STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

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MEMORANDUM:

To: Chas Ariss, P.E., Wastewater Program Manager, State Office
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From: Scott MacDonald, EIT, MBA, CPM, Associate Engineer S.M

Date: January 11, 2016

Subject: **Staff Analysis for the *Draft* Recycled Water Reuse Permit, Basic American Potato Company, Inc. (BAPCI), I-036-04**

Executive Summary

- The Basic American Potato Company, Inc. (BAPCI) facility is an industrial potato processor.
- The permit was transferred from NonPareil to BAPCI effective August 31, 2013.
- The facility uses 353 irrigated acres receiving approximately 230 million gallons (MG) of recycled water annually, with a current limit of 108 MG in the non-growing season.
- Map updates increased MU-03611 to 89 acres, and decreased MU-03610 to 83 acres.
- The facility is permitted for growing-season, and non-growing season application.
- The facility reports no changes since the last permit was issued, but the field corners receiving solids will be included in the new permit as a combined 41.4 acre management unit.
- Inspections and annual reports show no exceedances or permit violations.
- This is a routine permit renewal.
- Staff recommends issuance of I-036-04, for a period of 6 years.

1 Introduction

The purpose of this memorandum is to satisfy the requirements of IDAPA 58.01.17.400 for issuing Recycled Water Reuse Permits. It briefly states the principal facts and significant questions considered in preparing the draft permit, and provides a summary of the basis for the draft permit conditions.

- The current permit was issued on December 6, 2010, expiration date December 5, 2015.
- The pre-application workshop was conducted on February 5, 2015.
- Permit application materials were received June 5, 2015.
- DEQ's Completeness Determination letter was issued on October 2, 2015.

2 Site Location and Ownership

The Basic American Potato Company, Inc. (BAPCI) land application management units are located adjacent to the Snake River in the city of Blackfoot, Idaho. The processing facility is on the south side of Highway 26, just west of Interstate 15 in Blackfoot, while the land application management units are on the north side of Highway 26. Both the facility and the land application management units are located within Bingham County. The processing facilities are located southwest of the land application site on the south side of Highway 26. Final recycled water treatment is accomplished via land application for crop nutrient uptake over 353 acres using nine full or partial pivots with one management unit irrigated via wheel lines, and an additional management unit of 41.4 acres encompassing pivot corners is used to apply tare solids and silt from the fresh pack operations. This management unit is irrigated with supplemental irrigation water (no recycled water) using solid set sprinklers.

3 Process Description

Recycled water is discharged from three adjacent BAPCI production facilities, combined in a central collection tank for primary treatment, and then pumped to the land application management units. The potato fresh pack facility is operated by Nonpareil as "Idaho Potato Packers." The potato dehydration processing facility is operated by BAPCI as "BAI Dehydrated." The third facility is operated by BAPCI as "BAI Processing Flake Facility."

BAPCI operates two separate primary recycled water pretreatment systems, one for the flake plant and the other for the fresh pack and dehydration facilities. Both treatment systems remove solids from the recycled water stream by screening and sedimentation. Treated effluent from the fresh pack and dehydration facilities, as well as stormwater, are collected in concrete basins in a building referenced as the "Pond Shed," from which it is pumped to the management units.

The BAPCI facility consists of the recycled water treatment facility, and 353 acres of land treatment acreage. Recycled water generated in the plant is treated in settling basins and screening facilities. Waste streams are treated using primary clarification and screening, hydro-sieve de-watering, and rotary drum vacuum filtration. Waste solids are recovered for animal feed, with silt and rock sent to an off-site disposal location. A clarifier is used for solids removal prior to land application. Effluent is land applied on 353 acres of a forage grass/alfalfa crop via center pivot and hand line irrigation.

The recycled water treatment system does not make use of storage lagoons, but there are two HDPE lined surge basins near the pump house south of pivot 5. Crop irrigation needs are supplemented where necessary with water from the adjacent canal or from an on-site irrigation water supply well. Supplemental irrigation water can be applied directly on the fields without mixing with the recycled water. Each irrigation system has a separate flow meter to measure and report applied water.

Recycled water and supplemental irrigation water is applied between April and October. The facility is also permitted for non-growing season application of recycled water from Nov. 1, to March 31.

No sludge or biosolids have been generated at the site, or removed from the surge basins. If it becomes necessary for the facility to remove any accumulated solids from the lined surge basins, they will do so in accordance with permit Section 9.1.4.

