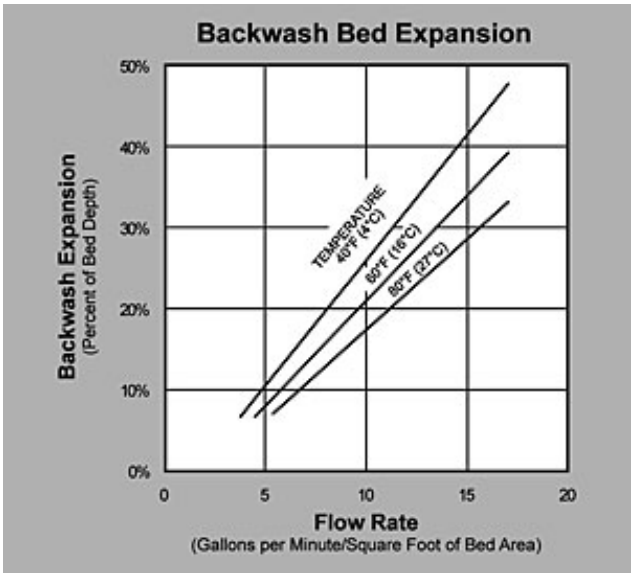
PRESSURE DROP — The graph above shows the expected pressure loss per foot of bed depth as a function of flow rate at various temperatures.

FEATURES:

- Broad operating range for iron reduction
- Lower pressure loss through the bed with high flock holding capacity
- Effective hydrogen sulfide, iron, and manganese reduction
- Light weight requires lower backwash rates and reduces pumping requirements
- Chlorine can be beneficial in extending filter run times
- Low attrition loss for long bed life
- Lower shipping cost
- Certified to NSF/ANSI Standard 61

TYPICAL PROPERTIES	
Part Number	MTM
Color	Dark brown
Specific Gravity	2.0 gm/cc
Effective Size	0.43 mm
Uniformity Coefficient	2.0
Mesh Size	12 x 50
Net Weight	45 to 50 lb / cu.ft.
Packaging	1 cu.ft. bag

SUGGESTED OPERATING CONDITIONS	
Water pH Range	6.2 to 8.5
Water Temperature	100°F (38°C) maximum
Bed Depth	24 to 36 inches
Freeboard	50% minimum



BACKWASH — After each cycle the media bed should be backwashed at a rate that expands the bed 20 to 40 percent.

When the oxidizing power of MTM is reduced, the bed has to be regenerated with a weak solution of potassium permanganate (KMnO4), thus restoring its oxidizing capacity. A regenerating solution of 1½ to 2 ounces (dry weight) of potassium permanganate per cubic foot is sufficient for normal regeneration. Upon startup a new bed should be backwashed and caution taken to insure that the lightweight media is not backwashed to drain. A new bed should be regenerated the evening of installation. **Operating the filter after its oxidizing capacity is exhausted will reduce its service life and may cause staining.**

MTM requires either intermittent or continuous regeneration to maintain its oxidizing capacity. A solution of potassium permanganate (or chlorine then potassium permanganate) can be pre-fed to maintain capacity. In the latter case, the manganese dioxide coating acts as a catalyst to enhance the oxidation reaction and as a buffer to reduce any excess potassium permanganate concentration and prevent it from entering the service lines.

The addition of other chemicals to influent or backwash water which contacts MTM

Service Flow Rate	2 to 5 gpm/sq.ft. continuous (Intermittent flows up to 10 gpm/sq.ft.)
Backwash Flow Rate 12 inch tanks and smaller 13 inch tanks and larger	 8 to 10 gpm/sq.ft. @ 60ºF 10 to 12 gpm/sq.ft. @ 60ºF
Backwash Bed Expansion	20 to 40% of bed depth min.

MAXIMUM PRACTICAL LIMIT	
Iron	15 ppm
Manganese	5 ppm
Hydrogen Sulfide	2 ppm

INFLUENT AND BACKWASH LIMITATIONS	
Oil	None present
Polyphosphates	None present
Air Scour	Not allowed

CONTINUOUS REGENERATION
Use Cl2, KmnO4, or both

INTERMITTENT REGENERATIONS	
KMnO4 Dosage	1.5 to 2.0 oz (dry wt.)/cu.ft.
Regeneration Time	30 minutes minimum
Rinse	Until all traces of KMnO4 are gone

10,000 gallons water containing 1 mg/L iron per cu.ft. regeneration
5,000 gallons water containing 1 mg/L manganese per cu.ft. regeneration
2,000 gallons water containing 1 mg/L hydrogen sulfide per cu.ft. regeneration

For dilute solutions mg/L = ppm
37,850 mg KmNO4 demand
KMnO4 demand = [1 x mg/L Fe] + [2 x mg/L Mn] + [5 x mg/L H2S]

View SWT Filtration Media Guide

California Proposition 65 Warning

This product contains crystalline silica which is known to the State of California to cause cancer and other substances which are known to the State of California to cause cancer, birth defects, and reproductive harm.

This filter media does not remove or kill bacteria. Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

This information has been gathered from standard materials

media may inhibit iron, manganese, or hydrogen sulfide removal, or may break down or coat MTM media. Before adding any chemical to the influent or backwash water, other than chlorine or potassium permanganate, the chemical's compatibility with MTM should be thoroughly tested.

Certified to NSF/ANSI Standard 61

and or test data that is believed to be accurate and reliable. Nothing herein shall be determined to be a warranty or representation expressed or implied with respect to the use of such information or the use of the goods described for any particular purpose alone or in combination with other goods or processes, or that their use does not conflict with existing patent rights. No license is granted to practice any patented invention. It is solely for your consideration, investigation and verification.

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Last Updated: January 8, 2014

