STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

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C.L. "Butch" Otter, Governor
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MEMORANDUM:

To: Bruce Olenick, Regional Administrator, Pocatello Regional Office
Tom Hepworth, Engineering Manager, Pocatello Regional Office

From: Scott MacDonald, EIT, MBA, CPM, Associate Engineer

Date: August 3, 2016

Subject: **Staff Analysis for the *Draft* Recycled Water Reuse Permit, Basic American Foods, Blackfoot Facility, I-039-03**

Executive Summary

- The Basic American Foods Blackfoot facility is an industrial potato processor.
- The facility uses 448.1 irrigated acres receiving ~460 million gallons (MG) of recycled water.
- Map updates show an additional 30 acres from the previous permit.
- An additional management unit is included for emergency use only.
- The facility is permitted for growing-season, and non-growing season application.
- Irrigation type has changed from flood to sprinkle since the last permit was issued.
- Inspections and annual reports show no exceedances or permit violations.
- This is a routine permit renewal.
- Staff recommends issuance of I-039-03, 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 August 6, 2002, expiration date August 18, 2007.
- Permit application materials were received February 17, 2007.
- DEQ's 'Intent to Issue a Draft Permit' letter sent on October 15, 2010.

2 Site Location and Ownership

The Basic American Foods Blackfoot facility land application management units are located approximately 3.5 miles to the west of the Snake River to the west of 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 facility is located south of the land application sites on the south side of Highway 26. Final recycled water treatment is accomplished via land application for crop nutrient uptake over 448.1 acres using primarily pivot and lateral pivot irrigation. A vicinity map, and site maps are provided in the Appendix.

3 Process Description

Recycled water is discharged from the BAF Blackfoot production facility, it passes through the facility's process water clarifier, the mud water clarifier, vacuum filter drum, screening to remove solids, and then onto the advanced treatment membrane bioreactor system composed of an anoxic basin, three aeration basins, and three membrane trains. The process water is mixed with the decant water from the silt settling basins, and is then pumped to the land application management units.

Waste solids are recovered for animal feed, with silt and rock sent to an off-site disposal location.

The recycled water treatment system does not make use of storage lagoons. Crop irrigation needs are supplemented where necessary with canal water. 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 during the growing season between April and October. The facility is also permitted for non-growing season application of recycled water from November 1, to March 31.

No sludge or biosolids are generated at the site, and no animals graze on site.

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

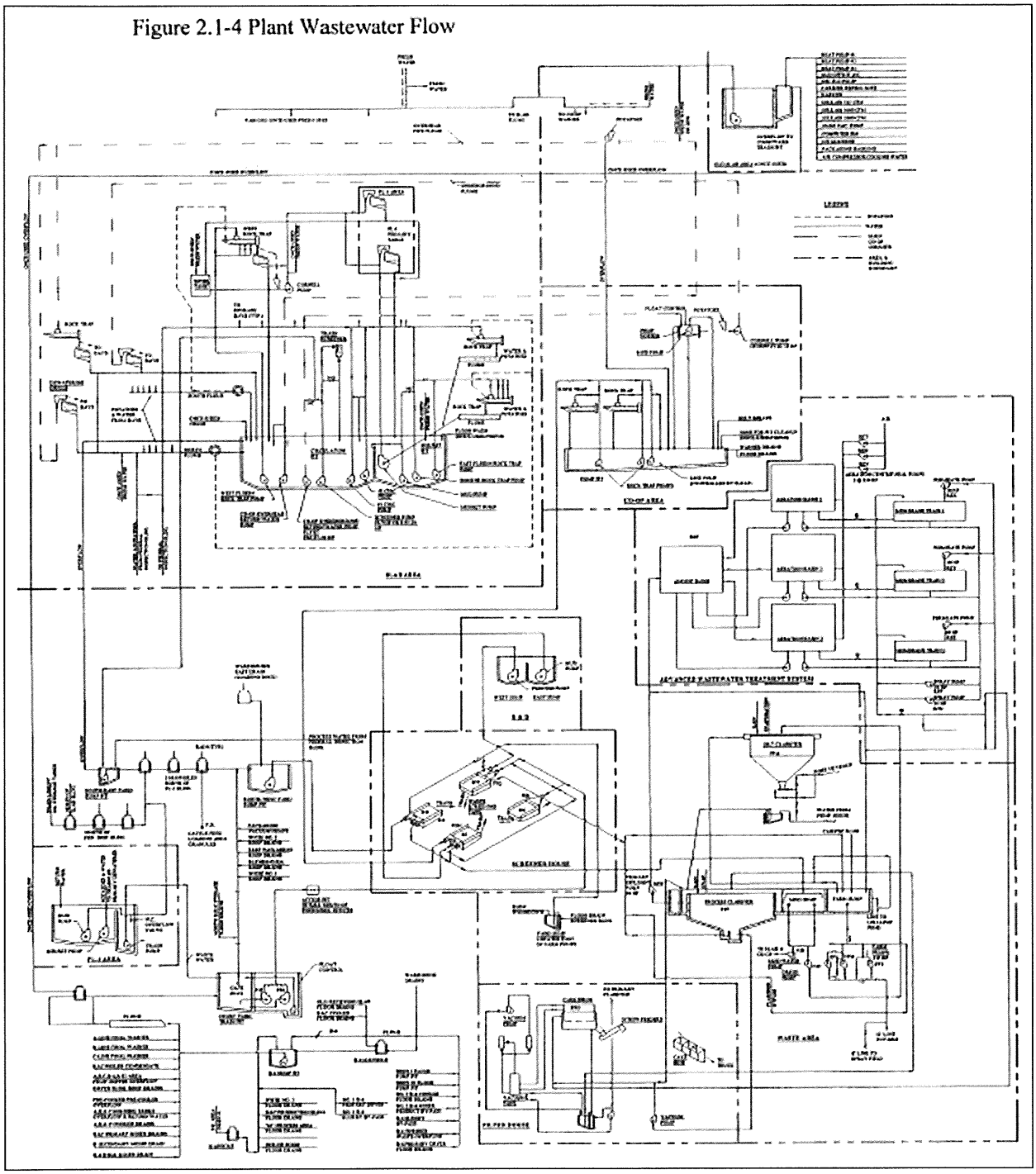

Figure 1. Facility flow diagram, from the facility Plan of Operation, November 7, 2008.

The 8 management units shown in the image below consist of 448.1 irrigated acres. The total acreage is increased by 30.1 acres from the previously permitted acreage, due to more accurate delineations of the actual permitted acreage, and the increase in acreage on MU-03909 where the canal was moved. The management unit now listed as MU-03907 used to be listed as two separate management units, but has been combined into one management unit under the same pivot.

The site topography is flat, with a less than 3% slope overall. The elevation is approximately 4,490 feet above mean sea level.

