STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

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MEMORANDUM:

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

Date: February 2, 2016

Subject: Staff Analysis for the *Draft* Recycled Water Reuse Permit, J.R. Simplot Company, Permit Number I-031-05 (Previous Permit Number LA-000031-04)

Executive Summary

- The J.R. Simplot Company Aberdeen Facility is an industrial potato processor.
- The facility uses 1293.5 irrigated acres receiving roughly 230 MG of recycled water annually at full production, with a permit limit of 190 MG in the non-growing season.
- The facility is permitted for both growing season, and non-growing season application.
- There have been no changes to the facility since the last permit was issued, with the exception of the down-time during the facility transition to the Caldwell facility.
- Map updates resulted in a minor overall acreage reduction of 0.49 acres.
- Inspections and annual reports show no exceedances or permit violations.
- This is a routine permit renewal, with the expectation that the facility will return to full production within the first year of permit issuance.
- Staff recommends issuance of I-031-05, for a period of 5 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 April 1, 2011, expiration date March 31, 2016.
- The pre-application teleconference was conducted on August 31, 2015.
- Permit application materials were received September 30, 2015.
- DEQ's Completeness Determination letter issued on November 19, 2015.

2 Site Location and Ownership

The J.R. Simplot owns and operates the Aberdeen processing plant and land application management units in and near Aberdeen, Idaho. Permitted sites include the Original site (north-east of the plant), the Knudsen expansion site (south-east of the plant), and the Pratt site (north-west of the plant). The Original site is 259.7 acres; the Knudsen expansion, acquired by the Permittee in 1996, added 183.3 irrigated acres, while the Pratt sites acquired in 2003, added an additional 850.5 acres that are currently permitted.

3 Process Description

The J.R. Simplot Aberdeen plant produces consumer products from locally grown potatoes and corn for national and international markets. In-plant water usage includes washing, cooking, and product conveyance. Following in-plant use, the facility's pretreatment includes solids screening, primary clarification, dissolved air flotation which removes fats, oils and greases, anaerobic digestion, and oxygen injection to reduce odors and potentially reduce Chemical Oxygen Demand (COD).

Plant process water volumes average 700,000 gallons per day or 240 million gallons annually at full production. Silt water from potato washing is accounted for in the total recycled water produced. The plant operates on average between 330 and 350 days during the operating season. Process water, as well as process water blended with well water from the 'Boat Dock' pump house, is applied to the permitted hydraulic management units for final recycled water treatment. Groundwater sources on the Pratt site can also provide Supplemental Irrigation Water (SIW).

Prior to issuance of the current permit, permit LA-000031-03 was the first to include the Pratt site for additional treatment capacity. Treatment configuration for I-031-05 will consist of the same acreage as listed in the current permit which is 1293.7 total irrigated acres. An additional 6 full or partial pivots at the Pratt site consisting of 577.5 acres are held in reserve in the event of plant production increases. Approval from the Idaho Department of Environmental Quality is required before bringing the reserve pivots or pivot corners on the reserve sites into service for recycled water land application.

Recycled water generated in the plant is treated through rotating barrel screens, a primary clarifier, dissolved air flotation, an anaerobic digester, and super oxygenation. The oxygen injection treatment step serves to further reduce odors and may have the potential to reduce COD loading. Recycled water is land applied to grow corn, alfalfa, timothy grass, sugar beets, wheat, and oats. Waste solids are recovered for animal feed. Settled silt material is dried on the corner of MU-03114, and is used to fill low spots on other management units.

The recycled water treatment system does not make use of storage lagoons, but there is an HDPE lined pond where fresh water is stored, prior to irrigation. Crop irrigation needs are supplemented at the Pratt site with water from on-site irrigation wells. 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 irrigation water.

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

There has been no municipal sludge or biosolids generated at the site. Municipal wastewater is not connected to the recycled water system. All municipal septage is sent to the City of Aberdeen municipal treatment facility.

