June 16, 2011

M E M O R A N D U M

TO: Greg Eager, P.E.
Engineering Manager, Idaho Falls Regional Office

FROM: Tom Rackow, P.E.
Staff Engineer, Idaho Falls Regional Office

SUBJECT: Staff Analysis for Draft Recycled Water Permit LA-000075-04 (Industrial Wastewater) Idahoan Foods, LLC – Dubois Facility.

1. PURPOSE

The purpose of this memorandum is to satisfy the requirements of the *Recycled Water Rules*, IDAPA 58.01.17.400.05, for issuing wastewater reuse permits. This memorandum addresses draft wastewater reuse permit No. LA-000075-04 for the industrial wastewater treatment and reuse system operated by Idahoan Foods, LLC at the facility located near Dubois, Idaho. Idahoan Food's treatment and reuse system is currently permitted under the terms of Wastewater Land-Application Permit No. LA-000075-03, Modification "D". Please note that the terms Wastewater Land Application Permit, Wastewater Reuse Permit, and the new Recycled Water Permit generally refer to the same processes and procedures, rules, and guidance as previous years. The three terms may be used interchangeably throughout this analysis.

2. SUMMARY OF EVENTS

The Department of Environmental Quality (DEQ) originally permitted the Blaine Larsen Processing, Inc., Dehydration Division (a.k.a. Larsen Farms) on January 20, 1989. Permit LA-000075-03 was issued on March 17, 2003 with an expiration date of March 16, 2008. Modification "B" was issued to Blaine Larsen Processing on May 9, 2003 to correct compliance activity completion date errors. Modification "C" was issued January 31, 2006 in response to a change of ownership of the facility from Blaine Larsen Processing, Inc. to RDO Processing, LLC. Modification "D" was issued July 27, 2007 in response to RDO Processing, LLC changing it's name to North American Foods, LLC (no change of ownership). The Modification "C" change of ownership applies to the production facility only. On January 14, 2009 the company notified DEQ of another name change from North American Foods, LLC to Idahoan Foods, LLC (again, no change of ownership). When the facility was sold from Blaine Larsen Processing to RDO/North American Foods/Idahoan Foods, only the processing facility was sold. The acreage used to land apply wastewater remains owned by Larsen Farms and Idahoan Foods leases the acreage for wastewater land application practices. Larsen Farms continues to farm the same fields that Idahoan Foods uses for wastewater treatment. The current permittee will be referred to as "Idahoan" for the remainder of this analysis.

A permit renewal pre-application meeting was held with Idahoan on October 4, 2007. On February 26, 2008 Idahoan's consultant notified DEQ they expect to submit the permit renewal application to DEQ before May 16, 2008 and request permission to continue operating under LA-000075-03 until a new

permit is issued. On February 28, 2008 DEQ issued letter to Idahoan granting extension of the permit application to March 16, 2008 and authorized continued operation under LA-000075-03 until DEQ reviews the application and makes a determination whether to issue a new permit. DEQ received Idahoan's permit renewal application on May 23, 2008. DEQ requested additional information from Idahoan on December 18, 2008 and performed a permit renewal site inspection on January 21, 2009. On September 7, 2009 Idahoan informed DEQ that they may have enough product to continue operations until the end of the year, but may choose to shut the plant down after that. On October 23, 2009 Idahoan notified DEQ that operations have temporarily ceased at the Dubois plant. DEQ suspended permit renewal activities for the Dubois plant at that time to concentrate resources on priority permit renewals for other facilities still in operation.

Additional conversations with Idahoan staff during spring and summer and fall of 2010 indicate Idahoan prefers to continue with permit reissuance for Dubois facility even though facility is not operating. On September 21, 2010 Idahoan requested that all proposed fields south of the plant be removed from the permit application proposal and new fields, Pivot #313 and Pivot #314, also be removed from permit consideration.

On January 18, 2011 another permit renewal meeting was held and Idahoan requests to add Pivot #313 and Pivot #314 back into the new permit and eliminate fields MU-007502 (pivot #107/316), MU-007503 (pivot #108/317), MU-007510 (corners A, B, E), and MU-007511 (corners C, D, L[also known as 'V']). The current fields requested for land treatment and inclusion in the new permit are as follows and total 1, 462 acres.