The land application sites are bordered by surface waters with the Aberdeen-Springfield Canal and the Peoples Canal on the north end of the site, and roadways on the remaining boundaries. Land use in the area is rural agricultural, irrigated agriculture, rural residential, mobile home courts, and an interstate highway.

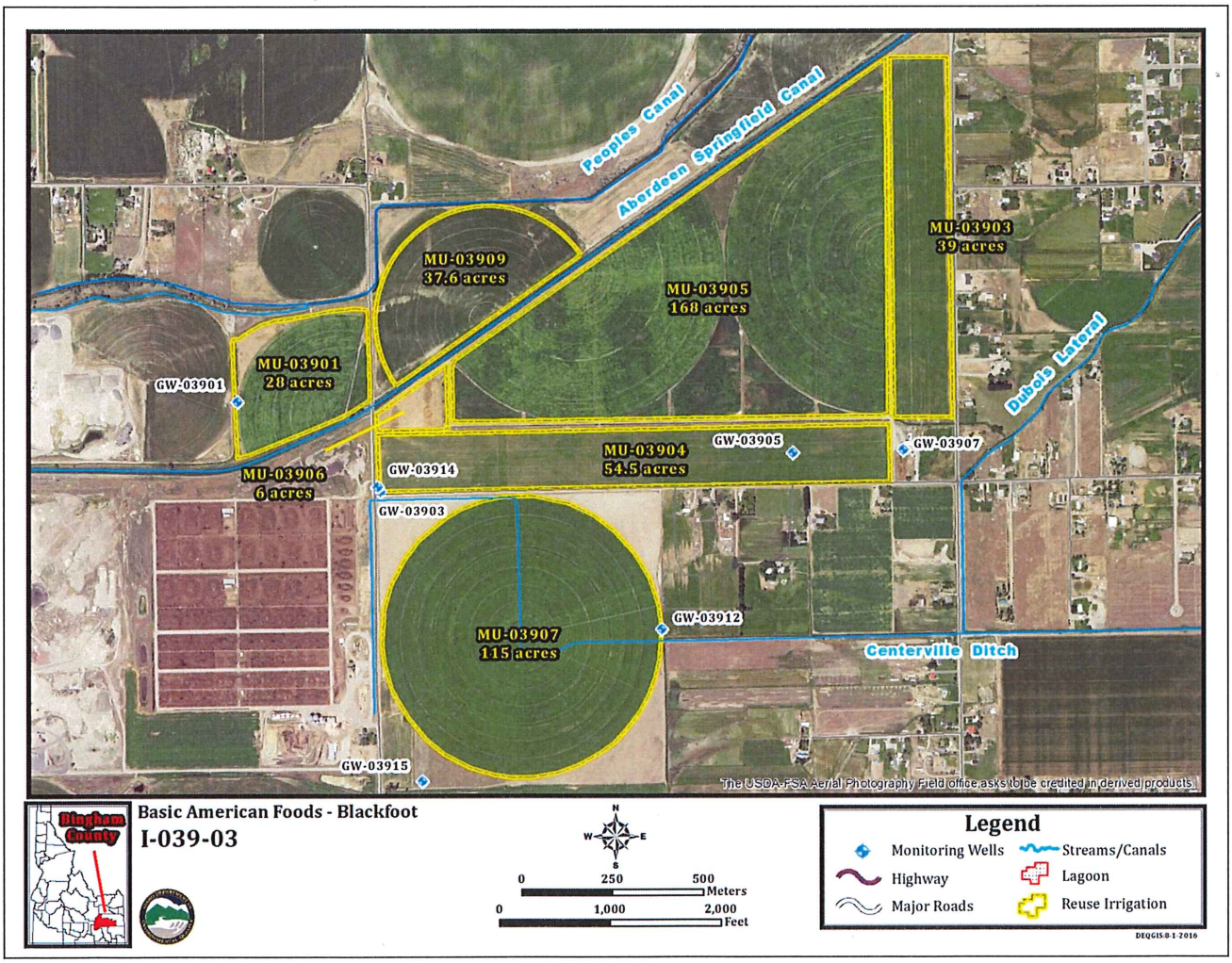

Figure 2. Management unit delineations

4 Site Characteristics

4.1 Site Management History

The reuse system has been in operation in since it was first permitted in September of 1990.

The BAF Blackfoot facility land applies wastewater on eight hydraulic management units. Past wastewater application practices included flood irrigation on some fields. All hydraulic management units now use sprinkle irrigation, for wastewater and supplemental irrigation water, with the exception of the corners on MU-03906 that receive some flood irrigation. All fields will continue to be planted in grass or alfalfa hay for nitrogen utilization and removal.

Supplemental fertilizers are generally not applied to the land application site, but last year dry urea was added at 50 lb. per acre.

4.2 Climatic Characteristics

The climatic characteristics of the BAF Blackfoot site are typical for the surrounding area. 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

Soil management unit delineations in the permit are the same as the hydraulic management unit acreage. The soil management units found west of Blackfoot are at an elevation of approximately 4,490 feet. The sites are generally flat, rural farming ground bordered by county roads, a canal to the north, and other agricultural land practices. The permit application characterizes the general soil profiles as Pacham Gravely Loam PaA with 0%-2% slopes, and PaB with 2%-4% slopes consisting of well-drained, nearly level to gently sloping soils that are 20 to 30 inches thick over gravel and sand. Site soils have been found to adequately accommodate the volume of wastewater and supplemental irrigation water applied.

Site soils were evaluated via twenty-nine test pits and three drainage plots. Drainage plots, tested by flooding to saturation, revealed that the site soils drained to field capacity within 21 to 26 hours of the flooding event. With adequate drainage of the soils (typically PaA and PaB[1]) at this site, irrigation should not damage crops.

This site does not have high-clay soils or restrictive layers. The fields at this site have yielded over five dry tons per acre per year of grass on average with pivot irrigation and some corner areas flood irrigated with process and irrigation water.

Highly biodegradable organics in potato process wastewater are a primary cause of objectionable odors. BAF's advanced treatment effectively mitigates the possibility of clogging the soils due to organic overloads. By treating the wastewater and destroying these highly biodegradable organics before the water is applied to the fields, the potential to create objectionable odors has been minimized.

Staff concludes that the continuation of current irrigation practices, under conditions proposed in application materials and at wastewater strengths resulting from advanced treatment, will not result in damage to treatment site soils or vegetative cover.

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 site soils are able to accommodate the non-growing season loadings, and that the non-growing season loadings remain as listed in the previous permit.

4.4 Surface Water

The Aberdeen Springfield Canal and the People's Irrigation Canal run through and along the northern boundary of the land application site. BAF Blackfoot will be required to submit an updated Runoff Management Plan to manage potential stormwater runoff from entering surface water. Runoff has not been a concern at the site. The buffer distances from the management units to canals, ditches, and other surface waters are addressed in Section 4.4 of the permit.