A flow diagram of the recycled water system is shown in Figure 1 below

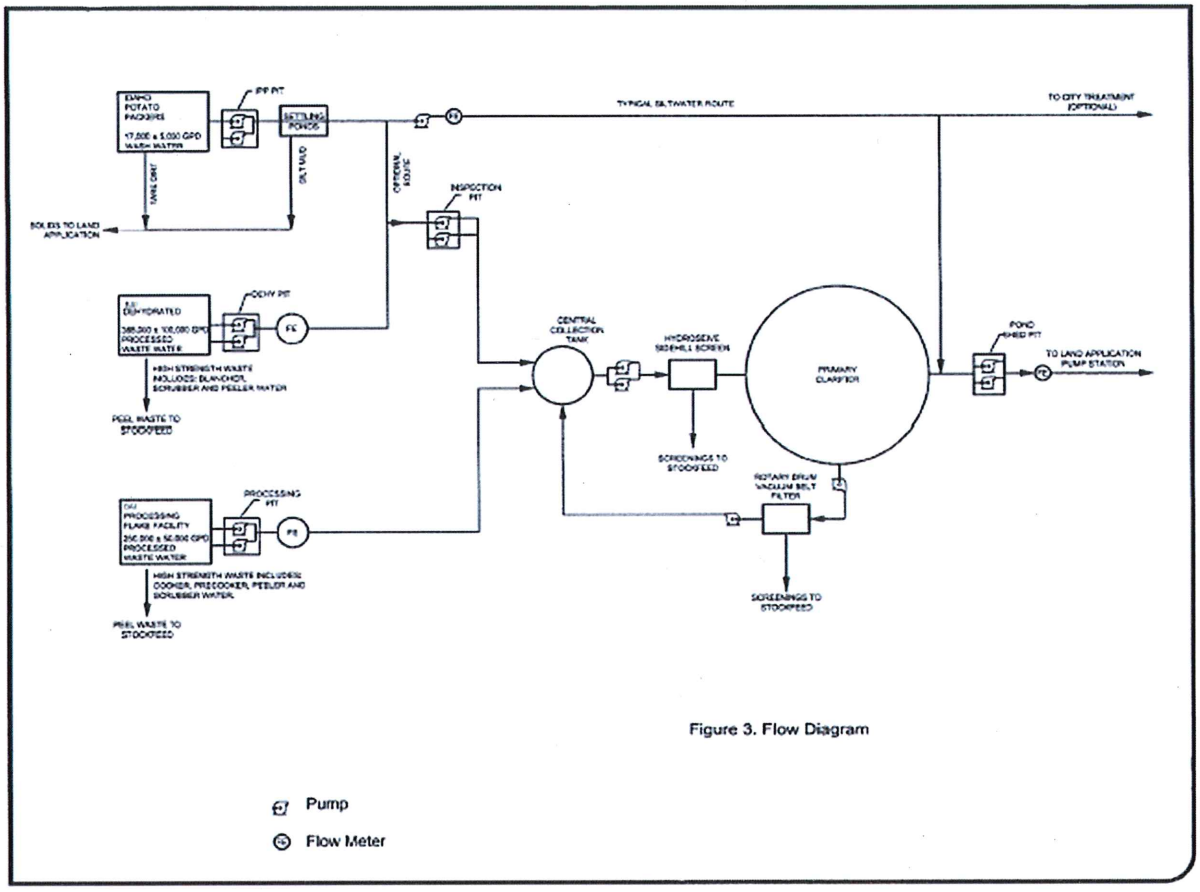


Figure 3. Flow Diagram

Figure 1. Facility flow diagram.

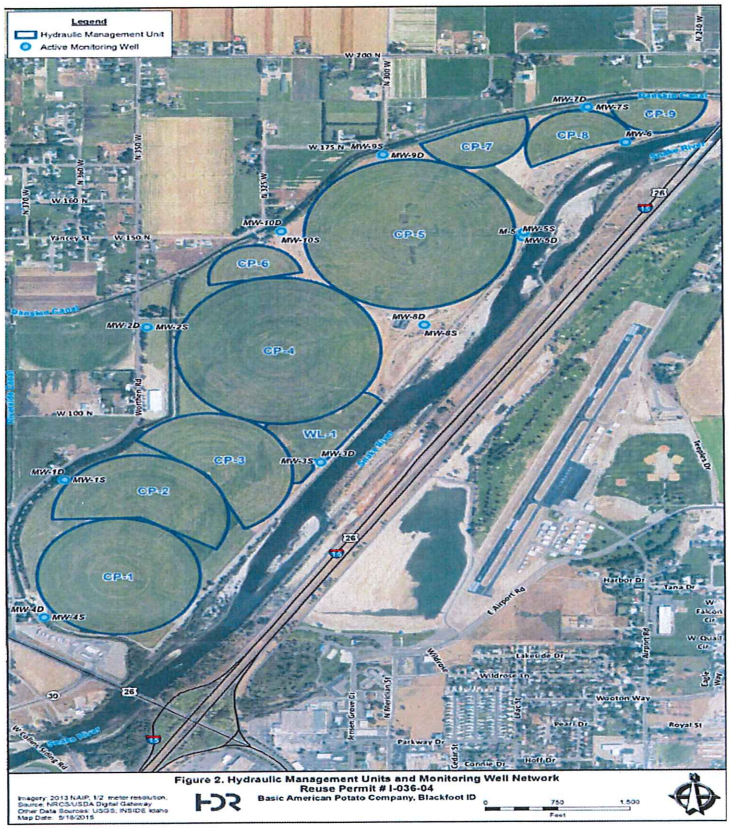


Figure 2. Management unit delineations

The 10 management units shown in the image to the left consist of 353 irrigated acres. The total acreage is unchanged from the previously permitted acreage.

The additional acreage listed as a single management unit, includes the corners of several fields that receive solids. Some corners receive fresh water application.

The site topography is flat, with a less than 2% slope overall. The elevation is approximately 4,490 feet above mean sea level.

The land application site is bordered by surface waters with the Snake River on the east boundary, and the Danskin Canal to the west. Land use in the area is rural agricultural, irrigated agriculture, rural residential, mobile home courts, an airport, and an interstate highway.

4 Site Characteristics

4.1 Site Management History

The reuse system has been in operation in since it was first permitted in February of 1991. BAPCI has owned and operated the site since 2013. Prior to BAPCI's ownership, the facility and land application site were operated by NonPareil. The first permit was issued for land application on 238 acres. The second permit was issued in 2001, and included 353 acres for recycled water land application.

The pivot corners that receive the tare dirt and settled dirt solids from the process, were not included in previous permits, but will be recognized in the new permit as a combined management unit of 41.4 acres receiving solids, and some acres receiving fresh water application for growing crops.

Supplemental fertilizers are generally not applied to the land application site.

4.2 Climatic Characteristics

The climatic characteristics of the BAPCI site are typical for the surrounding area, and are described in detail in the permit application. Weather data from the Regional Climate Center near Blackfoot is summarized in Section 2.4 of the permit application as follows:

- Average annual precipitation of 10.18 inches.
- Minimum monthly precipitation of 0.00 inches, between 1948 - 2005.
- Maximum monthly precipitation of 5.14 inches in June, between 1948 - 2005.
- Average minimum temperature of 33.0 degrees F in February between 1948 - 2005.
- Average maximum temperature of 87 deg. F, in the months of June.
- Winds are primarily out of the southwest.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg Max Temp (°F)	31.6	37.9	48.3	59.6	69.4	78.1	87.0	85.8	75.9	62.7	45.5	33.4	59.6
Avg Min Temp (°F)	14.7	18.8	25.6	32.1	40.0	46.7	52.5	50.4	42.3	32.8	24.1	16.1	33.0
Avg Precip (in)	0.93	0.81	0.91	0.98	1.30	1.02	0.47	0.49	0.70	0.74	0.88	0.94	10.18
Avg Snow Fall (in)	6.6	4.0	2.2	0.9	0.0	0.0	0.0	0.0	0.0	0.6	2.3	6.3	22.8
Avg Snow Depth (in)	2	2	0	0	0	0	0	0	0	0	0	1	0

Figure 3. Western Regional Climate Center Climatic Data

The net irrigation water requirement for alfalfa with frequent cutting is 32.3 inches over the growing season. The plan of operation will provide watering schedules, in accordance with the site-specific irrigation water requirements, irrigation system efficiencies, and will take into account the effects of climatic variability on water requirements.

4.3 Soils

Section 2.5 of the permit application includes an updated soil analysis. The updated analysis confirms previous soil descriptions. Site soils consist of alluvial deposits associated with the Snake River. The site-specific soils described as Hayeston Series sandy loams and loam, Heiseton Series sandy loams and loam, Riverwash sand and gravel, and Wardboro Series sandy loam, with slopes ranging from 0-4%. Soils on site are well-drained and are suitable for agricultural production. Soil management unit delineations in the permit are the same as the hydraulic management unit acreage.