As+3 QUICK As+5 II™

Rapid Arsenic Test Kit

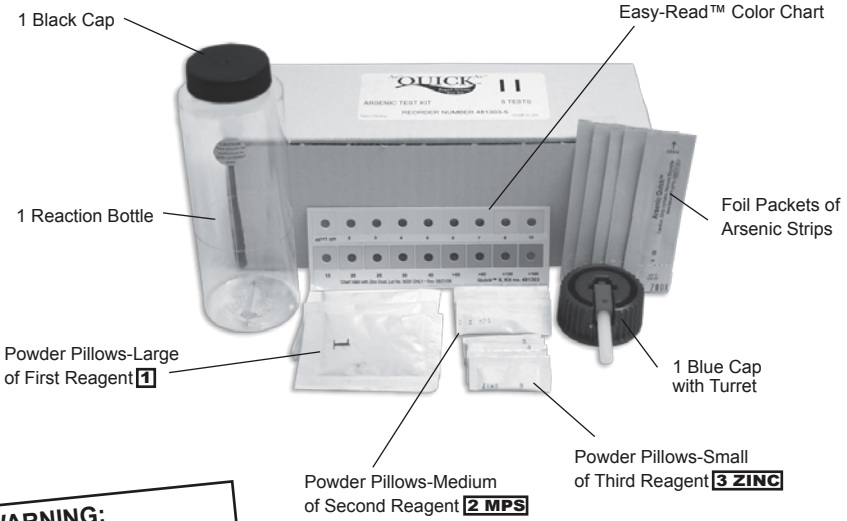
Kit Part Number: 481303-5
5 Tests

ETV® EPA / ETV Test Verified Performance

Instruction Booklet	Page

Information on the performance characteristics of this kit can be found at *www.epa.gov/etv/verifications/verification-index.html*, or call ITS at 803-329-9712 for a copy of the ETV verification report. The use of the ETV® Name or Logo does not imply approval or certification of this product nor does it make any explicit or implied warrantees or guarantees as to product performance.

FOR BEST RESULTS, FOLLOW KIT INSTRUCTIONS.



WARNING:
Hydrogen and Arsine gases are generated during the test. Work in a well-ventilated area away from open flames and other sources of ignition. Review the Material Safety Data Sheet before handling any chemicals.

Industrial Test Systems, Inc.
1875 Langston Street, Rock Hill, SC 29730 USA
Phone: (800) 861-9712, (803) 329-9712, **Fax:** (803) 329-9743
eMail: its@sensafe.com, **International:** www.ITSExport@sensafe.com
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Salisbury, Wiltshire SP3 5DU, UK
Phone: +44 (0)1722 717911, **Fax:** +44 (0) 1722 717941

481303-5-INST
Revision: 01/24/13

ABOUT KIT # 481303-5:

This test detects soluble <u>inorganic</u> Arsenic (As^{+3} and As^{+5})

As^{+3} QUICK™ As^{+5} II
Rapid Arsenic Test Kit

Part Number: 481303-5, 5 Tests

This Arsenic Test Kit provides a safe, simple, and precise way to test for Arsenic from 3 to 20 µg/L. For accurate results when Arsenic value is above 20 µg/L, perform a dilution of the water sample so that the value will read below 20 µg/L. Follow the instructions carefully to get reliable results. All components are supplied in the kit except for a thermometer and timer. This test tolerates up to 2 mg/L Hydrogen Sulfide without interference. No interference was found for this test kit for Antimony up to 0.5mg/L. No interference from Iron or Sulfate was found. Higher levels of Hydrogen Sulfide can be corrected for by diluting (only where sensitivity needs are not compromised). There were no interferences from other components typically found in tap water. It is recommended that the water sample be 22ºC - 28ºC. For reference, record the temperature at which the sample was run. Use kit within the shelf life as marked.

Kit Components:

- 1 Reaction Bottle, clear PVC, with 100mL line
- 1 Blue Cap, with white turret, for holding testing pad
- 5 Powder Pillows of First Reagent **1** (Approx. 4 gm)
- 5 Powder Pillows of Second Reagent **2 MPS** (Approx. 1 gm)
- 10 Powder Pillows of Third Reagent **3 ZINC** (Approx. 2 gm)
- 5 Arsenic Strips in Foil Packets - **Caution:** Each testing pad contains about 1 mg Mercuric Bromide ($HgBr_2$)
- This Instruction Booklet with MSDS
- 1 Black Cap for mixing
- Kit Box for Components
- Easy-Read™ Color Chart

About the Patented Reaction (Modified Gutzeit method):

Inorganic Arsenic compounds in the water sample are converted to Arsine (AsH_3) gas by the reaction of Zinc Dust and Tartaric Acid. Ferrous and Nickel salts have been added to accelerate this reaction. The Arsine reacts with the Mercuric Bromide on the test strip to form mixed Mercury halogens (such as AsH_2HgBr) that appear with a color change from white to yellow or brown. Potassium Peroxymonosulfate (second reagent) is added to oxidize Hydrogen Sulfide to Sulfate.

PRECAUTIONS: Hydrogen gas and Arsine gas are generated during the reaction. Work in a well-ventilated area away from fire and other sources of ignition. All reagents are unsuitable for human consumption and must be kept away from children and pets.

US Patent # 6696300

ATTENTION: Your Arsenic results will be low if step 5 in the **Test Procedure** is not followed carefully.

When you position the testing pad over the orifice, you must press down the turret handle <u>very firmly</u> over the testing pad to securely lock the testing pad into position. If the cap is not firmly formed around the testing pad, arsine gas will bypass the testing pad, which results in lower arsenic levels.

One method of assuring a properly seated testing pad is to use the round end of a pen to apply pressure to the turret (Image 1).

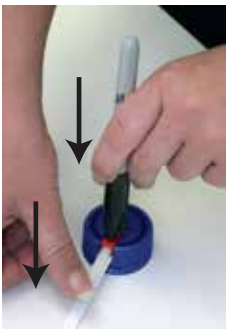


Image 1

Image 2

Another technique is to simultaneously press on the red turret and the turret handle to properly seat the turret into the testing pad (Image 2).

WARNING: Hydrogen and Arsine gases are generated during the test. Work in a well-ventilated area away from open flames and other sources of ignition. Review the Material Safety Data Sheet on pages 6 and 7 before handling any chemicals.

As^{+3} QUICK™ As^{+5} II
Rapid Arsenic Test Kit

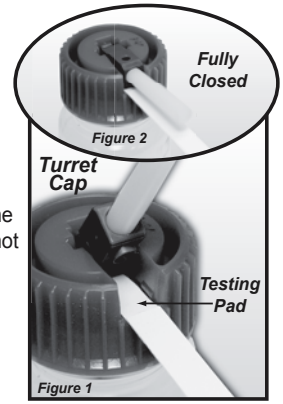
Test Procedure:

FOLLOW KIT INSTRUCTIONS CLOSELY.
Part Number: 481303-5, 5 Tests

1. For best results, the water temperature should be between 22°C to 28°C. Use a thermometer to verify the temperature of the sample.
2. To the Reaction Bottle, slowly add the water sample to the marked line on the bottle (100 mL).
3. Add contents of one Powder Pillow* (Large Packet) of First Reagent **1** to the Reaction Bottle. Cap the bottle securely with black mixing cap and shake vigorously for 15 seconds.
4. Uncap the Reaction Bottle; add contents of one Powder Pillow* (Medium Packet) of Second Reagent **2 MPS**. Cap the bottle securely with black mixing cap and shake vigorously with bottle upright for 15 seconds. Allow the sample to sit for 2 minutes to minimize Sulfide interference.
5. **While the test is incubating for 2 minutes**, prepare the ***turret cap*** as follows (NOTE: The cap and turret must be dry. If the testing pad becomes wet results will be inaccurate):

   a) Open the packet and carefully remove the strip. While handling the strip avoid touching the Mercuric Bromide testing pad at one end of the strip.

   b) Position either side of the testing pad over the orifice (Figure 1) and press down the turret handle over the pad until it locks into position on the cap. Make certain the red turret with handle is fully closed (as illustrated in Figure 2). The red turret should be pressed level with the top of the cap to ensure all gas passes through the testing pad. To confirm that the testing pad completely covers the hole in the cap, visually inspect the orifice from under the cap. The ***turret cap*** is now ready for use in Step 7.