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[1] PaA (Packham gravelly loam, 0-2% slopes) and PaB (Packham gravelly loam, 2-4% slopes) consist of well-drained, nearly level to gently sloping soils that are 20 to 35 inches thick over gravel and sand.

4.5 Ground Water and Hydrogeology

Ground water characteristics at the BAF Blackfoot facility are similar to that of the neighboring acreage, where ground water yield of the basalt aquifer is high due to high secondary porosity and substantial thickness of hundreds of feet. Secondary porosity features include rubble zones between lava flows, voids such as lava tubes and pressure ridges, and fractures. Fine-grained sedimentary deposits occurring above the basalt can perch canal seepage during the growing season but these perched zones commonly become dry after canals are shut off. The aquifer is composed of basalt rock and interbedded sediments that change character over short distances. Depth to first ground water is at approximately 50 feet below ground surface.

Ground water flow direction and gradient was assessed from water level measurements collected during sampling. Ground water flows west to south-west with calculated average gradient of 2.2 feet per mile. Nearby canals can influence the gradient when losing water through seepage.

The Draft Permit includes a compliance activity requiring BAF to evaluate the adequacy of the monitoring well network. An important part of that evaluation will be to further characterize the influences of the canals on vicinity ground water flow and on specific monitoring wells.

There are no known public water supply wells for the BAF Blackfoot facility located near the site that would be impacted by land application activities. The facility has historically sampled up to 17 domestic wells near the site, at the request of the property owners. Wells have not shown exceedances of the ground water quality standards. No new wells are reported to have been installed in the area since the previous permit was issued. The permit will include the standard recommendation to continue to sample any domestic wells within ¼ mile of the reuse site.

Ten domestic wells were sampled in 2014. Of those ten wells, 7 are upgradient to the land application site. The average TDS from those seven wells is 328 mg/L, indicating an overall high background TDS level in the area, although well below the secondary constituent standard of 500 mg/L. Two of the domestic wells are side-gradient to the site, with an average TDS value of 318 mg/L, and one well is down gradient with TDS also at 318 mg/L.

The monitoring wells sampled between December 2014, and September 2015, show depth to water at around 60 feet bgs. The October samples show some wells at 82 feet bgs.

4.6 Recycled Water Characterization and Loading Rates

4.6.1 Recycled Water Characterization

In 2002, BAF installed a new advanced wastewater treatment system prior to applying the treated wastewater on the land application sites. Silt water from potato washing receives primary clarification and is sent directly to land application. The silt water is not processed through the advanced treatment system. The silt water is used to wash potatoes, but is not used to process potatoes.

The advanced treatment system includes a pre-anoxic tank for reduction of nitrogen and extended aeration stabilization tanks for reduction of COD, nitrification of TKN and stabilization of biosolids. BAF uses a proprietary ultra-filtration system known as the "Z-Weed®" ultra-filter, manufactured by Zenon Corporation. The ultra-filter system is more robust and efficient than a traditional secondary clarifier. The system offers significant operational flexibility for wastewater land application activities.

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

	COD	Nitrate	TKN	Total P	TDS	NVDS
2014-2015	528	2	25	11	614	535
2013-2014	500	2	12	11	531	428
2012-2013	443	3	27	13	556	375
2011-2012	490	1	28	12	589	452
2010-2011	424	5	7	10	577	363

Figure 4. BAF Blackfoot Recycled Water Characteristics (reported in ppm)

Nitrogen loading from recycled water and supplemental fertilizers will continue to be limited to 150% of typical crop uptake. Nitrogen loading from recycled water is comparatively low, and additional fertilizers may sometimes be needed to maintain healthy crop growth and to maximize crop uptake.

4.6.2 Hydraulic Loading Rates

A mixture of alfalfa hay and grass hay are the standard crops, with an irrigation water requirement ranging from 32 to 42 inches per year, or 363 MG to 477 MG, based on permitted acreage. Predictive calculations suggest that the 448.1 acres will be adequate for recycled water treatment for the recycled water 5-year average flow volume of approximately 430 MG annually.

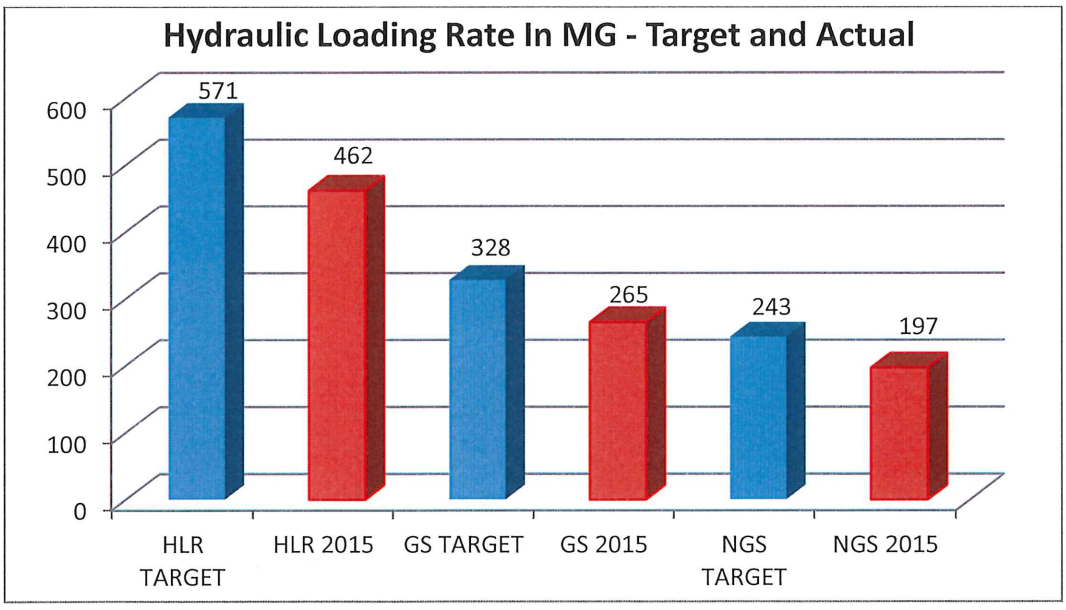


Figure 5. Target and Actual Hydraulic Loading Rates

The Permittee adds 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 Irrigation Water Requirement (IWR) and irrigation scheduling is a requirement in the facility Plan of Operation.