Since site monitoring wells do not show negative effects from field loadings and even show decreasing constituent content, DEQ is in agreement with the proposal in the permit application that the non-growing season loadings remain as listed in the previous permit.

4.4 Surface Water

The Danskin Canal runs along the western boundary of the land application site. The Snake River forms the eastern border of the site. BAPCI has implemented a Runoff Management Plan to manage potential stormwater runoff from entering surface water. The buffer distances from the management units to canals, ditches, and other surface waters are addressed in Section 4.4 of the permit.

Irrigation sources include surface waters from a nearby canal, and on-site irrigation wells.

4.5 Ground Water and Hydrogeology

There are no public water supply wells for the BAPCI facility located near the site that would be impacted by land application activities. The nearest culinary well is 0.7 miles from the site. No new wells are known to have been installed in the area since the previous permit was issued.

Ground water near BAPCI occurs primarily in the Snake River Plain basalt formations consisting of alternating layers of dense, non-water bearing rock and layers of highly porous, fractured rubble. Ground water in the Snake River Plain aquifer at BAPCI flows predominately through porous, fractured rubble zones that occur between basaltic lava flows.

Ground water beneath the site consistently flows northwest, away from the Snake River. The water table slopes northwest in sand and gravel river deposits along the east side of the site, but within the site the river deposits are dry and the water table is typically found within the deeper, underlying basalt. Therefore, the majority of ground water beneath the site is transmitted through basalt and only a small fraction is transmitted from recharge sources through river-deposited sediments.

Ground water beneath the site is recharged throughout the year by the Snake River flowing along the eastern border of the site. Additional recharge occurs from about April through October, as seepage flows from other nearby surface water sources including Jensen Grove and area canals. The gradient of the water table becomes shallower in the summer months, as canal seepage raises the water table on the west side of the site to within about 35 feet of the ground surface.

The ground water gradient was traditionally described as 1.01 %, based on reported ground water elevations, while a more recent study describes the groundwater gradient as 0.83% across the site. Ground water velocity across the site was calculated at approximately 139 ft/day. Site transit time is reported as approximately 19 days, based on a horizontal dimension of 2,700 feet.

The thickness of the aquifer mixing zone exerts considerable control over the concentration of constituents in ground water leaving the down gradient boundary of a site. Numerical modeling of the aquifer based on pumping tests, supports the conceptual model of a leaky confined deep basalt aquifer zone overlain by an unconfined sand, gravel, and shallow fractured basalt aquifer zone. Studies showed that the hydraulic connection between the two aquifers was limited, even under stress from a pumping test conducted in 2001. The highly stratified nature of the aquifer constrains ground water flow through a few narrow rubble zones within the basalt aquifer. Rock layers between the rubble zones reduce the opportunity for localized contaminant migration into deeper zones, although the layers may be fractured or laterally discontinuous in other locations.

The high velocity of ground water should result in any percolate moving into and through the aquifer system very rapidly. Percolate dispersion with the shallow water bearing zones should help prevent deeper contamination with the aquifer.

For the most recent information consult the HDR study titled ,'Groundwater Evaluation Update' from June 2015. That study concludes that groundwater is improving over time. DEQ concurs with the study conclusions.

4.6 Recycled Water Characterization and Loading Rates

4.6.1 Recycled Water Characterization

Summary results from the past four years of average recycled water sampling are given below.

	Total N - mg/L	COD - mg/L	NVDS - mg/L	Phosphorus - mg/L
2009-2010	249	4129	1155	no data
2010-2011	198	3810	no data	17
2011-2012	177	3952	no data	17
2012-2013	159	3555	no data	20
2013-2014	116	3653	876	30

Figure 4. BAPCI Recycled Water Characteristics

Results from sampling the BAPCI recycled water show decreasing average constituent concentrations over time, with the exception of phosphorus. Over the course of the new permit, assuming operational and raw product consistency, effluent constituent concentrations should become stabilized, compared with the past effluent concentrations that were affected by process fluctuations, addition of pulverized solids into the recycled water stream, and inconsistent clarifier operations. DEQ will continue to monitor phosphorus concentrations in the required ground water sample results.

The COD chart below shows the average COD concentrations for the past 5 reporting periods. COD concentrations are down from 4,129 mg/L, to 3,653 mg/L; a decrease of 11.5%.

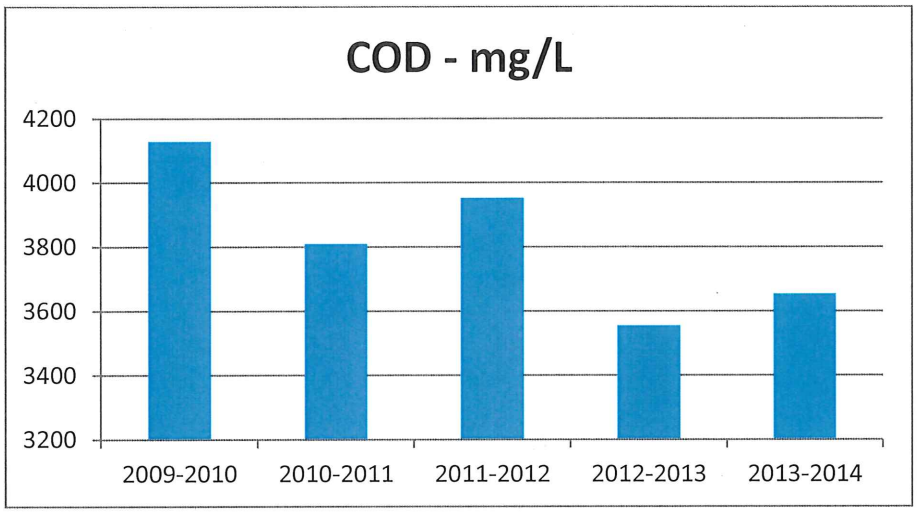


Figure 5. COD comparison Chart from 2009 to 2014.

There were monthly COD loadings above the 50 lb/acre/day limit during the 2014 growing season. These monthly loadings average out as 49.98 lb/ac/day for the non-growing season, and 55 lb/ac/day for the growing season. The facility reports taking action to reduce overall COD loadings.

The NVDS chart below shows the average NVDS concentrations for 2 of the past 5 reporting periods. NVDS concentrations are down from 1,155 mg/L, to 876 mg/L; a decrease of 24.1%. Growing season loading is 2,821 lbs/ac for NVDS, and 1,991 lb/ac NVDS in the non-growing season. The average TDS is elevated in downgradient wells compared to upgradient wells across the site. The average TDS concentration for all sampled wells was 242 mg/L, compared to the ground water standard of 500 mg/L.