The remainder of this staff analysis will be based upon Idahoan's latest request to permit 1,462 acres by removing all fields south of the facility, removing all corners except F, G, and H, and adding new pivots #313 and #314, and largely serves as the basis for the terms and conditions contained in the draft permit.

3. PROCESS AND SITE DESCRIPTIONS

Process:
Idahoan Foods – Dubois is a food processing facility utilized for potato dehydration processes. Wastewater generated by the facility is collected in a sump then alternately pumped using twin pumps on variable speed drives through twin 500 micron self cleaning filters and sent directly to land application for final treatment. Back-flush from the filters is returned to the pump tank. A magnetic flow meter is mounted on the effluent discharge line downstream of the filters to track total volume of wastewater sent to land treatment. Currently all wastewater is treated by slow-rate land application using center pivot irrigation. In years past this facility also used two infiltration ponds for wastewater disposal. The disposal ponds are no longer in service, but are believed to be the primary contributor to perched water conditions at this facility, as discussed later in this analysis.

Operation:
The facility was operated by Blaine Larsen Processing, Inc. dehydration Division (a.k.a. Larsen Farms) from 1975 – 2005. The processing facility was purchased by Idahoan Foods in January 2006 and the land treatment acreage leased from Larsen Farms by Idahoan. According to the lease agreement between Idahoan and Larsen Farms, in general Idahoan leases and is allowed to land apply wastewater to the permitted property owned by Larsen, but Larsen retains the right to continue farming and

operating the same wastewater treatment fields as an agronomic operation provided Larsen Farms' activities do not violate Idahoan's permit requirements.

Idahoan Foods operated the Dubois plant until operations temporarily ceased on October 23, 2009. The facility is currently idle and based on the 2010 Annual Report it appears the wastewater treatment fields are being operated and managed by Larsen Farms for agronomic use. The permitted fields are being irrigated with supplemental irrigation only and all nutrients are provided through supplemental fertilization at this time. In 2010 Larsen Farms applied supplement nitrogen fertilizer at rates exceeding Idahoan Food's permit limit on four of the ten permitted HMU's including MU-007501 (152%) , MU-007502 (167%), MU-007505 (158%) and MU-007506 (179%). The nitrogen loading permit limit is 150% of crop uptake.

Acreage:
As noted in Section 2, Idahoan has modified its request for permitted acreage to 1, 462 acres by removing most corner pivots and all full pivots south of the facility. Fields being removed from the permit will revert from Idahoan Foods control back to the land owner, Larsen Farms, and will continue to be farmed by Larsen for agronomic purposes rather than wastewater treatment. The revised acreage values shown in Table 1 for each field have been updated from the values in the last permit using 2009 NAIP satellite photography for calculation. Both the 'old' field names from the current permit and the 'new' field names proposed for the new permit are shown for reference.

HMU	Old Field Name	New Field Name	Revised Acreage[1]	Irrigation Method	Irrigation Efficiency[2]
7501	Pivot #106	Pivot #315	221	Full Pivot	80%
7505	Pivot #151	Pivot #303	282	Full Pivot	80%
7506	Pivot #152	Pivot #302	226	Full Pivot	80%
7507	Pivot #153	Pivot #301	219	Full Pivot	80%
7508	Pivot #154	Pivot #300	194	Full Pivot	80%
7513	n/a (new)	Pivot #313	120	Full Pivot	80%
7514	n/a (new)	Pivot #314	146	Full Pivot	80%
7521	Corner F	Same	19.5	Corner Pivot	80%
7522	Corner G	Same	17.5	Corner Pivot	80%
7523	Corner H	Same	17.0	Corner Pivot	80%
		Total =	1,462 acres		

Table 1. Proposed Hydraulic Management Units for the new permit LA-000075-04. (1) the Revised acreage listed above and used for this new permit was determined by DEQ using 2009 NAIP imagery and web-based GIS measurements available through the Idaho Department of Water Resources website. (2) An Irrigation Efficiency of 80% will be assigned to all pivots in this permit.

Pivot #313 and #314 are the new fields proposed for addition to the new permit. They are adjacent to the other HMU's and contain similar soils and hydrogeological characteristics as the remaining permitted acreage. Corners F, G, and H are currently combined into a single HMU; however, the fields are physically separated and irrigated independently using different pivots. Staff recommends splitting each corner field out into its own HMU to improve the operation, management, monitoring and compliance tracking for each corner pivot in the new permit.