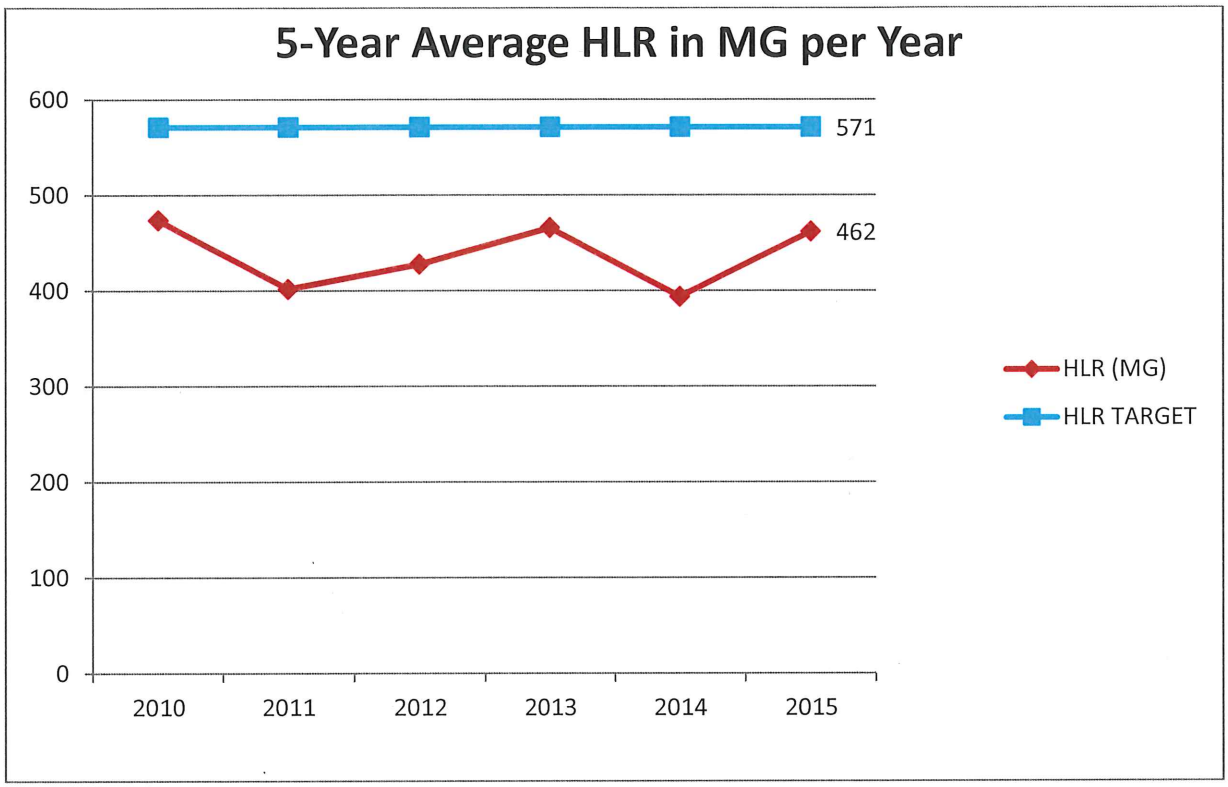


Figure 6. 5-Year Hydraulic Loading Compared with the Target Loading Rate

The precipitation deficit (net irrigation water requirement or IWR) 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 will be updated to provide watering schedules, in accordance with the site-specific irrigation water requirements.

Non-growing season loading limits remain unchanged from the previous permit, at approximately 220 MG. Loading limits were based on the performance based loading calculations for the site specific soils. The following paragraphs include excerpts in italics from the DEQ Guidance Document, referencing the methodology for addressing any potential concerns related to higher non-growing season loadings.

> *Excessive non-growing-season wastewater land application may contribute to secondary contamination of the ground water or surface water resource. Excessive COD and/or hydraulic loading coupled with low temperatures limits microbial oxidation and causes accumulation of COD in the soil profile. The rise of soil temperatures during spring thaws with high soil COD levels may cause reducing conditions to develop in the soil. This can cause the reduction of iron and manganese in the soil to mobile forms, which can leach. (Guidance 2007)*

Analysis of the site ground water does not indicate that iron is present in excess in the ground water samples, verifying that current hydraulic loading is not contributing to secondary iron contamination. Excessive COD loading is not a concern from the highly treated recycled water applied at the site. COD loading is only about 10% of the permit limit, as shown in Figure 7 below.

Non-growing season-wastewater land application during freezing conditions can cause wastewater to accumulate on the surface of the soil. Accumulated frozen wastewater, with associated chemical constituents, melts during spring thaw conditions and may overload the soils both hydraulically and with respect to constituents such as COD, nitrogen and others. (Guidance 2007)

The facility employs an advanced membrane treatment system that removes the constituents that could accumulate on the site fields. Regular site inspections, conducted even during freezing conditions, have not identified accumulations of frozen wastewater. Spring thaws have not led to any reported runoff events.

Rapid melting of frozen wastewater may also create the potential for runoff. Wastewater which runs offsite does not undergo land treatment of constituents, and may carry with it sediments which, if these have elevated levels of phosphorus may result in phosphorus contamination of surface water. (Guidance 2007)

Since the site has been in operation during the 14 years of the current permit cycle, there have been no reports of runoff from the site or runoff to surface waters. The facility is required to have an approved runoff management plan in place to address any potential sources of water that may leave the permitted management units. Runoff Management Plans are required to address the potential effects from 25-year, 24-hour precipitation events.

Non-growing season loading occurs during the months when there is no water in the adjacent canals, so any potential NGS runoff could not come in contact with surface waters. If there were some extraordinary precipitation event or field overwatering event that led to runoff into an empty canal, it would be immediately obvious, and addressed by the facility according to their approved runoff management plan.

4.6.2.1 General Guidelines for Non-Growing Season Hydraulic Loading (Guidance 2007)

Non-growing season hydraulic loading should conform to the following guidelines. NGS hydraulic loading:

- *will not cause significant degradation to ground water as determined by DEQ;*

The most recent domestic well sampling (March 2010) shows all results for dissolved Mn below the detection limit, and mostly non-detects for standard manganese samples, with only one domestic well, on the east side of Bond Road upgradient to the reuse site with a manganese level of 0.004 mg/L, while the Mn SCS is 0.05 mg/L; showing the limit as an order of magnitude higher than the sample. Upgradient, background well samples indicate that some background Mn exists in well samples.

- *will preserve beneficial uses of surface and ground water;*

The beneficial uses of surface and ground water are not affected by reuse activities, for either growing season or non-growing season application.

- *will not cause prolonged anaerobic conditions to develop in the soil or aquifer, such that the flux of redox sensitive constituents and soluble organics beyond the crop root zone causes significant degradation of ground water;*

There have been no observable anaerobic conditions that have led to observable ground water degradation. Over the term of the current permit, ground water has improved.

- *will be sufficiently designed so that late winter/early spring thaw or precipitation events do not cause runoff, hydraulic overloading, or other crisis conditions;*

The sites have sufficient berms to prevent runoff.

- *will not create or contribute to nuisance conditions, crop damage, or adversely affect public health and safety;*

The NGS loading rates have not caused nuisance conditions that have led to odor complaints, excess solids application, or conditions that adversely affect public health or safety. During regular facility inspections, there has been no observed crop damage from NGS loadings that would have been observable in the spring during crop emergence.