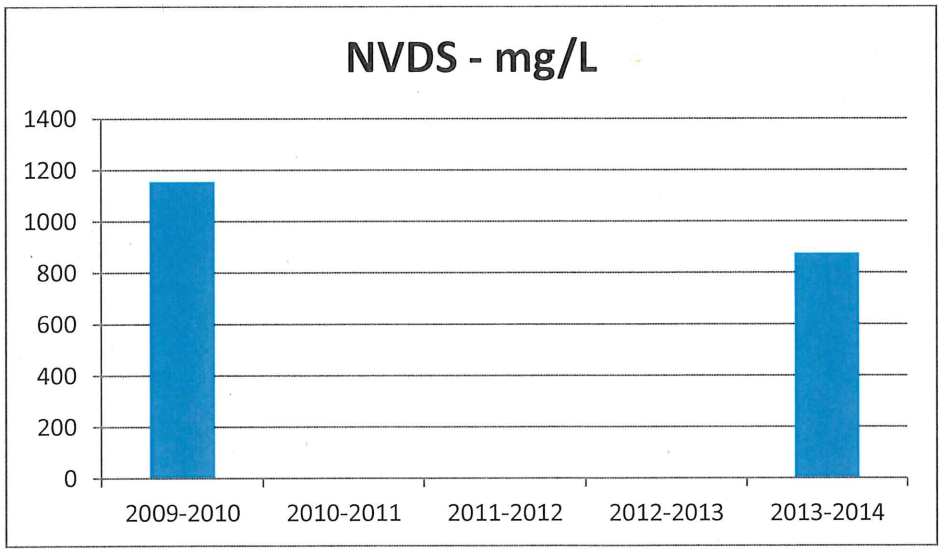


Figure 6. NVDS Chart from 2009 and 2014.

The permit limits nitrogen loading from recycled water and supplemental fertilizers to 150% of typical crop uptake. Based on information in the figure below, the nitrogen concentration and loading is decreasing significantly over time.

The chart below shows the average total nitrogen concentrations for the past 5 reporting periods. Total nitrogen concentrations are down from 249 mg/L, to 116 mg/L; a decrease of 53.4%. The facility has been working to remove waste solids from the recycled water stream, and to remove suspended solids and constituent content from the settled wash water, prior to sending the recycled water to the management units.

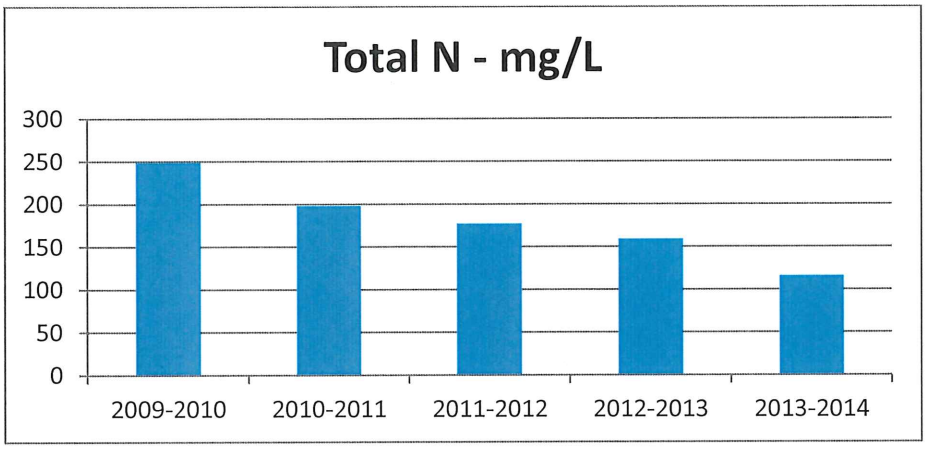


Figure 7. Total Nitrogen Chart from 2009 to 2014.

The chart below shows the average phosphorus concentrations for the past 4 reporting periods. Total phosphorus concentrations are increasing from 17 mg/L, to 30 mg/L; an increase of 43%. This results in per acre phosphorus loadings of nearly 160 lb P/ac, with an estimated uptake of only 30-40 lb P/ac for alfalfa. Alfalfa can only take-up ¼ of the phosphorus applied. The annual reports do not describe a specific source of the increased phosphorus concentrations. However, the new facility owners have identified waste streams that were previously being sent to the reuse system, that are now being handled more appropriately to reduce the solids content of the waste stream, along with reduced constituent content. DEQ will continue to monitor phosphorus loading and the build-up of phosphorus in site soils to determine if corrective measures must be incorporated into the permit requirements to reduce phosphorus concentrations and overall site loadings.

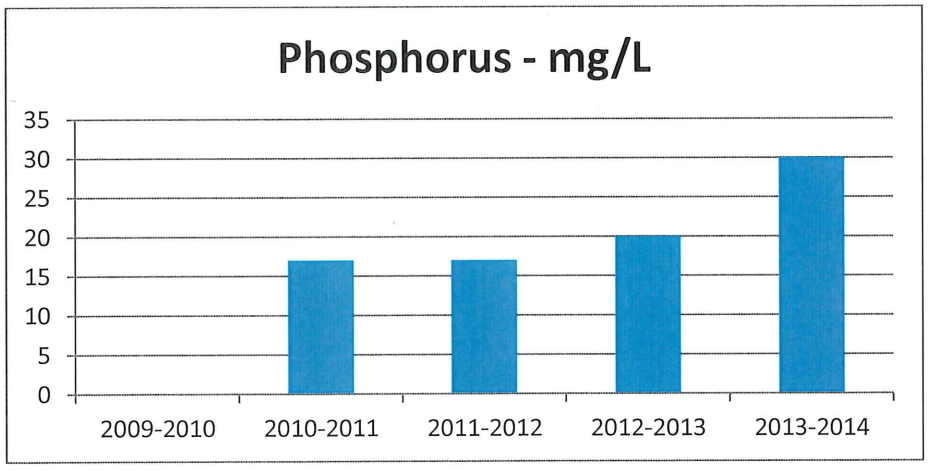


Figure 8. Recycled Water Phosphorus Concentration chart from 2010 to 2014.

4.6.2 Hydraulic Loading Rates

A mixture of wheat hay and grass hay are the intended crops, with an irrigation water requirement ranging from 32 to 42 inches per year, or 306 MG to 402 MG. Predictive calculations suggest that the 353 acres will be adequate for recycled water treatment for the recycled water flow volume target of approximately 250 MG annually.