6. Uncap the Reaction Bottle and add contents of two Powder Pillow* (Small Packet) of Third Reagent **3 ZINC**. Cap the bottle securely with black mixing cap and shake vigorously for 5 seconds.
7. Remove the black cap from the Reaction Bottle and recap securely using the ***turret cap*** within **20 seconds**. As you screw on the ***turret cap***, be careful not to splash the water or reagents on the testing pad. It is important that the testing pad remains dry during the test. Place the bottle in a well-ventilated area where it will not be disturbed. You should notice numerous small hydrogen gas bubbles generating from the Tartaric Acid and Zinc Dust Reagents.
8. Start the timer and wait for 10 minutes.
   Reaction generates small hydrogen gas bubbles.
9. **After waiting 10 minutes** (but no longer than 12 minutes), pull the turret up. Carefully remove the test strip with the testing pad. Flatten the testing pad, if necessary, by gently pressing it between two clean pieces of paper. Use the Color Chart and match the color of the exposed side of the testing pad **within the next 2 minutes** (colors oxidize when exposed to light). For best color matching use natural daylight, but do not use direct sunlight. The color can be preserved for a short time by returning the testing pad to the packet and keeping it out of light. If using the ***Quick™ Scan*** Test Pad Reader, follow the meter's instructions.
10. Record your result.

****Before opening the powder pillow packet at one end, shake the reagent in the packet to the "bottom" so that the reagent will not spill when opening at the "top" of the packet.***

(Mercuric Bromide strips (Arsenic test strips) will not react with arsine gas if they are wet!)

ATTENTION: Soon after testing is completed, decant liquid from the bottle down a drain that is not used for food preparation and flush with water. See comment #4 on page 4. Wet Zinc should be collected and disposed of according to local regulations. Rinse the bottle and the cap with clean water. Shake off any excess water. Do not rinse turret cap. It is best to dry turret cap with a soft tissue or paper towel, especially if you plan to run the next test immediately. Keep the used strips inaccessible to children and pets, and dispose according to local environmental regulations.

SUGGESTIONS FOR BEST ACCURACY

1. To gain confidence in using this test kit for unknown samples, it is highly recommended that you use the kit on a sample with a known inorganic Arsenic concentration value, or with a sample that has been prepared using an Arsenic standard. By making a "practice run" of the test, you will familiarize yourself with all of the procedures necessary to ensure accurate testing results. Additionally, you will have the opportunity to become familiar with the process of color matching, which will help to ensure accurate test results. ITS suggests the test be run in duplicate for better accuracy.

2. The water sample must not be preserved with Nitric Acid or any other preservation method. Small amounts of strong acids will interfere with the test results; and therefore it is best that the water sample be freshly drawn and run within 24 hours. Some water samples held for over 24 hours may read low. The water sample should not contain any significant amount of buffers. If you are planning to send a duplicate sample for ICP laboratory verification, follow preservation requirements for that sample only.

3. The water and ambient temperature are very important to ensure accurate results. As an example, a water temperature of 15°C can result in the color development on the testing pad to be lighter than the actual Arsenic concentration in the tested sample (a false low reading occurs). When the water is cold, warm water sample to 22°C to 28°C before testing (using a microwave is acceptable). If the water temperature is above 28°C your result may read low (accelerator chemistry reacts too fast). Consideration must also be made for the air temperature when running the test. Best results are from 22°C to 28°C (water and air). The color chart and Arsenic Scan chart are calibrated at 24°C.

4. After the test has been run, try to rinse out the reaction bottle with clean tap water as soon as possible. When the reaction chemicals are allowed to sit in the reaction bottle after the reaction time, the zinc may begin to adhere to the bottom of the bottle. When this occurs, you may need to clean the reaction bottle with a bottlebrush. Another method for zinc removal is to use a 20% Hydrochloric Acid (reusable) rinse. Be sure to rinse the reaction bottle with clean tap water before running the next test.

5. When matching your test strip pad with the colors on the Easy-Read™ color chart, it may be helpful to find a color that is clearly lighter than the test strip pad and make note of it (as an example, we will use a value of 10 ppb). Next, find a color that is clearly darker than the test strip pad (as an example, we will use a value of 20 ppb). By defining a lowest and highest possible value range we can assume that the correct color match is 13 ppb. If the 13 ppb color matches, then you have determined your Arsenic level. In some cases, an exact color match will not be available. Following these easy steps can make color matching more precise. Careful color matching will assure the best possible result.

6. Levels of Hydrogen Sulfide above 2 mg/L can interfere with this test, resulting in elevated Arsenic readings. Our test kit will eliminate up to 2 mg/L of Sulfide interference. To overcome Hydrogen Sulfide levels above 2 mg/L, allow the water sample to sit at room temperature, uncovered and exposed to air for 8 hours (about 50% of the H_2S gas dissipates for every 8 hours).

Industrial Test Systems, Inc. sells Hydrogen Sulfide detection kits (part # 481197-20) for quick, accurate verification of this interfering ion. The test kit detects levels of 0.3, 0.5, 1.0, and 2.0 mg/L (ppm). The Hydrogen Sulfide test kit contains all components necessary to run the test, and is economically priced at $15.99 for 30 tests.

7. Do not use components from other kits. Interchanging components may result in inaccurate results since each kit is Quality Control released for accuracy with its given components. Some conditions can result in getting an incorrect reading: the presence of Hydrogen Sulfide above 2ppm; color matching in poor lighting conditions; color blindness of operator; and sample temperatures that are high or low.

8. If you have any questions or comments, please feel free to contact our R&D Department at 1-803-329-0162 ext 211 or by email at: *its@sensafe.com*.