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 loadings are reported well below the standard permit limit of 50 lb/acre-day for both the growing season and the non-growing season, and below the facility target loading rate. COD loading is 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.

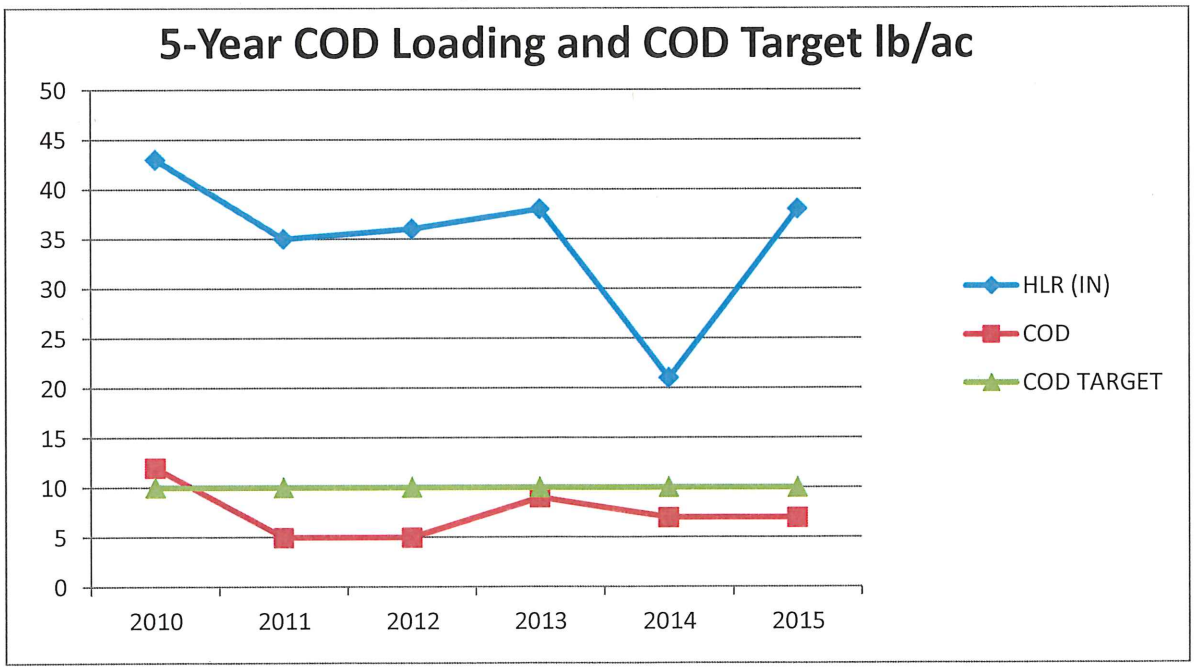


Figure 7. 5-year COD Loading and COD Target in lbs per acre, compared to the hydraulic loading

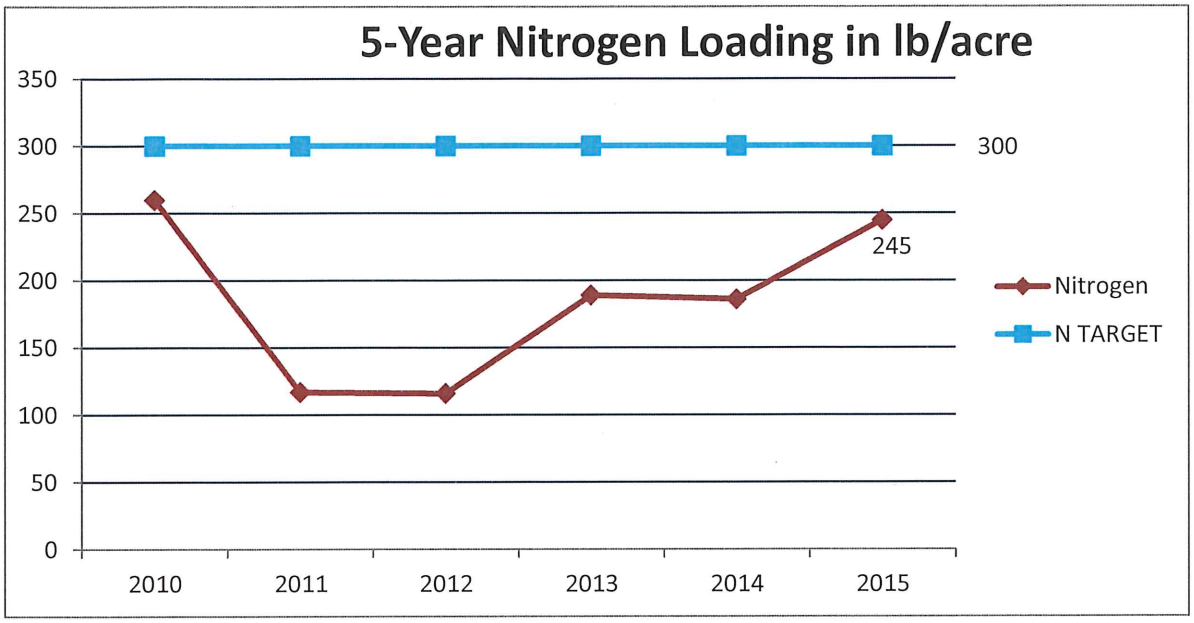


Figure 8. 5-year Nitrogen Loading Rates compared to the Target Loading Rate

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

Since the previous buffer zone plan was submitted, site conditions have changed slightly due to upgraded irrigation systems, and different configuration of the irrigated management units. The new permit will require submittal of an updated buffer zone plan. The management units are located in a rural area off of publically accessible roads, so restrictive buffer zones are not required for the facility. Engineered buffer zone mitigation strategies have been employed to maintain the permit buffer zone requirements.

5.1.2 Runoff

An updated runoff management plan will be required by the new permit. Recycled water applied to the land surface must be restricted to the premises of the application site. The facility does not currently have discharges to surface waters. Wastewater discharges to surface water that require a permit under the Clean Water Act must be authorized by the appropriate permitting authority.

5.1.3 Seepage Rate Testing

The facility does not use storage lagoons.

5.1.4 Waste Solids, Biosolids, Sludge, and Solid Waste

An updated waste solids management plan will be required in the new permit. The facility does not generate biosolids, sludge, or solid waste as part of the reuse activities.

5.1.5 Nuisance Odors

An updated nuisance odor management plan will be required by the new permit. The most recent odor complaint was determined to be a potato shed up-wind, and not caused by reuse activities. The facility has not received odor complaints from neighbors for some time for their land application operations, and it is not expected that odors will be an issue going forward.

5.1.6 Cropping Plan

A cropping plan will be required as part of the overall Plan of Operation in the new permit. 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

Excessive salt loading is a potential deterrent to crop growth, but has not been identified as an issue on the reuse management units. 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.