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

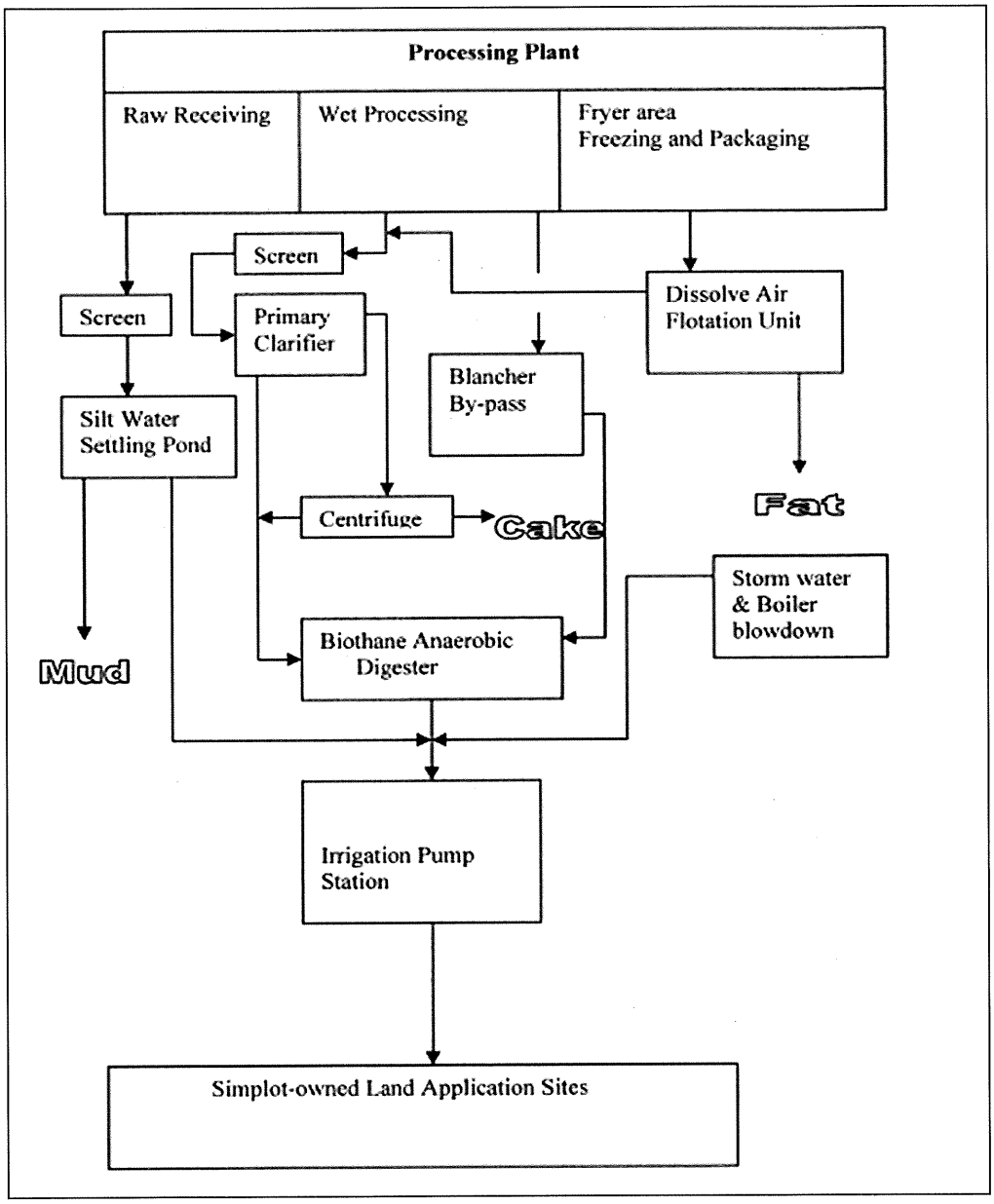

Figure 1. Facility flow diagram.

The 16 management units consist of 1293.4 irrigated acres, which is unchanged from the previously permitted acreage. The site topography is relatively flat, rural farm land. The elevation is between 4,400 and 4,500 feet above mean sea level. Land use in the area is rural agricultural, irrigated agriculture, rural residential.

4 Site Characteristics

4.1 Site Management History

The reuse system has been in operation in since it was first permitted in 1991. The facility began operations of the potato processing facility in 1973. The permit application materials provide two full pages of site management history for review; that history is not repeated here.

4.2 Climatic Characteristics

The climatic characteristics at the Simplot Aberdeen site are typical for the surrounding area and, are described in detail in the permit application. Weather data from the Regional Climate Center at the Aberdeen Experimental Station is summarized in Section 3.2 of the permit application as follows:

- Average annual precipitation of 8.84 inches.
- Minimum monthly average precipitation of 0.45 inches, between 1914 - 2009.
- Maximum monthly average precipitation of 1.10 inches in June, between 1914 - 2009.
- Average minimum temperature of 11.0 degrees F in January between 1914 - 2009.
- Average maximum temperature of 87.9 deg. F, in the months of July.
- Winds are primarily out of the southwest.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (°F)	31.1	37.0	47.1	59.1	68.9	77.7	87.9	86.3	75.8	62.8	45.7	34.1	59.4
Average Min. Temperature (°F)	11.0	16.0	23.3	30.0	37.7	44.3	49.9	47.2	38.3	29.6	21.6	13.9	30.2
Average Total Precipitation (inches)	0.72	0.64	0.72	0.85	1.10	0.92	0.45	0.47	0.67	0.81	0.72	0.79	8.84
Average Total Snow Fall (inches)	6.5	4.1	2.0	1.3	0.1	0.0	0.0	0.0	0.0	0.5	1.5	5.1	21.1
Average Snow Depth (inches)	3	2	1	0	0	0	0	0	0	0	0	2	1

Figure 2. Western Regional Climate Center Climatic Data 1914-2009. (Permit application, Table 3-2)

The net irrigation water requirement for alfalfa with frequent cutting is 43 inches over the growing season. The plan of operation will provide watering schedules, in accordance with the site-specific irrigation water requirements, 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 analysis of the soil types found on site. 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.

Site monitoring wells do not show increasing negative effects from field loadings, but do show elevated TDS and nitrates even in upgradient wells. DEQ is in agreement with the proposal in the permit application for the Original site and Pratt site that the non-growing season loadings remain as listed in the previous permit. Despite a request for increased non-growing season (NGS) loading, the loading at the Knudsen site will also remain unchanged from previous non-growing season limits.

4.4 Surface Water

The facility has implemented a Runoff Management Plan to manage potential stormwater runoff from entering surface waters. Berms and canal banks are also in place to prevent potential runoff to surface waters. Hazard Creek is the nearest surface water to the Knudsen and Original sites, located on the west end of the Original site. The established buffer distances from the management units to canals, ditches, and other surface waters are addressed in Section 4.4 of the permit.