The Permittee is required to add supplemental irrigation water as necessary to preserve crop vitality and productivity during periods when reuse water is insufficient to meet crop requirements. The Permittee is required to estimate crop water requirements at the beginning of each year and to sufficiently pre-plan recycled water and supplemental irrigation water applications to ensure crop vitality for maximum nutrient uptake. An analysis of IWR and irrigation scheduling is provided in the permit application package.

The precipitation deficit (net irrigation water requirement) for alfalfa with frequent cutting is 32.2 inches over the growing season. Assuming an irrigation efficiency of 80%, the equivalent irrigation water requirement for the irrigation pivots on site will be 40.3 inches per year on average. The plan of operation provides watering schedules, in accordance with the site-specific irrigation water requirements.

Non-growing season loading limits remain unchanged from the previous permit. Loading limits were based on site specific soils and the DEQ guidance loading calculations for site specific soils,

4.6.3 Constituent Loading Rates

As with the previous permit, nitrogen loading is limited to150% of typical crop uptake calculated separately for each hydraulic management unit. COD loading is limited to 50 lb/acre-day for both the growing season and the non-growing season, calculated on a monthly basis and averaged by month over a seasonal basis; likewise COD is considered on an individual HMU basis. COD loading is not averaged between the growing season and the non-growing season.

5 Site Management

- Monitoring is addressed in Section 6 of this staff analysis.
- Site 'operations and maintenance' is addressed in Section 8 of this staff analysis.
- A brief cropping plan evaluation is included in this section as a site management topic.

5.1.1 Buffer Zones

The buffer zone plan was approved by DEQ on February 16, 2012. Since the site conditions have not changed since the buffer zone plan was approved, the permit will not require an updated buffer zone plan to be submitted. The management units are located in a rural area off of publically accessible roads, so restrictive buffer zones are not required for the BAPCI facility.

5.1.2 Runoff

The Runoff Management Plan was submitted to DEQ on January 31, 2012, and was approved by DEQ on February 16, 2012. The plan is current and does not require revision at this time.

Recycled waters or recharge waters applied to the land surface must be restricted to the premises of the application site. Wastewater discharges to surface water that require a permit under the Clean Water Act must be authorized by the United States Environmental Protection Agency.

5.1.3 Seepage Rate Testing

The facility does not use storage lagoons.

5.1.4 Waste Solids, Biosolids, Sludge, and Solid Waste

A waste solids management plan was submitted in the Plan of Operation as required by the previous permit. A plan update will not be necessary as a separate compliance activity in the new permit. The Waste Solids Management Plan has been updated by the new facility owners to reflect current operations.

Under the new ownership, the facility has made several improvements to reduce waste solids generation, and has reduced the solids volume applied under the solids management plan.

The facility does not generate biosolids, sludge, or solid waste as part of the reuse activities.

5.1.5 Nuisance Odors

A nuisance odor management plan was submitted in the Plan of Operation as required by the previous permit. A plan update will not be necessary as a separate compliance activity in the new permit. The facility has not received odor complaints from neighbors from their past operations, and it is not expected that odors will be an issue going forward. Should nuisance odor conditions become a problem at the facility, updates to the Nuisance Odor Management Plan will be considered.

5.1.6 Cropping Plan

A cropping plan was approved as part of the Plan of Operation on February 16, 2012. The Plan of Operation has been updated, including the cropping plan. An analysis of crop yield is listed in Section 6.1.5 below.

5.1.7 Grazing

Grazing is not proposed for the site, and submittal of a grazing management plan is not necessary as a new permit requirement. Should grazing be considered, the facility will follow the recommendations listed below.

See DEQ Guidance, section 6.4 for grazing management information. A DEQ-approved grazing plan is required prior to any grazing activities on a permitted reuse site.

5.1.8 Salts

Salt loading has not been identified as a potential deterrent to crop growth on the reuse management units, and submittal of a salt loading management plan is not necessary as a new permit requirement.

5.1.9 Monitoring Well Installation Requirement

Requirements for additional monitoring wells will be evaluated as a requirement in the new permit.

As a result of the review of the Groundwater Evaluation Update, there are some of the shallow wells that may be removed from the monitoring well network, since they may not have been installed in a water bearing zone, or designed to provide sufficient well samples. The new permit will require an evaluation of these wells, and replacement or abandonment as deemed necessary as a result of compliance activity CA-036-01, which requires submittal of a Monitoring Well Network Analysis.

6 Monitoring

6.1.1 Recycled Water Monitoring

Section 5.1.1 of the permit includes the following standard recycled water monitoring requirements. The facility generally monitors TKN, ammonium-nitrogen, nitrate-nitrogen, total phosphorus, COD, electrical conductivity, pH, sulfate, total dissolved solids, volatile dissolved solids, and non-volatile dissolved solids.

Supplemental irrigation water will be sampled twice during the permit cycle for TKN, nitrate-nitrogen, total phosphorus, and TDS.

6.1.2 Soil Monitoring

Soil monitoring has been completed each year according to the permit, and is reported in the annual reports. The tables shown below include the soil monitoring results from the permit application.

Figure 9. Soil samples from spring (left) and fall 2014, listed in the BAPCI permit application, Table 2-12.