9. Record your results and details for future reference.

Sample No.	1	2	3	4	5
Location					
Date					
Result					

QUICK™ ARSENIC SCAN INSTRUCTIONS (INSTRUMENT SOLD SEPARATELY) FOR USE WITH ARSENIC Quick™ TEST KIT:

Instrument Components:

1. Quick™ Arsenic Scan Unit (R710 Color Reflection Densitometer, part number 481305)
2. Operation Manual (109 page book)
3. Calibration Reference Card
4. 18 Month Limited Warranty and Registration Card
5. AC Adapter (110VAC)
6. Carrying Case
7. White Opaque Plastic Card (2 3/8" x 7")
8. Conversion Table for the Following Arsenic Test Kit:
Arsenic Quick™ Test Kit

Locate the ridged, black latch between the two (2) screws near the round end of the measurement shoe. Slide it forward. The measurement shoe is now unlocked, and will lift up by spring action from the body of the instrument.

1. Instrument setup for Arsenic measurement:

a. Remove the instrument from the case and turn the instrument over with the bottom facing up.
b. Locate the "OFF/ON" switch at the square end of the instrument where the data port and DC 9V connector ports are located. Gently slide the switch to "ON".
c. Turn the instrument upright so that the LCD screen and six soft keys (3 black buttons, menu, exit, help) are facing upward.
d. Depress once any one of the six soft keys on top of the unit. The LCD display will turn on.
e. The instrument is now ready to make density measurements.

Notes:

a. The instrument is calibrated, and ready for use when received.
b. The AC adapter (supplied) may be used while performing color density measurements. Be sure the power switch is "OFF" before connecting the adapter to prevent any surge in power.
c. When the unit will stand unused for a long period of time slide the power switch to "OFF".
d. Typically, over 100 measurements can be made when using the battery pack only.

2. Strip measurement:

a. Run the test sample according to the arsenic kit instructions.
b. Read the strip with the Quick™ Arsenic Scan instrument within 30 seconds of completing the test.
i. Place the reacted strip with colored test pad facing upward on the white opaque plastic card (2 3/8" x 7"). It is very important that the white opaque plastic card provided (or a white sustance) is placed under the reacted strip for accurate measuring.
ii. Position the target circle of the base shoe over the color pad so that the pad is centered in the black outlined circle (as illustrated).
iii. Press the body of the instrument down until the optical head is in contact with the target circle. The message "**Measuring...**" will appear in the LCD. A "Y" and a number next to the "Y" will appear in the LCD (For example, Y = 0.19 indicates a yellow color density of 0.19).
iv. Use the number in the LCD (in the example 0.19) and compare with the Data Table provided to determine the concentration of arsenic in the sample. Be sure that you are using the appropriate Data Table for your test kit. 0.19 equals 20 µg/L or ppb Arsenic.
v. Record the "Y" value and the concentration of Arsenic from the appropriate Data Table for future reference. Note: Use of the Quick™ Arsenic Scan unit will yield more precise results when compared to using the Easy-Read™ color chart for color matching determinations.

3. Calibration of Instrument:

See details on pages 34-40 in the Color Reflection Densitometer Operation Manual. It is recommended that "Quick Cal" (pages 39-40) be performed weekly. It is also recommended that "Standard Calibration" (steps 4, 5, & 8 in the manual) be performed when "Quick Cal" results are not within the allowed +/- variance of the "Y" values (White, Black, & Solid {Yellow}) listed in the reference table below:

Step 1: **White**	Step 2: **Black**	Step 3: **Solid (Yellow)**
Y value +/- 0.01	Y value +/- 0.06	Y value +/- 0.03

The Conversion Table below is valid for (Zinc) Reagent 3 lot 9035.

**Note: For best accuracy dilute and retest samples with scan values above 0.61

Arsenic Scan Conversion Table for Arsenic Quick™ II Kit Part # 481303

Match the instrument reading to the corresponding As level (in ppb) as found in the table below: **"Ihara (Y) Reading" = Yellow density value**

Ihara (Y) Reading	As Level (ppb)	Ihara (Y) Reading	As Level (ppb)	Ihara (Y) Reading	As Level (ppb)	Ihara (Y) Reading	As Level (ppb)	Ihara (Y) Reading	As Level (ppb)	Ihara (Y) Reading	As Level (ppb)	Ihara (Y) Reading	As Level (ppb)
0.00	*BDL	0.15	2.3	0.30	6.3	0.45	10.3	0.60	19	0.75	>40	0.90	>40
0.01	BDL	0.16	2.7	0.31	6.5	0.46	10.5	0.61	20	0.76	>40	0.91	>40
0.02	BDL	0.17	3.0	0.32	6.7	0.47	10.7	0.62	21	0.77	>40	0.92	>40
0.03	BDL	0.18	3.3	0.33	7.0	0.48	11.0	0.63	22	0.78	>40	0.93	>40
0.04	BDL	0.19	3.6	0.34	7.3	0.49	11.3	0.64	23	0.79	>40	0.94	>40
0.05	BDL	0.20	3.8	0.35	7.5	0.50	11.7	0.65	24	0.80	>40	0.95	>40
0.06	BDL	0.21	4.0	0.36	7.7	0.51	12.0	0.66	26	0.81	>40	0.96	>40
0.07	BDL	0.22	4.3	0.37	8.0	0.52	12.8	0.67	27	0.82	>40	0.97	>40
0.08	BDL	0.23	4.6	0.38	8.3	0.53	13.0	0.68	29	0.83	>40	0.98	>40
0.09	BDL	0.24	4.8	0.39	8.5	0.54	13.5	0.69	30	0.84	>40	0.99	>40
0.10	BDL	0.25	5.0	0.40	8.7	0.55	14	0.70	32	0.85	>40	1.00	>40
0.11	1.0	0.26	5.3	0.41	9.0	0.56	15	0.71	34	0.86	>40	----	----
0.12	1.3	0.27	5.5	0.42	9.3	0.57	16	0.72	36	0.87	>40		
0.13	1.9	0.28	5.7	0.43	9.9	0.58	17	0.73	40	0.88	>40		
0.14	2.0	0.29	6.0	0.44	10.0	0.59	18	0.74	>40	0.89	>40		

MSDS 1
Material Safety Data Sheet

Section 1 Chemical Identification

Catalog # / Description: Part Number 481196-D
Name: First Reagent (1)

Section 2 Composition / Information on Ingredients

CAS#: 87-69-4	L-Tartaric Acid	98.7%
CAS#: 7720-78-7	Iron (II) Sulfate • 7H2O	0.7%
CAS#: 10101-97-0	Nickel (II) Sulfate • 6H2O	0.6%

Section 3 Hazards Identification

Precautionary Statements:

- May be irritating to eyes and nasal passages.
- Low toxicity orally, moderately toxicity intravenously.
- Tartaric Acid is reported to have an oral rabbit LD50 at 5000 mg/kg, and a dermal rat LD50 at 485 mg/kg.