Irrigation sources do not include surface water sources, only on-site irrigation wells.

The Permittee has developed a site-specific run-off control system. Surface water run-on/run-off control is actively controlled at the Pratt site. The Pratt site acreage can be subject to high-volume, short-duration storm or thaw events with resulting rapid overland flows, generally occurring during spring thaw events. Control efforts involve establishing 5-foot contour intervals and preparing detailed topographic maps used to design the facility 'pump-back' systems and containment berms. Containment berms must be regularly maintained when any accumulated water erodes berms or otherwise causes the effectiveness of the berms to be compromised.

The pump-back system designed by Simplot will function as follows. Winter application can occur at the Pratt site on all seven active pivots until frozen ground prevents infiltration. After that point, CP-5P and CP-6P are graded to enhance natural drainage patterns such that potential run-off water can be contained and pumped back to the pivot for re-application. The design objective was containment of a 10-year, 24-hour storm event on 24 inches of snow, with no infiltration (frozen ground). According to the isopluvial maps in the Guidance excerpted from NOAA data, the 10 year/24 hour storm could produce 1.8 inches of water. In addition, snow might already be present on the site, so snow moisture content was conservatively assumed to be 1 inch of water per foot of snow, or a total of 3.6 inches of water. A 25 year/24 hour storm is estimated to produce 1.8 inches of water, which is the 25 year/24 hour mapping for Idaho[1]. The pump-back system and associated infiltration/evaporation should accommodate 3.6 inches of water; which is effectively double the volume expected from a 25year/24 hour storm.

DEQ concurs that this is a conservative design basis and that the proposed system should minimize the potential for storm runoff or thaw that has possibly contacted recycled water to leave the application area. The pump-back and containment systems are not designed nor intended to contain the movement of all overland flow (precipitation/snow melt) with respect to the 5 other active pivots at the Pratt site. DEQ recommends regular inspection and maintenance of the berms to maintain integrity and operability.

[1] NOAA, Atlas 2, Volume 5, Figure 28

4.5 Ground Water and Hydrogeology

Original and Knudsen Sites

Hydrogeological characteristics of the Original and Knudsen locations have been assessed by the Permittee, consultants, and DEQ in the course of this and previous permitting processes. The regional aquifer is generally heterogeneous with water bearing formations comprised of basalt flows and sedimentary inter-bedding mainly consisting of sand and silt. Water is typically encountered 20-40 feet below ground surface with relatively small seasonal variations. Typical variations in static water levels are less than 5 feet. Basalt and sedimentary inter-bedding is present to at least 350 feet based on available drilling records. Although confined or semi-confined conditions may exist, there appears to be no definite separation between the shallow and deeper, regional aquifer systems; rather varying degrees of communication between the two layers is likely occurring.

Ground water flow gradients have been estimated to be 28 ft/mile across the Original Site and 11 ft/mile across the Knudsen location. Hydraulic conductivity was estimated to be in the range of 580 ft/day with a porosity of 0.10. Given these assumptions, travel times across the longest flow path are 4.5 months for the Original Site and 13 months for the Knudsen location.

Ground water quality has been extensively evaluated through sampling and analysis by Simplot's consultants. Nitrate-nitrogen (NO_3-N) and total dissolved solids (TDS) levels are highly variable both spatially and temporally, but are generally only elevated in about 4 monitoring wells.

The permit requirements, together with a comprehensive, updated, Plan of Operation, act as an effective ground water quality protection strategy. The Permittee's adherence to terms and conditions in the permit and to practices identified in site management plans should continue to result in improved ground water quality, maintainable at levels acceptable to DEQ.

The permit application includes additional details on ground water and site hydrogeology, including 32 pages of detailed analysis. The conclusions from that study indicate no increasing or decreasing trends in groundwater elevation. DEQ is in agreement with the conclusions that four downgradient wells showing increasing trends for nitrate or TDS should continue to be carefully monitored. Wells 8a and 10 appear to have constituent increases from past activities, where a former feed lot was located on site before the current facility was in place. Wells 17 and 18 are located at the site between two pivots where waste solids are managed. The facility should continue to monitor each of these wells to ensure that increased constituent content is not being caused from site reuse activities, and they should continue to manage waste solids in the form of silt dirt, in a manner that will not affect ground water.

Pratt Site

Relative to the Pratt Site, DEQ anticipates that ground water quality is not likely to exhibit detectable degradation as the result of recycled water land application. However unlikely degradation may be, DEQ required that the facility install a comprehensive ground water monitoring network at the Pratt sites used for industrial recycled water land application. The Permittee shall conduct continuing assessments of the monitoring well sampling to demonstrate that the interpretation of sampling and analysis results can be accomplished with an acceptable level of confidence.

4.6 Recycled Water Characterization and Loading Rates

4.6.1 Recycled Water Characterization

Annual recycled water flow rate measurements from 2005 to 2014 are given below.

Year	Effluent Wastewater Land Applied (MGA)	Days Generated
2005	255	344
2006	258	341
2007	258	331
2008	245	347
2009	239	332
2010	225	335
2011	210	350
2012	228	366
2013	239	341
2014	217	280
Average	**237**	337

Figure 3. Annual recycled water production in million gallons annually. (Permit Application Table 4-1.)