The facility's ground water monitoring plan appears to be comprehensive, but was submitted in 2001. The plan objectives should be revisited to reflect current ground water monitoring objectives.

Review of the facility's ground water sampling results in the annual reports, and other ground water analyses, indicated that there are some facility monitoring wells that may need to be rehabilitated or relocated to provide sufficient well samples. Some well samples show wells that have gone dry, or are otherwise not able to provide sufficient samples. The new permit will require an evaluation of these wells, and replacement or addition of wells as deemed necessary as a result of compliance activity CA-039-02, 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. Soil monitoring is completed primarily for nutrient management purposes. Soil sampling is also required to assess soil quality. The tables shown below include the soil monitoring results from the permit application. Long-term soil characterization can reflect effects of particular land use activities. Soil quality monitoring can signal the accumulation of constituents which may constitute a risk to ground water, given leaching conditions. Soil data can then be utilized to determine appropriate loading rates and management.

Nitrate-nitrogen results from the March 2015, and October 2015, soil samples are generally in the 'low' range according to the chart below. Nitrate-nitrogen results from pivot 5 (which had traditionally been used as a flood field) shows nitrate results for the one foot and two foot depths in the excessive range according to the chart. The majority of monitoring well samples show nitrate below detection limits. The highest nitrate sample of 4.66 mg/l is from 12/2014 in well MW-1 which is located upgradient from any recycled water application on a site that is owned by BAF, but has not received recycled water application. MW-1 is located downgradient from an adjacent feed lot.

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

Soluble salts in the soil samples are reported to be generally low in the annual report with only a few areas showing samples in the high range. There does not appear to be a buildup of salts in the soil that would reduce crop yields.

Phosphorus levels are in the excessive range for some of the site 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. The facility reports applying fertilizer with only nitrogen content, listed with the formula 46-parts nitrogen, 0-parts phosphorus, and 0-parts potassium (46-0-0), meaning that no additional phosphorus was applied as fertilizer, in agreement with DEQ's recommendation to all facilities, that they use low phosphorus fertilizer on any fields with high phosphorus content.

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 be able to maintain acceptable crop yields.

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 required sampling results throughout the year, due to seasonal fluctuations or reductions in ground water elevations.

Some monitoring wells show extremely stable ground water elevations that vary less than 2 tenths of a foot over the year. However, some wells show depth to water varying between 60 feet and 80 feet bgs. The variability is likely due to seasonality, which can be influenced by canal seepage when the canals are full, and inversely by irrigation wells which can draw down ground water elevations in the area. The reported field parameter measurements for the wells sampled indicate that sampling is being conducted according to an established sampling plan, but not all wells are providing consistent samples over the year.

Upgradient domestic wells indicate a background level for TDS above 300 mg/L, so it is important to conduct a complete monitoring well analysis to understand how monitoring well constituent levels are influenced by upgradient activities.

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

6.1.4 Supplemental Irrigation Water and Monitoring

The BAF Blackfoot facility uses the Dubois Canal as their supplemental irrigation water source (SW-03901). The facility has 1,274 shares from both the Peoples Canal and the Dubois Canal (18,461 ac-ft. – 6,016 MG/yr.). Water rights are available to use the reported volume for land application. The canal passes under Bond Road, just south of the east lateral field, flowing west to the sampling point, and then to the pump station, the pipeline connection includes a backflow device to ensure proper backflow prevention.

DEQ requires that field management must optimize crop health and production with respect to the nutrients supplied by process water and/or supplemental irrigation water. Irrigation water must be applied at times and in volumes to match crop needs. The permit requires that BAF calculate the irrigation water requirement on a monthly basis during the growing season but imposes no other hydraulic or constituent loading limitation for canal water.

Supplemental irrigation water 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.

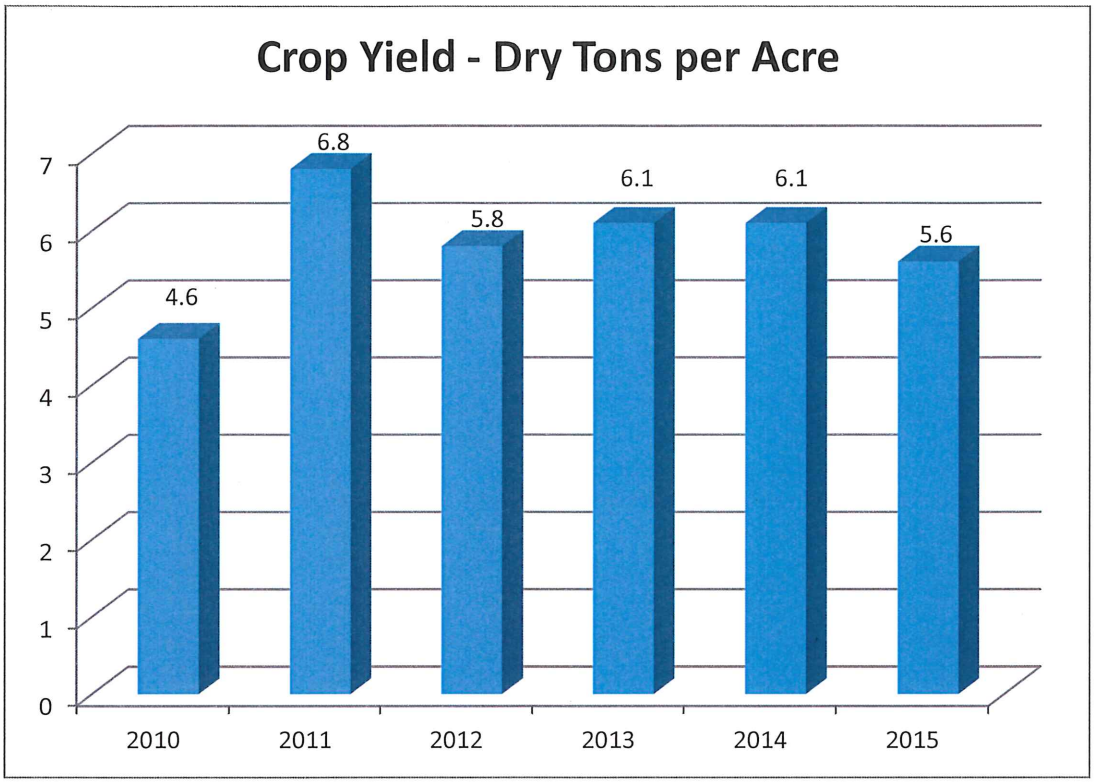


Figure 10. Crop Yield Chart from 2010 to 2015

Nitrogen removal is reported as 439 lb of nitrogen per acre in the 2014-2015 annual report, which is the median value, up from 347 lb per acre the previous year. The facility reports a nitrogen loading rate below their target loading rate of <300 lb nitrogen per acre. Supplemental fertilizer was applied at 50 lb. per acre, as dry urea in a mixture of 46-0-0, with no phosphorus content.