Tartaric Acid Reagent has minimal toxicological effect. However, inhalation may cause irritation of respiratory tract; ingestion in large amounts may cause gastrointestinal upset; skin or eye contact may cause mild irritation; prolonged exposure may cause allergic reaction. Wash hands after use.

- Iron (II) Sulfate is harmful if swallowed or inhaled.

Causes irritation to skin, eyes, and respiratory tract.
Affects the liver. Oral mouse LD50: 1520 mg/kg.

- Nickel Sulfate is toxic. Harmful if swallowed. Possible risk of irreversible effects. May cause sensitization by inhalation and skin contact. Possible carcinogen.

Toxicity data: oral rat LD50: 264 mg/kg.

Section 4 First-Aid Measures

- If swallowed, wash out mouth with water. Call a physician or the Poison Control Center as a precaution.
- In case of skin contact, flush with copious amounts of water for at least 15 minutes.
- In case of contact with eyes, flush with copious amounts of water for at least 15 minutes.
- If inhaled, remove to fresh air. If breathing is difficult, give oxygen and seek medical advice.

Section 5 Fire Fighting Measures

Not Applicable since the amount of First Reagent per kit is negligible.

Section 6 Exposure Controls / Personal Protection

Do not expose to eyes, skin, or clothing. Keep away from children and pets. Wash hands thoroughly after handling. Maintain general hygienic practices when using this product.

Section 7 Physical and Chemical Properties

Appearance and Odor:

- Solid/semi-solid, white powder. Soluble in water.

Physical Properties:

- Melting Point: Not Applicable
- Vapor Pressure: Not Applicable
- Specific Gravity: Not Applicable
- Vapor Density: Not Applicable

Stability:

- Stable when stored under proper conditions.

Hazardous Polymerization:

- Will not occur.

Incompatibilities:

- Reaction with silver, zinc, aluminum in the presence of water or moisture will release explosive Hydrogen gas.

Section 8 Toxicological Information

Acute Effects:

- Do not breathe dust! Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

Section 9 Other Information

The above information is believed to be correct but does not purport to be all-inclusive and shall be used ONLY as a guide. Keep away from children and pets. Store in a dry, cool place. Keep container tightly closed.

MSDS 2
Material Safety Data Sheet

Section 1 Chemical Identification

Catalog # / Description: Part Number 481196-E
Name: Second Reagent (2 MPS)

Section 2 Composition / Information on Ingredients

CAS#	10058-23-8	Potassium Peroxymonosulfate 43%
CAS#	7646-93-7	Potassium Bisulfate 23%
CAS#	7778-80-5	Potassium Sulfate 29%
CAS#	7727-21-1	Potassium Peroxydisulfate 3%
CAS#	546-93-0	Magnesium Carbonate 2%

Comments: NOTE: CAS# for mixture is 70693-62-8

Section 3 Hazards Identification

Emergency Overview:

- Physical Appearance: White, granular material
- Immediate Concerns: DANGER. CORROSIVE. Causes skin and eye damage. Wear goggles or face shield and rubber gloves when handling. May be fatal if swallowed. Irritating to nose and throat. Avoid inhalation or dust. Remove and wash contaminated clothing before reuse.

Potential Health Effects:

- Eyes: DANGER. Corrosive. Causes eye damage. Do not get in eyes.

Section 4 First-Aid Measures

EYES: If contact with eyes occurs: Immediately flush with cold water for at least 15 minutes. Then get immediate medical attention.
SKIN: If contact with skin: Rinse off excess chemical and flush skin with cold water for at least 15 minutes. If skin irritation develops, seek medical attention.
INGESTION: If swallowed: Do not induce vomiting. Drink 1-2 glasses of water to dilute the stomach contents. Never give anything by mouth to an unconscious person. Call a physician immediately.
INHALATION: If inhaled: Remove to fresh air. If breathing is difficult, have trained person administer oxygen. If not breathing, give artificial respiration. Call a physician immediately.

Section 5 Fire Fighting Measures

- This product is not flammable or combustible.
- Will release oxygen when heated, intensifying a fire.

Acidic mist may be present.

- Exercise caution when fighting any chemical fire.
- Extinguishing Media: Water

Section 6 Exposure Controls / Personal Protection

Do not expose to eyes, skin, or clothing. Keep away from children and pets. Wash hands thoroughly after handling. Maintain general hygienic practices when using this product.

Section 7 Physical and Chemical Properties

Appearance and Odor:

- Solid. Granular, free-flowing solid. White.
- Odorless

Physical Properties:

- Melting Point: Not Applicable
- Vapor Pressure: Not Volatile
- Specific Gravity: 1.1 to 1.4
- Vapor Density: Not Volatile

Stability:

- Stable when stored under proper conditions.

Hazardous Polymerization:

- Will not occur.

Incompatibilities:

- Mixing with compounds containing halides or active halogens can cause release of the respective halogens if moisture is present. Mixing with cyanides can cause release of hydrogen cyanide gas. Mixing with heavy metal salts such as those of cobalt, nickel, copper, or manganese can cause decomposition with release of oxygen and heat.

Section 8 Toxicological Information

Acute Effects:

- Skin Absorption: >11,000 mg/kg in rabbits
- Oral LD50: 2,000 mg/kg (rat)
- Inhalation LC50: >5 mg/l (rats) (4-hour)

Section 9 Other Information

The above information is believed to be correct but does not purport to be all-inclusive and shall be used ONLY as a guide. Keep away from children and pets.

MSDS 3
Material Safety Data Sheet

Section 1 Chemical Identification

Catalog # / Description: Part Number 481196-F
Name: Third Reagent (3 Zinc)

Section 2 Composition / Information on Ingredients

CAS #: 7440-66-6
Chemical Name: Zinc >99%
Synonyms:

- Blue powder, granular zinc, zinc dust, zinc powder

Section 3 Hazards Identification

Precautionary Statements:

- Flammable solid. This material, like many powders, is capable of causing a dust explosion.
- If inhaled, remove to fresh air. If breathing is difficult, give oxygen and seek medical advice.

Section 4 First-Aid Measures

- If swallowed, wash out mouth with water. Call a physician or the Poison Control Center.
- In case of skin contact, flush with copious amounts of water for at least 2 minutes. Remove contaminated clothing and shoes.
- In case of contact with eyes, flush with copious amounts of water for at least 5 minutes. Call a physician.
- If inhaled, remove to fresh air. If breathing is difficult, give oxygen and seek medical advice.

Section 5 Fire Fighting Measures

Fire/Explosion Hazard:

- Dust may form a flammable/explosive mixture with air. May form explosive mixture with oxidizers.

Extinguishing Media:

- Sand or inert dry powder. Do not use water.