Results from recycled water generation show a relatively consistent production flow rate over the years. The average production flow of 237 MG over 1,294 acres is only 6.7 inches per acre on an annual basis.

Parameter	2005	2008	2014	Ave
COD	2550	760	1285	1532
TKN	98	119	94	104
NH_3-N	55	86	72	71
NO_3-N	1	2	0	1
TDS	1747	835	1248	1277
VDS	907	426	558	630
NVDS	840	409	690	646
Total-P	22	21	18	20
K	330	254	263	282
SO_4	56	63	42	54
Cl	254	250	168	224

Figure 4. Average annual recycled water concentrations. (Permit Application Table 4-2.)

Based on the data in the figure above, COD concentration and loading have decreased significantly over time. TKN concentrations remain fairly steady, and while total nitrogen loadings are fairly low, the permit limits nitrogen loading from recycled water and supplemental fertilizers to 150% of typical crop uptake. Most other constituents in the table show decreasing concentrations.

4.6.2 Hydraulic Loading Rates

Figure 3 above shows a fairly steady recycled water production volume over the past 10 years. The average loading rate of 6.7 inches per acre is not sufficient to grow and maintain healthy crops, even if it were all available in the growing season. A mixture of grasses and hay are the intended crops, with an irrigation water requirement of 33 to 40 inches in the growing season. 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 the irrigation water requirement and irrigation scheduling is provided in the permit application package.

The precipitation deficit (net irrigation water requirement) for alfalfa with frequent cutting is 33.14 inches over the growing season. Using an irrigation efficiency of 80%, the equivalent irrigation water requirement for the irrigation pivots on site will be 41.43 inches per year on average. The plan of operation will provide watering schedules, in accordance with the crop-specific irrigation water requirements.

The facility's permit application (Page 4-4) requested an increased loading rate for the non-growing season to 75% of the calculated AWC for the Knudsen site; from 1.5 inches per acre to 5.2 and 6 inches per acre. The permit application has a detailed analysis showing TDS and nitrate do not appear to be increasing, but TDS remains well above the SCS of 500 mg/l in some monitoring wells at the Knudsen site. Non-growing season loading limits will remain unchanged from the previous permit.

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, inclusive of any permitted NGS loading allowances. Nitrogen loading from fertilizers or from dried silt dirt must also be accounted for when calculating annual nitrogen loading rate limits.

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 loading is reported on an individual HMU basis. COD loading is not averaged between the growing season and the non-growing season.

Hydraulic loading limits for the growing season will be the irrigation water requirement of the crop, but cannot exceed the nitrogen loading limit of 150% of typical crop uptake2 as stated in the permit.

The NVDS limits of 4,800 lb/ac-year from the previous permit is no longer applicable. The NVDS limit was initiated to help make sure loadings were even, especially during the NGS, before the facility had the Pratt acreage. The facility does not currently load any of the MUs above 1470 lb/ac-year, with an average of 924 lb/ac-yr. The lowest MU is 197 lb/ac-yr. The 4,800 NVDS limit is no longer needed, since the facility loads in the 1000 lb/ac range which is approximately the NVDS uptake for the crops being grown. At these NVDS loading rates, impacts to ground water quality for TDS would not be expected.

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2 Typical crop uptake is the median constituent crop uptake from the three (3) most recent years the crop has been grown. Typical crop uptake is determined for each hydraulic management unit. For new crops having less than three years of on-site crop uptake data, regional crop yield data and typical nutrient content values, or other values approved by DEQ may be used.

5 Site Management

- Monitoring is addressed in Section 6 of this staff analysis.
- Site 'operation and maintenance' is addressed in Section 8 of this staff analysis.
- Compliance activities are addressed in Section 9 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 January 11, 2016. The new 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 facility.

5.1.2 Runoff

The Runoff Management Plan was approved by DEQ on March 16, 2012. No changes or updates have been made at the facility to warrant updating the Runoff Management Plan. 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 for recycled water storage, and is not required to conduct lagoon seepage testing at this time.

5.1.4 Waste Solids, Biosolids, Sludge, and Solid Waste

A waste solids management plan was submitted as part of the overall Plan of Operation as required by the previous permit. The Waste Solids Management Plan was approved by DEQ on March 16, 2012. A plan update will not be necessary as a separate compliance activity 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

A Nuisance Odor Management Plan was submitted as part of the overall Plan of Operation, and was approved on March 15, 2012. A plan update will not be necessary as a separate compliance activity in the new permit. The facility has received a few odor complaints from neighbors from their past operations, but 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.

The Simplot Aberdeen facility has completed or will continue with the following nuisance odor management measures:

- Pre-treatment at the plant including: solids screening, primary clarification, FOG removal, filtration, anaerobic digestion, and oxygen injection to reduce solids and nutrient content of the process water
- The addition of the Pratt acreage significantly increases the land treatment acreage available such that individual site organic loads on a lb/acre basis, are greatly reduced

- Ensuring that process water is not allowed to stagnate and undergo anaerobic decomposition in pipelines or on open surfaces
- Pipeline velocities are designed to operate around 4 feet/second with no process water to be stored within the pipelines when not in use, this includes flushing pipelines with fresh water when not in use to ensure that odors are not unduly generated when the plant has periodic shut-downs
- Sprinklers on pivots will incorporate the latest technology such as low-angle stream nozzles or spinners to reduce or eliminate spray drift
- Process water can be diluted with fresh water for application during the growing season
- Pipelines are designed with flushing and cleaning capabilities including pipeline pigging
- Implementation of written complaint response procedures, as required

Reuse permitting requirements includes buffer zones to reduce spray drift off site, and to reduce nuisances caused by odors generated from applying process water on site management units near areas where public access may lead to odor complaints.