HMU	Depth (in)	pH (std)	Salts (mmhos/cm)	NO_3-N (mg/Kg)	NH_4-N (mg/Kg)	P-Olsen (mg/Kg)	pH (std)	Salts (mmhos/cm)	NO_3-N (mg/Kg)	NH_4-N (mg/Kg)	P (mg/Kg)
		Spring 2014					Fall 2014				
MU-003607 (CP-1)	0-12	7.9	1.2	16	8.3	80	7.9	1.3	6	11.5	86
	12-24	8.2	0.9	10	4.2	63	8.1	0.8	3	4.3	64
	24-36	8.3	1.0	10	3.5	39	8.2	0.8	3	2.9	50
MU-003608 (CP-2)	0-12	8.0	1.6	24	10.6	95	7.9	1.2	11	11.9	105
	12-24	8.0	1.3	13	6.1	90	8.1	1.1	5	3.5	89
	24-36	8.3	1.1	9	3.6	71	8.1	0.8	3	2.3	69
MU-003609 (CP-3)	0-12	7.9	1.3	17	7.6	95	7.9	1.1	9	6.4	99
	12-24	8.1	1.0	10	4.1	72	8.1	1.3	4	5.3	82
	24-36	8.1	0.6	7	3.2	59	8.3	0.8	6	2.5	60
MU-003610 (CP-4)	0-12	7.8	1.6	27	10.3	72	7.7	1.4	7	9.0	79
	12-24	8.2	1.1	23	8.5	60	8.1	0.8	4	2.9	55
	24-36	8.4	1.0	10	3.0	33	8.1	0.6	4	2.0	30
MU-003611 (CP-5)	0-12	8.1	1.4	13	6.8	54	8.2	1.5	7	4.0	59
	12-24	8.2	1.1	7	4.2	27	8.2	1.1	3	2.5	27
	24-36	8.3	1.0	7	3.0	19	8.3	0.8	2	2.7	19
MU-003612 (CP-6)	0-12	7.9	1.2	14	8.1	40	7.9	1.1	6	5.8	47
	12-24	8.0	1.1	10	4.7	21	8.0	1.3	3	3.7	28
	24-36	8.0	1.0	7	2.9	15	8.0	0.8	3	2.2	19
MU-003613 (CP-7)	0-12	8.0	1.2	12	3.8	42	8.0	1.1	5	4.1	43
	12-24	8.0	1.2	11	3.4	19	8.1	0.8	3	2.9	22
	24-36	8.1	1.1	10	2.0	12	8.2	0.8	3	2.6	16
MU-003614 (CP-8)	0-12	8.0	1.1	12	8.0	31	8.1	1.1	5	9.0	35
	12-24	8.1	1.0	10	3.7	15	8.3	0.6	3	3.2	17
	24-36	8.3	1.0	7	3.3	10	8.3	0.6	3	2.2	11
MU-003615 (CP-9)	0-12	8.1	1.2	16	4.6	44	8.0	1.4	5	4.7	44
	12-24	8.3	1.0	10	3.5	29	8.2	0.6	3	2.3	18
	24-36	NS	NS				8.3	0.8	2	1.7	16

Nitrate-nitrogen results from the 2014 soil samples listed above are generally in the 'low' range according to the chart below, and indicate the need for possibly supplementing site soils with nitrogen fertilizer, or additional nitrogen from recycled water to help meet crop needs.

Constituent	Low	Medium	High	Excessive
Nitrate-N (mg/Kg)	<10	10-20	20-30	>30
Phosphorus (mg/Kg)	<10	10-20	20-40	>40
Soluble Salts (mg/Kg)	<1.0	1-2	2-4	>4

Source: Soil Test Interpretation Guide: Oregon State University Extension Service. 1996. Soil Test Interpretations, Guide A

Figure 10. Soil test interpretation for crop production, Table 2-11 form the permit application

Soluble salts in the soil samples are also reported to be generally low in the permit application, indicating no buildup of salts in the soil that would reduce crop yields.

Phosphorus levels are in the excessive range for soils. Phosphorus levels in the one-foot soil depth are the most concentrated; the lower depths show that applied phosphorus is being used by the crops.

Overall, the site soils do not appear to be increasing in constituent concentrations to a point that would hinder crop growth. With increased recycled water application, and attention to crop management the site should continue to yield sustained crop production.

6.1.3 Ground Water Monitoring

The draft permit includes a requirement for the facility to provide a monitoring well network analysis. The facility will reevaluate the applicability of the monitoring wells that may not be providing the intended sampling results.

The table below shows the relative location and constituent content as a summary of the well results from the Groundwater Evaluation Update.

Table 3-2. 2014 Average Nitrate and TDS Concentrations for Up and Downgradient Monitoring Wells Associated with Management Units

Management Unit	Upgradient Wells	Downgradient Wells
CP-1	MW-3S/3D: Nitrate:0.33/0.28 mg/L TDS: 205/205 mg/L	MW-4S/4D Nitrate:0.25/0.17 mg/L TDS: 227/242
CP-2, CP-3, and WL-1	MW-3S/3D: Nitrate:0.33/0.28 mg/L TDS: 205/205 mg/L	MW-1S/1D: Nitrate: Dry/0.93 TDS: Dry/254
CP-4, CP-6	MW-3S/3D: Nitrate:0.33/0.28 mg/L TDS: 205/205 mg/L MW-8S/8D: Nitrate: Dry/0.32 mg/L TDS: Dry/178 mg/L	MW-2S/2D: Nitrate: Dry/0.33 mg/L TDS: Dry/255
CP-5	MW-8S/8D: Nitrate: Dry/0.32 mg/L TDS: Dry/178 mg/L MW-5S/5D: Nitrate: 0.20/0.50 mg/L TDS: 227/209 mg/L	MW-9S/9D Nitrate: 1.1/1.5 mg/L TDS: 300/290 mg/L MW-10S/10D: Nitrate: 0.08/0.46 mg/L TDS: 213/273 mg/L
CP-7, CP-8, CP-9	MW-6 Dry	MW-7S/7D: Nitrate: Dry/1.0 mg/L TDS: Dry/209 mg/L

MW=monitoring well; TDS=total dissolved solids
mg/L=milligrams per liter

Figure 11. Table 3-2 from the BAPCI Groundwater Evaluation Update, 2015.

A majority of the onsite ground water monitoring wells are paired. These wells were installed in this manner to remedy the changing groundwater conditions that caused the shallow wells to go dry. A deep well was installed directly adjacent to the shallow wells to maintain continuity.

The facility is proposing to complete a Monitoring Well Network Analysis to potentially allow the removal of the dry wells. The new permit will include a compliance activity to conduct a monitoring well evaluation to determine the necessity of all of the network wells. The wells that are not required could be abandoned and if needed, other wells would be added.

DEQ will continue to monitor the results from the facility wells, and will evaluate the necessity and applicability of the wells that are not producing regular groundwater samples.

6.1.4 Supplemental Irrigation Water and Monitoring

BAPCI uses the Danskin Canal (SW-03601), and a single irrigation well (SW-03602) as their supplemental irrigation water sources. The facility has 60 shares from the Riverside Canal Company (6,327 ac-ft. – 2,061 MG/yr.), and 8 shares from United Canal, (253 ac-ft. – 82.5 MG/yr.). Water rights are available to use the reported volume for land application. The canal diversion is located near the canal crossing and pump station, the pipeline connection includes a backflow device to ensure proper backflow prevention.

The turbine pump on the irrigation well can provide 700 gpm, to meet the SIW requirements for the facility. Adequate water rights are available to use this volume for land application. The irrigation well has backflow prevention, and is located adjacent to the pump station.

Supplemental irrigation monitoring will continue according to the permit requirements.

6.1.5 Crop Yield and Tissue Monitoring

The facility is required to sample crop yield and crop tissue during each harvest, reporting moisture content, TKN, nitrate-N, phosphorous, and ash content. The facility reports alfalfa as the primary crop, but additional crops may be rotated in as the needed to maintain healthy crop production.