Section 6 Exposure Controls / Personal Protection

Do not get in eyes, on skin, on clothing. Keep away from children and pets. Wash hands thoroughly after handling. Use with adequate ventilation. Maintain general hygienic practices when using this product.

Section 7 Physical and Chemical Properties

Appearance and Odor:
Solid bluish-gray powder
Physical Properties:

- Melting Point: 419°C
- Vapor Pressure: Not Applicable
- Specific Gravity: 7,14
- Vapor Density: Not Applicable

Stability:

- Stable when stored dried and at room temperature.

Hazardous Polymerization:

- Will not occur.

Section 8 Toxicological Information

- Skin and eye irritation may result from intermittent exposure.
- Avoid creating dust. DO NOT breathe dust.

Section 9 Other Information

The above information is believed to be correct but does not purport to be all-inclusive and shall be used ONLY as a guide. Dispose of empty bottle as normal trash. Keep away from children and pets.

MSDS 4
Material Safety Data Sheet

Section 1 Chemical Identification

Catalog # / Description: Part Number 481196-G
Name: Arsenic Quick™ Testing Pad

Section 2 Composition / Information on Ingredients

CAS #: 7789-47-1
Synonyms:

- Toxic ingredient is: Mercuric Bromide.

Section 3 Hazards Identification

Precautionary Statements:

- Toxic poison is contained in testing pad (about 1mg / strip).
- Mercuric Bromide is reported to have an oral rat LD50 at 40mg/kg, and a dermal rat LD50 at 100mg/kg.

Section 4 First-Aid Measures

- If swallowed, wash out mouth with water. Call a physician or the Poison Control Center as a precaution.
- In case of skin contact, flush with copious amounts of water for at least 2 minutes. Remove contaminated clothing and shoes.
- In case of contact with eyes, flush with copious amounts of water for at least 5 minutes.
- If inhaled, remove to fresh air. If breathing is difficult, give oxygen and seek medical advice.

Section 5 Fire Fighting Measures

Not Applicable since the amount of Mercury per kit is negligible.

Section 6 Exposure Controls / Personal Protection

Do not expose to eyes, skin, or clothing. Keep away from children and pets. Wash hands thoroughly after handling. Maintain general hygienic practices when using this product.

Section 7 Physical and Chemical Properties

Appearance and Odor:

- Solid/semi-solid, white paper pad (containing Mercuric Bromide) attached to plastic strip.

Physical Properties:

- Melting Point: Not Applicable
- Vapor Pressure: Not Applicable
- Specific Gravity: Not Applicable
- Vapor Density: Not Applicable

Stability:

- Stable when stored under proper conditions.

Hazardous Polymerization:

- Will not occur.

Section 8 Toxicological Information

Acute Effects:

- Each strip contains about 1mg Mercuric Bromide so toxicological effect is minimal because of the amount. However, material is toxic and should be handled carefully to minimize exposure. Place all used test strips into plastic bag labeled “Used Test Strips”. Dispose of used strips per environmental and regulatory requirements in your community. Wash hands after use.

Section 9 Other Information

The above information is believed to be correct but does not purport to be all-inclusive and shall be used ONLY as a guide. Dispose of the used test strips as regulations require. Keep away from children and pets.

Our products are compliant with all 49CFR and IATA rules and regulations.

LETTER FROM THE KIT INVENTOR

Thank you for purchasing our U.S. Patented (# 6,696,300) Arsenic Quick™ II Kit. Our company has trademarked the kits Quick™ because of the short 14 minute time for analysis.

The Drinking Water standard of the US EPA and the World Health Organization (WHO) allows a maximum contaminant level of 10 ppb (µg/L) for Arsenic. The old US EPA level of 50 ppb (µg/L) remains as the maximum contaminant level for many countries in the world.

For several years, Industrial Test Systems, Inc. (ITS) committed a major research & development effort to provide better and safer arsenic test kits. The goal was achieved. The test was made safer by using tartaric acid, instead of strong acids, for the reduction of inorganic arsenic (As^{+3}/As^{+5}) to arsine gas. For these efforts a US Patent was granted for the acceleration of the arsenic detection chemistry by the addition of metal enhancers, iron and nickel salts. This permits Arsenic field tests to be completed faster. The Quick™ II series of kits use a modified Turret cap which allows detection of arsenic below 10 ppb (µg/L). The reduction reactions utilized in all kits are as follows:

$Zn + 2H^{+} \rightarrow Zn^{+2} + H_2$ (gas) and $As_4O_6 + 12\ Zn + 24H^{+} \rightarrow 4AsH_3$(gas) + $12\ Zn^{+2} + 6H_2O$ (pH 1.6)

The analysis is performed in a closed reaction bottle (plastic) with an appropriate volume of sample (50 to 500 ml). After the 10 minute reduction reaction, the mercuric bromide strip or testing pad is removed and matched to the color chart or color analyzed by the Quick™ Arsenic Scan instrument. A light yellow to brown color change indicates that arsenic is present. The color intensity is proportionately related to the concentration of arsenic in the sample. NOTE: ITS test kits detect free inorganic arsenic only. ICP-MS methods detect inorganic and organic arsenic. If organic arsenic is present, ITS kit results can be expected to give lower values when compared to ICP-MS results.

Quick™ Arsenic Test Kits Available:

US Patent # 6696300

PRODUCT NAME (PART NUMBER)	NO. OF TESTS	ETV® EPA / ETV Test Verified Performance	OPTIMUM RANGE* ppb (µg/L)	TYPICAL COLOR CHART DETECTION LEVELS ppb (µg/L)	TYPICAL ACCURACY** OF DUPLICATES USING QUICK™ ARSENIC SCAN
Arsenic Quick™ Mini Kit (481396-5) (Can also be used for soil analysis.)	5	**YES**	10 to 200	0, 5, 10, 20, 60, 100, 300, 500, >500, >>500	+/-18 ppb or +/-30%
Arsenic Quick™ Mini Kit (481396-W) (for wood analysis only.)	5	**N/A**	10 to 200	0, 5, 10, 20, 60, 100, 300, 500, >500, >>500	+/-18 ppb or +/-30%
Arsenic Quick™ II Mini Kit (481303-5)	5	**YES**	3 to 20	<1, 2, 3, 4, 5, 6, 7, 8, 10, 13, 20, 25, 30, 40, >50, >80, >120, >160	+/-1.2 ppb or +/-16%
Arsenic Low Range Quick™ II Mini Kit (481301-5)	5	**YES**	1 to 10	<0.5, 1, 1.5, 2, 3, 4, 5, 6, 7, 8, 12, >20, >30, >50	+/-0.8 ppb or +/-14%
Arsenic Ultra-Low Quick™ II Mini Kit (481300-5)	5	**YES**	0.5 to 6	0,0.3,0.7, 1.0, 1.5, 2, 2.5, 3, 3.5, 4, 5, 6, 8, 10, 13, 20, >20	+/-0.4 ppb or +/-12%
Arsenic Quick™ Kit (481396) (Can also be used for soil analysis.)	100	**YES**	10 to 200	5, 10, 20, 30, 40, 50, 60, 80, 100, 150, 200, 250, 300, 400, 500, >500	+/-18 ppb or +/-30%
Arsenic Low Range Quick™ (481297-I)	50	**YES**	7 to 80	<2, 4, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 100, >150, >300	+/-8 ppb or +/-25%
Arsenic Quick™ II (481303)	50	**YES**	3 to 20	<1, 2, 3, 4, 5, 6, 7, 8, 10, 13, 20, 25, 30, 40, >50, >80, >120, >160	+/-1.2 ppb or +/-16%
Arsenic Low Range Quick™ II (481301)	50	**YES**	1 to 10	<0.5, 1, 1.5, 2, 3, 4, 5, 6, 7, 8, 12, >20, >30, >50	+/-0.8 ppb or +/-14%
Arsenic Ultra-Low Quick™ II (481300)	25	**YES**	0.5 to 6	0, 0.3, 0.7, 1.0, 1.5, 2, 2.5, 3, 3.5, 4, 5, 6, 8, 10, 13, 20, >20	+/-0.4 ppb or +/-12%
Quick™ Arsenic Scan Instrument (481305)	1 meter	**YES**	N/A	0.01 to >1.00 color density ppb (µg/L) (as low as 0.2 ppb (µg/L) arsenic)	(see above)

Information on the performance characteristics of Quick™ can be found at www.epa.gov/etv, or call ITS at 1-800-861-9712 for a copy of the ETV verification report. The use of the ETV® Name or Logo does not imply approval or certification of this product nor does it make any explicit or implied warranties or guarantees as to product performance.

*Range can be expanded by diluting the sample with Arsenic-Free water.

**As with any test, actual results will fall within a range around the actual value. The Typical Accuracy listed is from data generated by a technician in our lab using the Quick™ Arsenic Scan instrument measuring interference-free aqueous arsenic standards. Kit expected accuracy is the larger of the two values listed. (Example using Quick™: If the mean is 40 ppb, then the typical accuracy is +/-18 ppb which is larger than +/-12 ppb (40 ppb X 30%)).

Where precision is important, ITS recommends that you run the water sample in duplicate, since the typical color matching is within one color block. For best precision consider the purchase of our Quick™ Arsenic Scan instrument. This unit is ideal for use with all test kits. Please contact our sales department at 803-329-9712 for more information or to order the Quick™ Arsenic Scan instrument.

Typical shelf life of kits is over 12 months. The kit includes First Reagent (Tartaric acid with iron and nickel salts); Second Reagent (MPS, an oxidizer); Third Reagent (zinc dust); and mercuric bromide strips, which contains about 1mg mercury per strip. After use, the strips should be discarded according to local environmental regulations. Valuable safety information about the kit is in the MSDS literature. As a safeguard to minimize the operator's exposure to arsine and hydrogen gas, please run all tests in a well-ventilated area away from open flames and other sources of ignition. Arsine gas is highly toxic; and this precaution becomes more urgent if the water sample has high arsenic levels.

Cordially yours,

Ivars Jaunakais, Analytical Chemist
email: Ivars@sensafe.com

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May 22, 2015

Analytical Report for Service Request No: K1504678

Bill Neal
North Beach Water District
2212 272nd Street & 25600 Ash Place
Ocean Park, WA 98640-0618

RE: North Beach Water / 63000C

Dear Bill,

Enclosed are the results of the sample(s) submitted to our laboratory May 05, 2015
For your reference, these analyses have been assigned our service request number **K1504678.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3275. You may also contact me via email at Chris.Leaf@ALSGlobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Chris Leaf
Project Manager

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
ISO 17025	http://www.pjlabs.com/	L14-50
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Chain of Custody

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CHAIN OF CUSTODY / WA. DRINKING WATER

ALS Environmental

SR#: K1504678

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Page _____ of _____

All fields must be filled out. The information in the Shaded Fields is required for reporting your results to the WA. DOH for compliance.

System Name or Property Owner Name: ☒ Public ☐ Private North Beach Water District

Public Water System ID: 63000 C Group A ☒ Group B ☐

Project Manager: (Person receiving results) Dennis Schweizer

Address: (Street/City/State/Zip) 25902 Vernon AVE Ocean Park, WA 98640

County: Pacific

Phone Number: 360-214-2810

Sampled By: (Please print clearly) Dennis Schweizer

Fax Number:

Sampler's Signature: Dennis Schweizer

Sample Name	Date Collected	Time Collected	* SOURCE S B C D	Specific Location Sample Taken	Sample Type (indiciate 1 per sample): Sampled Before Treatment (B)	Sampled After Treatment (A)	Unknown (NA)	Sample Purpose (indiciate 1 per sample): Routine Compliance (RC)	Confirmation (C)	Investigative (I)	Other (specify in comments)	NUMBER OF CONTAINERS	Synthetic Organics (SOCs): 504.1☐ 508.1☐ 515.4☐ 525.2☐ 531.1☐ 547☐ 548.1☐ 549.2☐	Volatile Organics (VOCs): 524.2☐	Disinfection By-Proeucts: THM☐ HAA☐ Chlorate☐ Chlorite☐ Bromate☐	Treatment & Precursors: Fluoride☐ Residual Chlorine☐ TOC☐	Inorganics (IOCs): WA. IOC List☐ Nitrate☒ Nitrite☐ pH☐	Metals (Circle Below): Lead & Copper☐ Hardness☐	Radionuclides': Gross Alpha☐ Gross Beta☐ Radon☐ Radium 226☐ Radium 228☐	©Other: Asbestos☐ Dioxions☐
2015 Metals	5-4	730	SO6	north ESS tap		X		X										X		
2015 Nitrate	5-4	745	SO6	"		X		X									X			

Teresa, SO-06 included SO-04, S0-07, SO-09, Bill Neal

COPY OF REPORT TO:

Name: DOH

Address:

e-mail

INVOICE INFORMATION

P.O.#:

Bill To:

Address:

SPECIAL INSTRUCTIONS/COMMENTS:

Circle Metals: Al (As) Sb Ba Be Ca Cd Co Cr Cu (Fe) Pb Mg (Mn) Mo Ni K Ag Na Se Tl Zn Hg