5.1.6 Cropping Plan

The Plan of Operation has been updated, including the cropping plan on page 5-7. 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 not be a requirement in the new permit.

As a result of the review of the Ground Water and Hydrogeology Section of the reuse permit application, it appears that the facility's monitoring well network is operating properly to provide ground water samples as designed. The new permit will require standard analysis and sampling of all ground water monitoring wells listed in the permit.

6 Monitoring

6.1.1 Recycled Water Monitoring

Through permitting, the Department requires environmental sampling, monitoring, and analysis which are necessary to assess the performance of hydraulic and soil management unit operations. Sampling and analysis assure that recycled water reuse practices do not adversely impact natural resources or public health. Permit I-031-05 includes standard permit language requiring sampling and analysis in an approved Quality Assurance Project Plan (QAPP) to record the quantity and quality of crop uptake, to measure soil health and productivity, and to ensure acceptable ground water quality.

The Department views the significant increase in treatment capacity and the effective management of all permitted management units as long-term, positive improvements. The increased acreage and pretreatment steps reduce per acre loading and reduces environmental concerns typically associated with reuse activities.

Section 5.1.1 of the permit includes the following 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 permit application materials include updated soil monitoring information, detailed soil analysis, and updated maps of site soils. The permit application states that the past data summaries are consistent with the findings from the most recent soil analysis.

Soil characteristics on the Original and Knudsen sites have been thoroughly investigated and reported in the course of prior permit applications and compliance activity processes. Soils on the Original and Knudsen sites generally consist of well-drained loam, silt-loam or silt soils with depths ranging from 12 inches to greater than 60 inches. Analytical data consistently indicates that on-site soils are suitable for continued use as treatment media to receive process water for nutrient recycling through proper application and crop uptake.

Soils at the Pratt site are more variable with respect to soil mapping classes, but the dominant soil type at the Pratt site is Declo loam, making up approximately 94 percent of the soils in that area.

Each field at the Pratt location was analyzed individually to estimate the soil AWC, or volume of water capable of being retained by the soil during the NGS. Using depth-of-soil data obtained from soil excavations, the estimated volume of soil lying beneath each field was calculated. Hydraulic and constituent loading objectives have been established for the Pratt site, according to the recommended minimum water holding capacity to provide NGS storage and reduce leaching to groundwater. Likewise, soil chemical qualities are generally within acceptable and characteristic ranges for productive agricultural soils.

Soils across the three management areas (Original, Knudsen, and Pratt) are generally well suited for process water land application if the Permittee operates the system in accordance with the facility Plan of Operation and within the terms and conditions contained in the permit.

The table below includes the soil monitoring results from the permit application.

Constituent	Mean	Range	Low	Medium	High
			Guideline Rates for Crop Production[1]		
Nitrate-N (mg/Kg)	7.8	0.5-28	< 10	10 -20	> 20
Ammonium-N (mg/Kg)	4.1	0.3-20	--	--	--
Soluble Salts (mmhos/cm)	0.7	0.3-2.9	< 1.0	1.0 – 2.0	> 2.0
Phosphorus, Olsen (mg/Kg)	33	3-200	<10	10-20	20-40
DTPA-Fe	13	2-48	<2.5	2.5-4.5	>4.5
DTPA-Mn	10	1-82	<1	1 – 2.5	>2.5

[1]Guideline rates based on Oregon State University Publication Bulletin EC1478; New Mexico University Guide A-122. There rates are recommended soil ranges for crop production.

Figure 5. Soil sample results listed in the permit application, Table 3-13.

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

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 fall in the 'high' range for site soils at the Original and Knudsen sites. Phosphorus levels in the one foot soil depth show the highest concentration in most samples, while the lower depths show that applied phosphorus is likely being used by the crops. Phosphorus levels at the Pratt site are in the normal range.

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

6.1.3 Ground Water Monitoring

Facility monitoring wells include eleven wells at the Original site, six wells at the Knudsen site, and seven wells at the Pratt site. The draft permit does not include a requirement for the facility to install additional monitoring wells at this time. The facility should continually evaluate the applicability of all monitoring wells, especially any wells that may not provide adequate sampling results.

Permit application materials include 32 pages of detailed analysis of the ground water at the site, and several years of compiled monitoring well data. The analysis includes ground water topography, constituent sampling results and trend analysis over time from 2002 to 2015. Ground water flow at the Knudsen and Original sites is generally toward the southeast, while ground water flow direction at the Pratt site is primarily toward the southwest.

Quarterly groundwater monitoring results have been collected and reported at the Original site since 1988, at the Knudsen site since 1996, and from the Pratt site wells since 2002. The facility believes site conditions and well constituents are well understood through continued sampling and analysis over the years. The facility proposes a reduction in sampling from quarterly sampling to twice yearly for the site monitoring wells. DEQ is in agreement that there is sufficient consistency in site loadings, coupled with consistent well sampling results, that sampling can be reduced to twice annually, and still be sampled frequently enough to show any anomalies in groundwater constituents. Should the facility propose increased loading rates, the sampling frequency may have to be increased accordingly.