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) will be updated to include 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 BAF Blackfoot facility does not currently have a QAPP for the Blackfoot facility. The Facility 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 responsibility for validation of the facility sampling data lies with the permittee's quality assurance officer.

The QAPP format 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 Foods, Blackfoot facility is an industrial recycled water facility. The facility will be required to update their 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 BAF Blackfoot 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

The compliance activities in the current permit have been completed. Since the time the permit was issued in 2002, many issues have changed. Irrigation systems have been improved, monitoring wells added, the advanced treatment system has been completed, and additional acreage has been added, so all facility management plans that were required as compliance activities in the previous permit will be required to be updated in the new permit as described below.

9.1.2 Compliance Activities Required in the New Permit

The following Compliance Activities are specified in the draft permit:

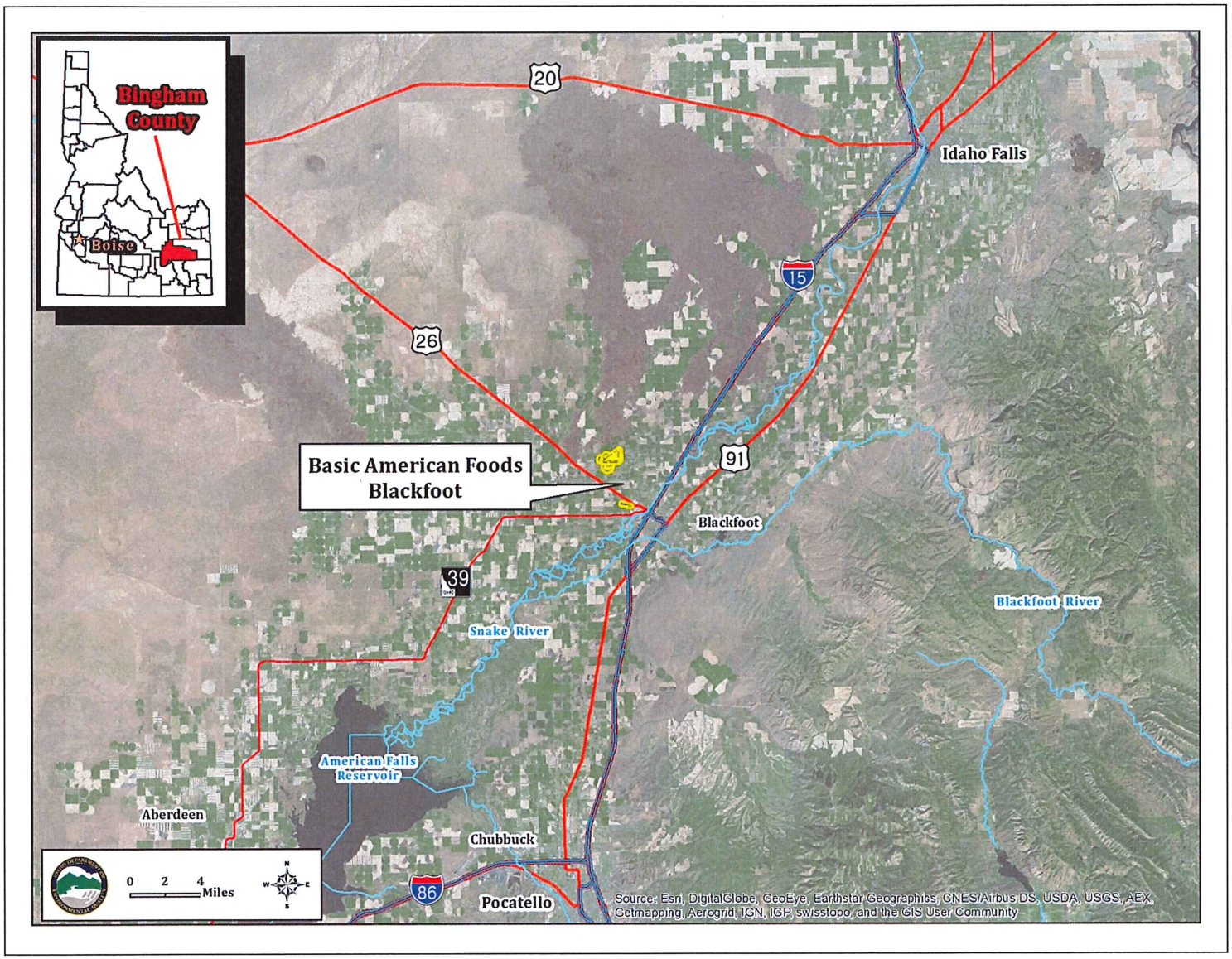
1. CA-039-01, The permittee is required to update the facility Plan of Operation, which will include updates to all the facility management plans.
2. CA-039-02, The permittee will be required to complete an analysis of the current monitoring wells on site, to ensure that all wells provide sufficient samples, according to the permit requirements.
3. CA-036-03, The permittee shall prepare and implement a QAPP that incorporates all monitoring and reporting required. A copy of the QAPP along with written notice that the permittee has implemented the QAPP shall be provided to DEQ.
4. CA-036-04, The permittee will be required to schedule a Pre-Application Workshop, 12 months prior to permit expiration.
5. CA-036-05, The permittee will be required to submit a complete Permit Application Package to DEQ, 180 days prior to permit expiration