Fluoride Field Measurement: _____

* S - Single Source, B - Blended Source, C - Composite, D - Distribution

* For composited or blended samples, list all sources in this section

RELINQUISHED BY:

Printed Name: Dennis Schweizer

Signature: Dennis Schwei

Date/Time: 5-4-15 800

Company: North Beach Water

RECEIVED BY:

Printed Name: ARyazan

Signature:

Date/Time: 5/5/15 0950

Company: ALS

RELINQUISHED BY:

Printed Name:

Signature:

Date/Time:

Company:

RECEIVED BY:

Printed Name:

Signature:

Date/Time:

Company:

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator

COC/WAD REV 07/12

PC CV

Cooler Receipt and Preservation Form

Client / Project: Noem Boam Service Request K15 0 4678

Received: 5/5/15 Opened: 5/5/15 By: L Unloaded: 5/5/15 By: L

1. Samples were received via? *Mail* (*Fed Ex*) *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y (N) If yes, how many and where? _____
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID (NA)	Tracking Number NA	Filed
2.4	2.1	5.6	5.3	-0.3	348		545076916843	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* (*Gel Packs*) *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* ~~NA~~ Y N
12. Was C12/Res negative? ~~NA~~ Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

SHORT HOLD TIME

Page _____ *of* _____

State Drinking Water Forms

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ALS Environmental
1317 South 13th Avenue
Kelso, WA 98626

INORGANIC CHEMICALS (IOCs) REPORT
for the State of Washington

REPORT OF ANALYSIS

Date Collected: (MM/DD/YY)	**05/04/15**	System Group (Select A,B,Other):	**A**
Water System ID Number:	**63000C**	System Name:	**North Beach Water District**
Lab Sample Number:	**01746781**	County:	**Pacific**
Sample Location:	**North ESS Tap**	Source Number(s):	**S06**
Sample Purpose:		Date Received:	**05/05/15**
Select One		Date Analyzed:	**05/05-05/06/15**
X	RC- Routine/Compliance	Date Reported:	**05/22/15**
	C- Confirmation	Comments:	**K1504678-001**
	Investigative		
	Other(specify)		
Sample Composition:		**Sample Type: (Select One)**	
Select One			Pre-Treatment/Raw
X	S- Single Source	**X**	Post-Treatment/Finished
	B- Blended		Unknown
	C- Composite	Sample Collected by:	**Dennis Schweizer**
	D- Distribution sample	Phone Number:	**360-214-2810**
Send Report to:	**Dennis Schweizer** **WA DOH**	**Bill to:**	

DOH #	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	MCL Exceeded check if yes	Method	Analyst
EPA REGULATED									
4	Arsenic	**0.008**	mg/l	0.0014	0.005	0.01		200.8	GJ
5	Barium	-	mg/l	0.1	2	2		200.7	NA
6	Cadmium	-	mg/l	0.001	0.005	0.005		200.8	NA
7	Chromium	-	mg/l	0.007	0.1	0.1		200.8	NA
11	Mercury	-	mg/l	0.0002	0.002	0.002		245.1	NA
12	Selenium	-	mg/l	0.002	0.05	0.05		200.8	NA
110	Beryllium	-	mg/l	0.0003	0.004	0.004		200.8	NA
111	Nickel	-	mg/l	0.005	---	---		200.8	NA
112	Antimony	-	mg/l	0.003	0.006	0.006		200.8	NA
113	Thallium	-	mg/l	0.001	0.002	0.002		200.8	NA
116	Cyanide	-	mg/l	0.01	0.2	0.2		335.4	NA
19	Fluoride	-	mg/l	0.5	2	4		300.0	NA
114	Nitrite - N	-	mg/l	0.1	0.5	1		300.0	NA
20	Nitrate - N	**<0.10**	mg/l	0.5	5	10		300.0	NB
161	Total Nitrate/Nitrite	-	mg/l	0.5	5	10		300.0	
EPA REGULATED (Secondary)									
8	Iron	**<0.02**	mg/l	0.1	---	0.3 [1]		200.7	EM
10	Manganese	**0.011**	mg/l	0.01	---	0.5 [1]		200.7	EM
13	Silver		mg/l	0.1	---	0.1 [1]		200.8	NA
21	Chloride	-	mg/l	20	---	250 [1]		300.0	NA
22	Sulfate	-	mg/l	50	---	250 [1]		300.0	NA
24	Zinc	-	mg/l	0.2	---	5 [1]		200.7	NA

Cont. on next page

INORGANIC CHEMICALS (IOCs) REPORT
for the State of Washington (cont.)

Lab Sample Number: **01746781**

Date Collected: **05/04/15**

STATE REGULATED									
DOH #	**ANALYTES**	**RESULTS**	**UNITS**	**SRL**	**TRIGGER**	**MCL**	**MCL Exceeded check if yes**	**Method**	**Analyst**
14	Sodium		mg/l	5	---	---		200.7	NA
15	Hardness		mg/l	10	---	---		2340B	NA
16	Conductivity		umhos/cm	70	---	700 [1]		2510B	NA
17	Turbidity		NTU	0.1	---	---		180.1	NA
18	Color		color units	15	---	15 [1]		2120B	NA
26	Total Dissolved Solids		mg/l	100	---	500 [1]		2540C	NA

STATE UNREGULATED									
9	Lead		mg/l	0.001	---	---		200.8	NA
23	Copper		mg/l	0.02	---	---		200.7	NA
OTHER									NA
171	Orthophosphate	NA	mg/l	0.1	---	---		SM4500-P-E	NA
172	Silica	NA	mg/l	1	---	---		200.7	NA
402	Aluminum	NA	mg/l	0.05	---	---		200.7	NA
403	Alkalinity	NA	mg/l	5	---	---		SM2320B	NA
404	Magnesium	NA	mg/l	0.1	---	---		200.7	NA
405	Calcium	NA	mg/l	0.05	---	---		200.7	NA
406	Ammonia	NA	mg/l	1	---	---		4500 NH3 E	NA
409	pH	NA	pH Units	---	---	---		SM 4500-H+B	NA
									NA

NOTES:

SRL (State Reporting Level): indicates the minimum reporting level required by the Washington Department of Health (DOH).

Trigger Level: DOH Drinking Water Response Level. Systems with compounds detected at concentrations in excess of this level are required to take additional samples. Contact your regional DOH office for further information.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.

NA (Not Analyzed): in the results column indicates this compound was not included in the current analysis.

ND (Not Detected): in the results column indicates this compound was analyzed and not detected at a level greater than or equal to the SRL.

<(0.00X): indicates the compound was not detected in the sample at or above the concentration indicated.
(lab mdl) lower than the SRL.

[1] : Secondary MCL (established for esthetic purposes, not health based.

Comments: _____