DEQ will continue to monitor the results from the facility wells, and will evaluate the applicability of the monitoring well sampling requirements as they relate to the Original and Knudsen sites where ground water shows impacts from past reuse activities.

6.1.4 Supplemental Irrigation Water and Monitoring

With respect to process water hydraulic loading, Permit I-031-05 imposes limits for growing season and non-growing season hydraulic loading. Loading rates from recycled water alone do not meet crop irrigation water requirements. Crop water needs must be met by application of supplemental irrigation water (SIW) during the growing season. Mixing process water with SIW can also help to reduce odors.

The new permit includes 6 irrigation wells as the facility's supplemental irrigation water sources. These are the same 6 wells listed in the previous permit, but some were listed as inactive. Water rights are available to use the reported volume for land application. Facility pipeline connections include backflow prevention.

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 grows a variety of grass hay crops, but additional crops are rotated in as the needed to maintain healthy crop production. Yield is as high as 13.7 tons per acre for silage corn, with a low of 2.8 tons per acre for oats.

Nitrogen removal is reported in the 2013-2014 annual report between 180 - 476 lb of nitrogen per acre for corn, 144 - 467 lb of nitrogen per acre for alfalfa, and 381 lb of nitrogen per acre for sugar beets, with an average nitrogen removal for all crops of 238 lb of nitrogen per acre. The facility reports an average nitrogen loading rate of 126 lb nitrogen per acre, with a high of 476 lb per acre, and a low of 85 lb per acre. Crops also received nitrogen from applied fertilizer on 6 of the 16 MUs, for an average of 140 lb of total nitrogen per acre from recycled water and fertilizers combined.

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.

Updated maps of the J.R. Simplot Aberdeen facility, have resulted in the following acreage changes. The site maps were updated to show the management unit boundaries and the monitoring well locations. The overall acreage is reduced by 0.49 acres, as shown in the table below. The facility was provided with the acreage adjustments, to ensure they were in agreement with the minor acreage updates.

Original	MU	previous	new permit	difference	
	3109	28.78	28.5		
	3117	77.52	77.2		
	3118	34.29	34		
	3119	78.84	78.2		
	3120	22.74	22.7		
	3121	17.51	18		
	total	259.68	258.6	1.08	
Knudsen	3114	55.7	55.7		
	3115	70.83	70.6		
	3116	56.98	56.9		
	total	183.51	183.2	0.31	
Other Pratt acres unchanged			850.5	0	
Reserve acreage	3129	121.5	121.5		
	3130	121.5	121.5		
	3131	91	91.9		
	3132	121.5	121.5		
	3133	61	61.5		
	3134	61	60.5		
	total	577.5	578.4	-0.9	
				0.49	
		1871.19	1870.7	0.49	Total difference
					0.49 acres less than previously permitted

Figure 6. Acreage adjustments made to reflect the updated GIS data for each management unit.

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 QAPP was submitted to DEQ, and the DEQ response was sent on March 16, 2012. 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 J.R. Simplot Company, Aberdeen 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 Aberdeen 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 Simplot Aberdeen permit LA-000031-04 was the first permit issued in the Pocatello Regional Office that did not include any compliance activity requirements. DEQ worked with the facility and their consultants up-front, to get all standard management plans reviewed and approved so the permit could be issued with no compliance activities as follow-up submittal requirements. The facility management plans must be kept current.

9.1.2 Compliance Activities Required in the New Permit

The following Compliance Activities are standard requirements specified in the draft permit:

1. CA-031-01, The permittee will be required to schedule a Pre-Application Workshop, one year prior to permit expiration.
2. CA-031-02, 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, September 2015, Technical Report Industrial Wastewater Reuse Permit Renewal (Reuse Permit Application for J.R. Simplot Aberdeen Facility Facility), TRIM 2015AGH1529

J.R. Simplot Aberdeen Facility 2013-2014 Annual Report, TRIM # 2015AGH244

Portions of the wording in this Staff Analysis may be 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 site in relation to major surrounding features such as cities, water bodies, highways and roads, county boundaries, state boundaries, etc.