10 Recommendations

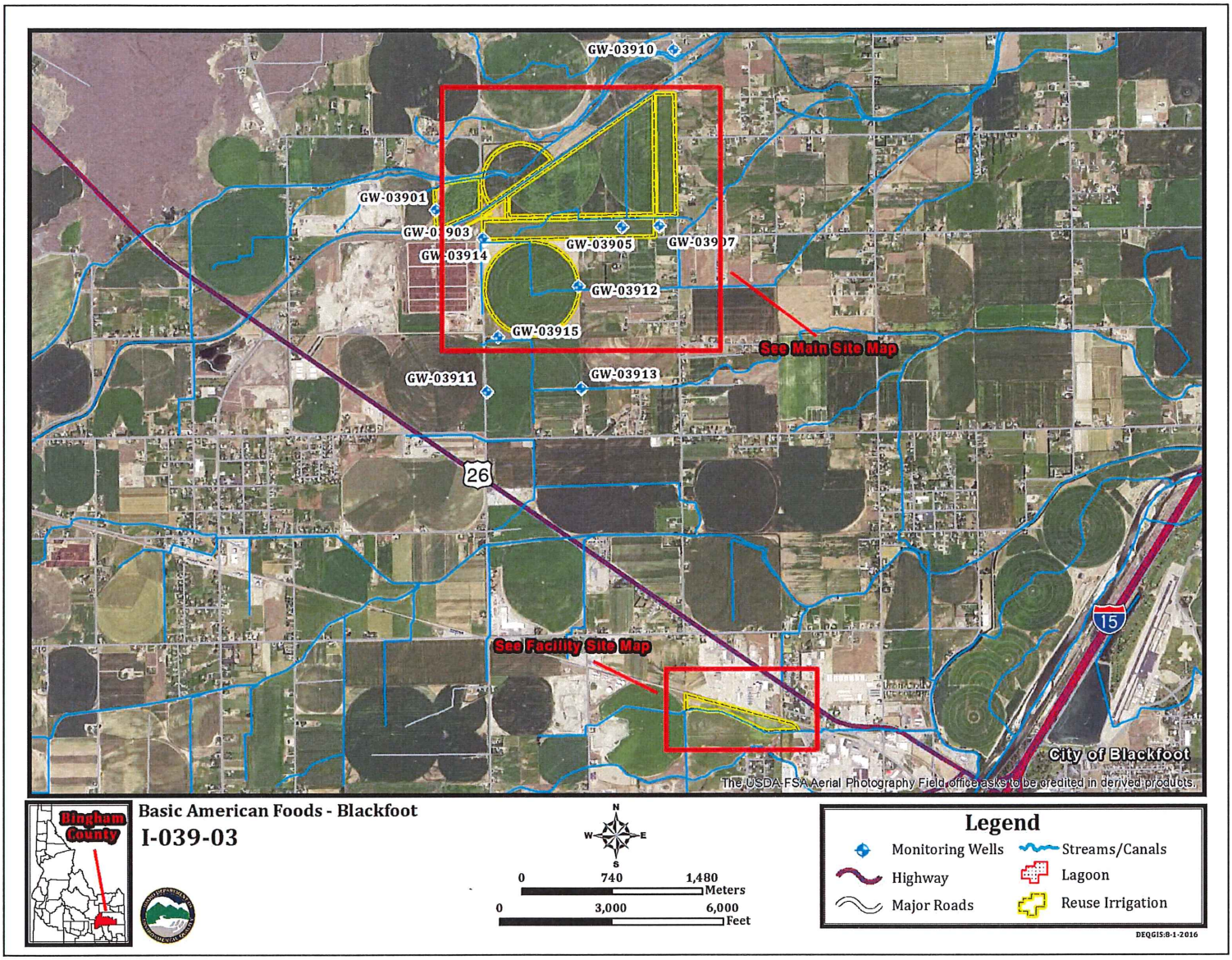
Staff recommends the draft recycled water reuse permit be issued. The permit specifies hydraulic and constituent loading limits and establishes monitoring and reporting requirements to evaluate system performance, environmental impacts, and permit compliance.

Appendix A. Site Maps

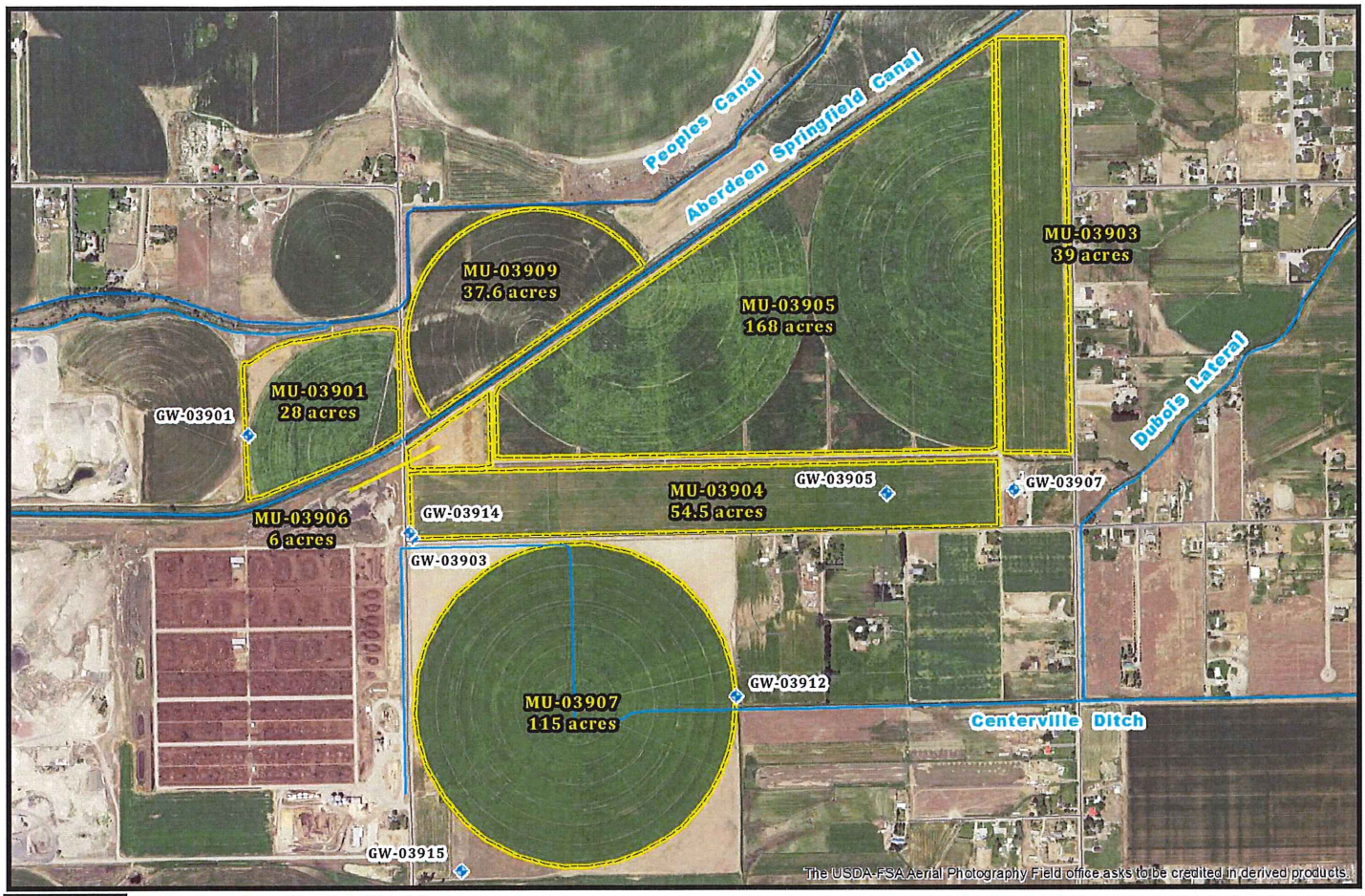
Appendix A, Figure 1. Regional Map, showing the reuse facility in relation to major surrounding features such as cities, water bodies, highways and roads, county boundaries, state boundaries, etc.



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



Appendix A, Figure 3. Basic American Foods – Hydraulic Management Units



Appendix A, Figure 4. Basic American Foods – Facility Site, for emergency use only.