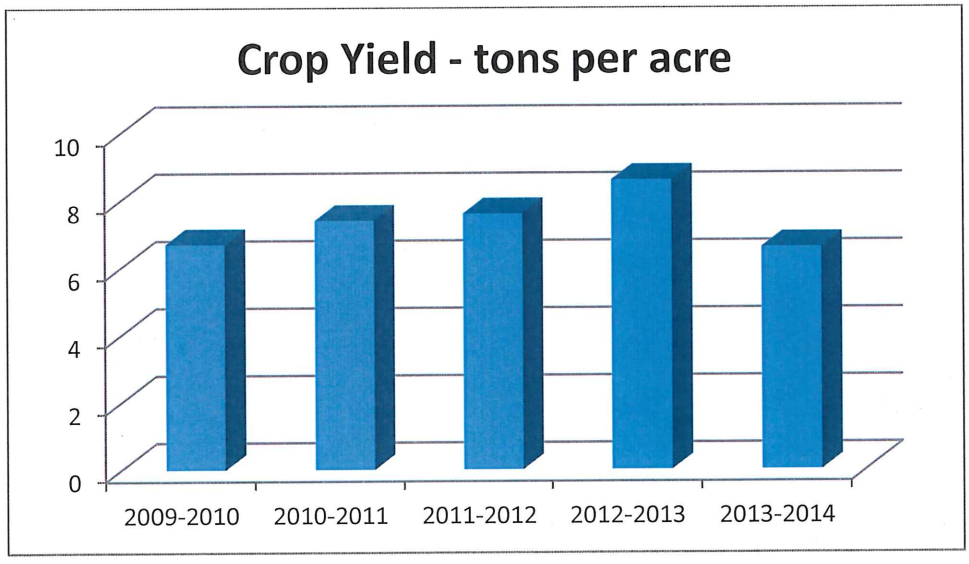


Figure 13. Crop Yield Chart from 2009 to 2014

Nitrogen removal is reported as 542 lb of nitrogen per acre in the 2013-2014 annual report, which is the median value, down from 749 lb per acre the previous year. Reduced yields are reported to be due to dry winter weather and late spring conditions. The facility reports a nitrogen loading rate of 831 lb nitrogen per acre. Recycled water is the sole source of applied nitrogen.

6.1.6 Calculation Methodologies

The facility provides example calculations for crop tissue monitoring in each annual report, and provides copies of the lab sheets for DEQ to use to verify calculation methods and crop nutrient uptake. Crop uptake is carefully tracked across all management units, and crop yields are typical for area harvests. A contract farmer is employed to harvest crops from the reuse sites.

The facility Quality Assurance Project Plan (QAPP) includes detailed descriptions for measuring crop yield.

7 Quality Assurance Project Plan

The Quality Assurance Project Plan (QAPP) is a written document outlining the procedures used by the permittee to ensure the data collected and analyzed meets the requirements of the permit. The final version of the BAPCI QAPP was submitted to DEQ on October 13, 2015. That plan is still current and on file with DEQ; the QAPP must be revised as necessary to incorporate any monitoring changes presented in the new permit, or personnel or position updates.

In support of the agency mission, DEQ is dedicated to using and providing objective, correct, reliable, and understandable information. Decisions made by DEQ are subject to public review and may at times, be subject to rigorous scrutiny. Therefore, DEQ's goal is to ensure that all decisions are based on data of known and acceptable quality.

The QAPP is a permit requirement and must be submitted to DEQ as a stand-alone document for review and acceptance. The QAPP is used to assist the permittee in planning for the collection, analysis, and reporting of all monitoring data in support of the reuse permit and explaining data anomalies when they occur.

DEQ does not approve QAPPs, but reviews them to determine if the minimum EPA guideline requirements are met, and that the reuse permit requirements are satisfied. The reason DEQ does not approve QAPPs is that the responsibility for validation of the facility sampling data lies with the permittee's quality assurance officer and not with DEQ.

The format of the QAPP should adhere to the recommendations and references in 1) the Assurance and Data Processing sections of the DEQ Guidance and 2) EPA QAPP guidance documents. EPA QAPP guidance documents are available at the following website:

http://www.epa.gov/quality/qapps.html

8 Site Operation and Maintenance

The Basic American Potato Company, Inc., facility is an industrial recycled water facility. The facility has an updated Plan of Operation for facility operations and maintenance.

The facility is not required to have a licensed operator for the system at this time.

Maintenance will be performed by the facility operators. Third-party cropping and farming operations are conducted under the supervision of the BAPCI facility management.

9 Compliance Activities

The following is an itemized summary and status of the compliance activities in the current permit, including a list and explanation of the compliance activities that will be required in the new permit.

9.1.1 Status of Compliance Activities in the Current Permit

1. CA-036-03-1. The Plan of Operation was submitted on January 31, 2012, and was approved by DEQ on February 16, 2012. The plan has since been revised to reflect the new operations of the current facility owners. The revised Plan of Operation was resubmitted to DEQ in April of 2015. It was reviewed by DEQ and revised by BAPCI. The final Plan of Operation was resubmitted to DEQ on October 13, 2015. The Plan of Operation was approved by DEQ on October 13, 2015. The Plan of Operation is current and does not need to be revised as a compliance activity in the new permit. The Plan of Operation and all required operating plans must be kept current.

   The Waste Solids Management Plan was submitted on January 31, 2012 and was approved by DEQ on February 12, 2012. The plan has since been revised to reflect the new operations of the current facility owners. The revised Waste Solids Management Plan was resubmitted to DEQ in April of 2015, it was reviewed by DEQ and revised by BAPCI. The plan was resubmitted to DEQ on October 13, 2015. The Waste Solids Management Plan was approved by DEQ on October 13, 2015. The plan describes the details of nutrient application and removal. The plan is current and does not need to be revised as a compliance activity in the new permit.

   The Nuisance Management Plan was submitted on January 31, 2012, and was approved on February 16, 2012. The plan has been revised as the Nuisance Odor Management Plan to reflect the new operations of the current facility owners. The revised Nuisance Odor Prevention Plan was resubmitted to DEQ in April of 2015, it was reviewed by DEQ and revised by BAPCI. The plan was resubmitted to DEQ on October 13, 2015. The Nuisance Odor Prevention Plan was approved by DEQ on October 13, 2015. The plan is current and does not need to be revised as a compliance activity in the new permit.

   The revised Buffer Zone Plan, Waste Solids Management Plan, along with the Irrigation Management Plan and Cropping Plan submitted as part of the Plan of Operation, were also approved on October 13, 2015.