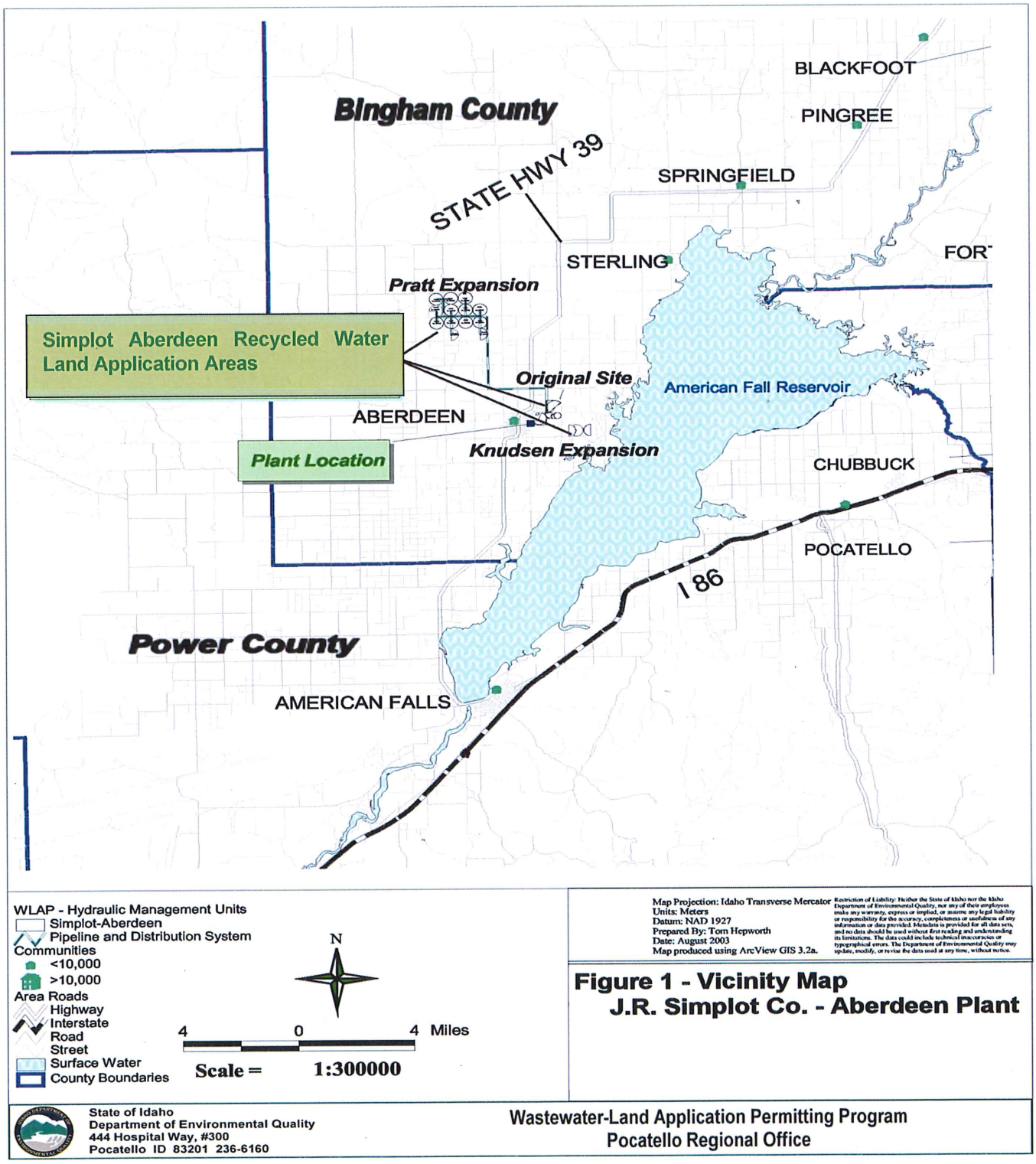

Figure Appendix 1. Regional Map

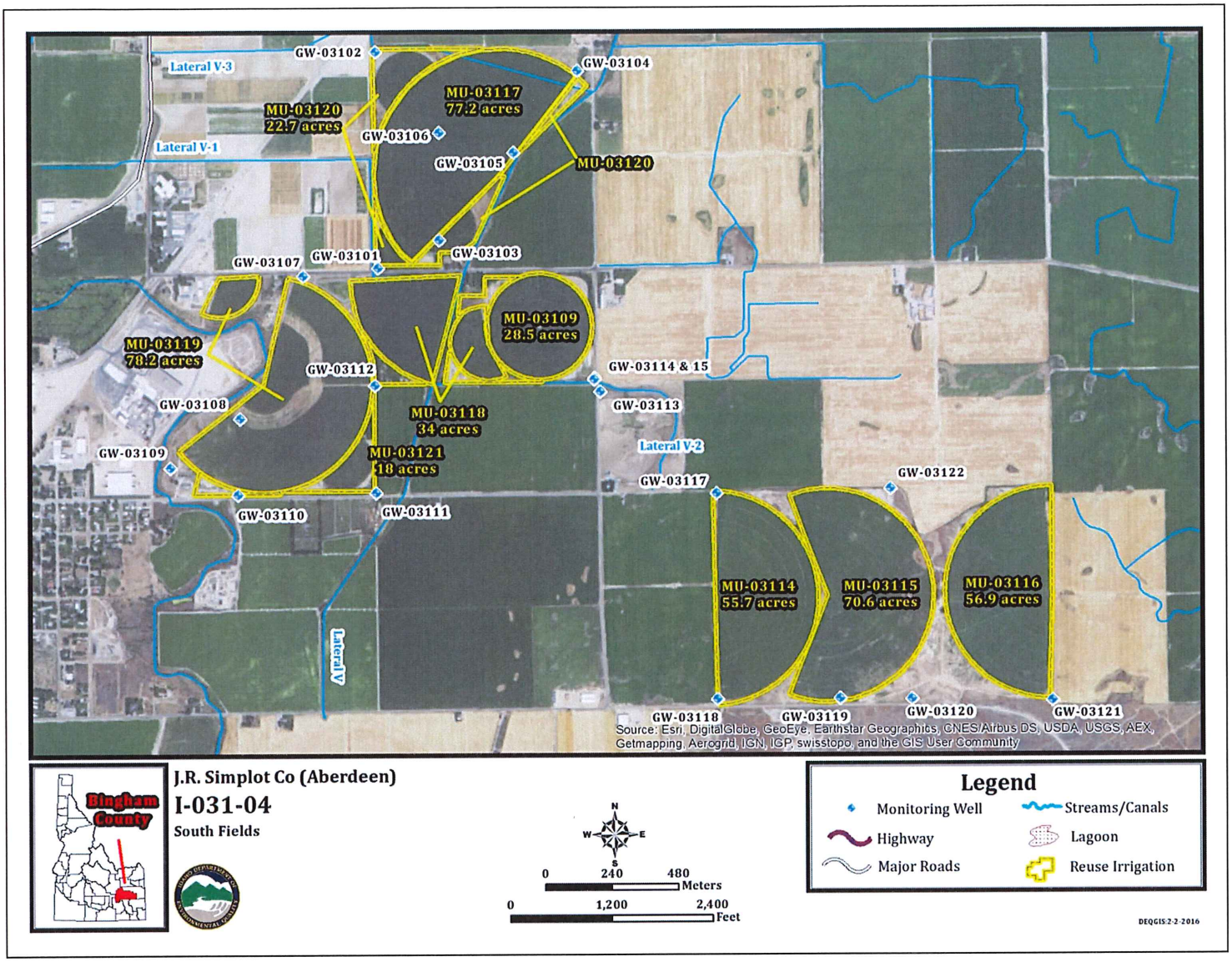

Figure Appendix 2. Original and Knudsen Site Map With Monitoring Well Locations

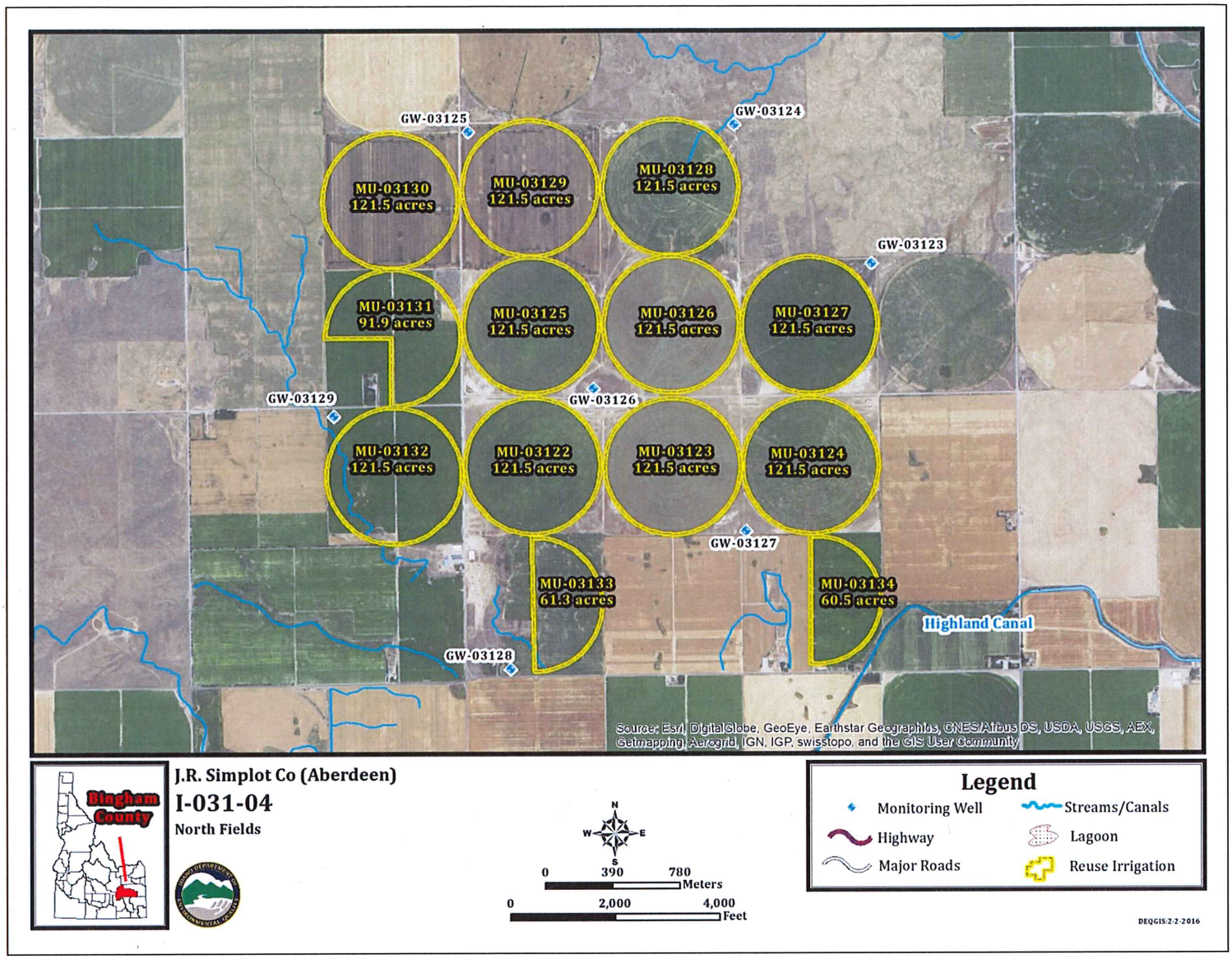

Figure Appendix 3. Pratt Site Map With Monitoring Well Locations