2. CA-036-03-2. The Quality Assurance Project Plan (QAPP) was submitted to DEQ on January 30, 2012. The plan has been revised to reflect the new operations of the current facility owners. The QAPP was resubmitted to DEQ on October 13, 2015. The compliance activity for development and implementation of a facility QAPP was recognized in a receipt letter on October 13, 2015. The plan is current and does not need to be revised as a compliance activity in the new permit. All management plans are required to be kept current, to reflect current permitting and monitoring requirements.

(Note: QAPPs are self-implementing and do not currently require DEQ approval. DEQ can review QAPPs at any time and require deficiencies be addressed.)

3. CA-036-03-2. The Monitoring Well Statistics Plan was submitted to DEQ on March 1, 2012, and was approved by DEQ on October 22, 2012.

4. CA-036-03-3. The Groundwater Investigation Report (Titled "Groundwater Evaluation Update"), was submitted to DEQ on June 5, 2015. DEQ provided a review response on August 21, 2015. Some of the monitoring wells will need to be reevaluated for relevance, as part of a compliance activity in the new permit.

5. CA-036-03-04. The Runoff Management Plan was submitted to DEQ on January 31, 2012, and was approved by DEQ on January 5, 2012. The plan has been revised to reflect the new operations of the current facility owners. The revised Runoff Management Plan was resubmitted to DEQ in April of 2015, it was reviewed by DEQ and revised by BAPCI. The plan was resubmitted to DEQ on October 13, 2015. The Runoff Management Plan was approved by DEQ on October 13, 2015. The plan is current and does not need to be revised at this time.

9.1.2 Compliance Activities Required in the New Permit

The following Compliance Activities are specified in the draft permit:

1. CA-036-01, The permittee will be required to complete an analysis of the current monitoring wells on site, to ensure that all wells provide sufficient samples, according to the permit requirements.
2. CA-036-02, The permittee will be required to schedule a Pre-Application Workshop, 12 months prior to permit expiration.
3. CA-036-03, The permittee will be required to submit a complete Permit Application Package to DEQ, 180 days prior to permit expiration

10 Recommendations

Staff recommends the draft recycled water reuse permit be issued. The permit specifies hydraulic and constituent loading limits and establishes monitoring and reporting requirements to evaluate system performance, environmental impacts, and permit compliance.

11 References

HDR, June2015, Technical Report to Support Permit Renewal (Reuse Permit Application for BAPCI Facility), TRIM 2015AGH1225

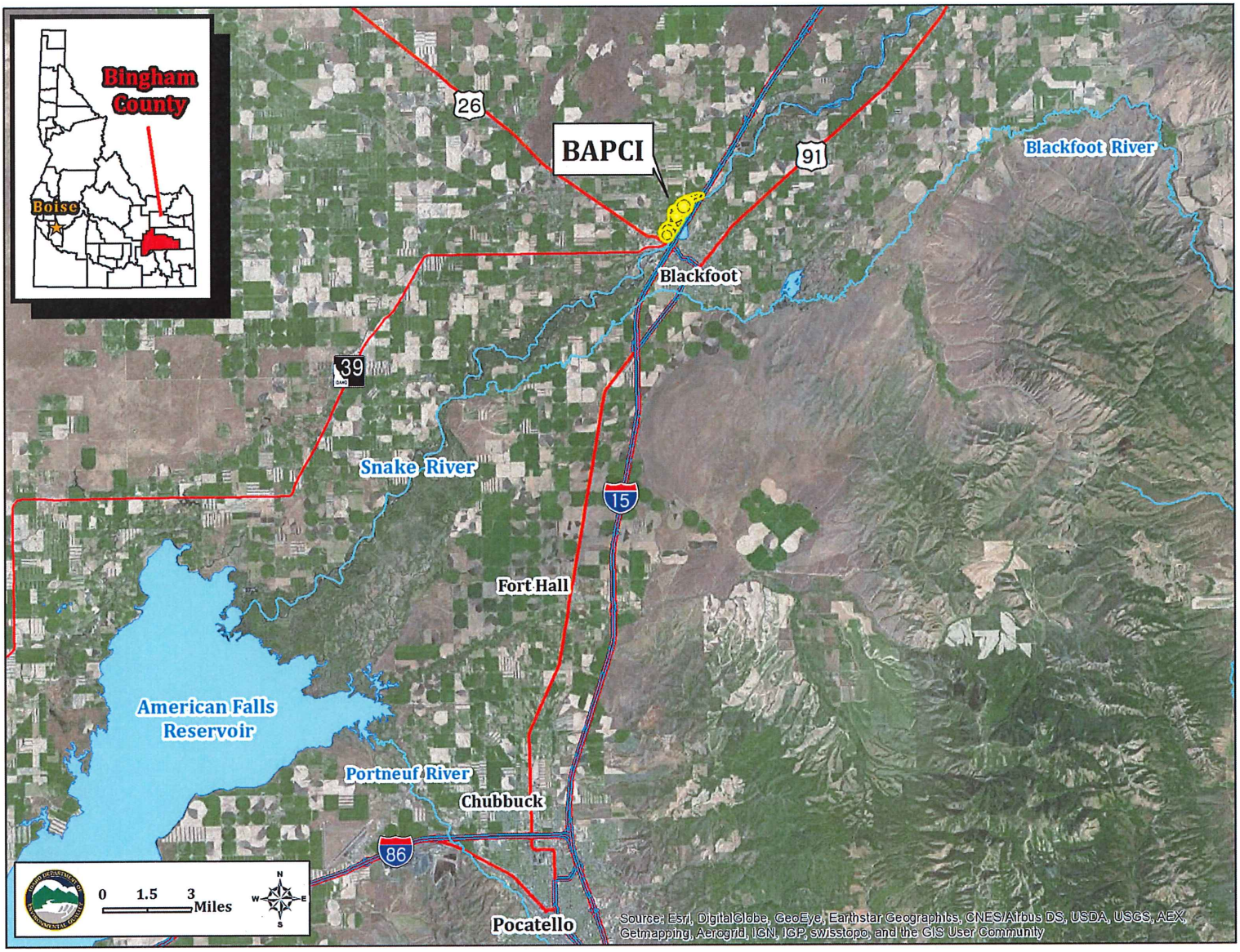
HDR, June2015, Groundwater Evaluation Update, TRIM 2015AGH1222

BAPCI 2013-2014 Annual Report, TRIM # 2015AGH245

Portions of the wording in this Staff Analysis may be directly copied from the permit application, because the technical wording could not be improved upon.

Appendix A. Site Maps

Appendix A, Figure 1. Regional Map, showing the reuse facility in relation to major surrounding features such as cities, water bodies, highways and roads, county boundaries, state boundaries, etc.



Appendix A, Figure 2. Facility Map showing the layout of the reuse site management units.