All pivots contain dual sprinkler packages that must be alternated by the operator (manually turning ball valves on or off at each sprinkler head along the length of the machine) every time the treatment field is cycled between wastewater and supplemental irrigation applications. The supplemental

irrigation sprinkler packages contain pressure regulators at each drop, the wastewater sprinkler packages do not. The permitted fields used for wastewater treatment will continue to be rotated with hay, grain, and potatoes.

Wastewater Volume, Quality, and Estimated Loading:
The site-wide summary of operations on the currently permitted site from 2006 – 2010 is shown in Table 2 for review. Note that the values in Table 2 present general trends that assume uniform loading to the entire 1,675 acre site. Because the fields were not uniformly loaded, these values should not be reviewed for compliance with permit conditions and limits in the current permit.

Year	Permitted Acres	NGS WW (MG)	GS WW (MG)	Annual WW (MG)	N Applied (lb/ac)	N Applied as % Uptake	P Applied (lb/ac)	NVDS Applied (lb/ac)	NGS COD (lb/ac-d)	GS COD (lb/ac-d)
2006	1676.5	160.54	218.01	378.55	289	233	43	1020	21	19
2007	1676.5	152.62	231.23	383.85	323	174	50	1283	22	21
2008	1676.5	189.25	216.27	405.52	286	175	39	1230	19	16
2009	1676.5	168.11	165.89	334.00	189	104	27	1121	20	9
2010	1676.5	0.00	0.00	0.00	196	127	n/a	n/a	0	0

Table 2. Site-Wide Summary, 2006 – 2010. Calculations assume uniform loading across 1,676.5 acres.

Although daily wastewater generation rates remained fairly stead between 0.9 – 1.1 million gallons per day, the wastewater application rates and nitrogen loading rates (wastewater + supplemental fertilizer) generally were not uniform across the permitted acreage as shown in Tables 3-6 and Figure 1, below.

HMU	Field	Current Acres	Non-Growing Season Wastewater Loading (in/ac)							
			2003	2004	2005	2006	2007	2008	2009	2010
7501	Full Pivot 315	212	0.0	3.2	0.0	0.0	0.4	3.8	6.5	0.0
7502	Full Pivot 316	209	0.0	3.1	0.0	0.0	0.0	3.6	0.0	0.0
7503	Full Pivot 317	199	0.0	1.0	0.0	0.0	5.6	3.0	3.3	0.0
7505	Full Pivot 303	290	2.0	3.4	7.9	5.1	4.2	0.9	3.6	0.0
7506	Full Pivot 302	226	0.0	1.4	5.3	8.4	4.1	9.6	5.4	0.0
7507	Full Pivot 301	223	10.3	1.2	0.0	7.8	7.5	10.1	6.6	0.0
7508	Full Pivot 300	188	2.9	2.6	0.0	4.2	1.2	0.0	0.7	0.0
7510	Corner Pivots A,B,E	36.5	0.0	0.0	0.0	0.0	4.2	0.0	0.8	0.0
7511	Corner Pivots C,D,V(L)	44.5	0.0	0.0	0.0	0.0	2.2	0.4	0.4	0.0
7512	Corner Pivots F,G,H	48.5	0.0	0.0	0.0	0.0	3.1	2.3	5.4	0.0

Table 3. Non-Growing Season (NGS) wastewater loading to currently permitted acreage. Values highlighted in yellow exceeded permit limit of 3.99 in/acre. Facility ceased production on October 23, 2009.

HMU	Field	Current Acres	Growing Season Wastewater Loading (in/ac)							
			2003	2004	2005	2006	2007	2008	2009	2010
7501	Full Pivot 315	212	6.1	0.0	11.3	7.4	8.8	16.2	0.8	0.0
7502	Full Pivot 316	209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7503	Full Pivot 317	199	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7505	Full Pivot 303	290	2.1	4.0	2.4	1.9	1.9	2.8	0.0	0.0
7506	Full Pivot 302	226	0.5	3.2	3.4	3.2	4.5	2.8	0.5	0.0
7507	Full Pivot 301	223	1.2	1.3	2.2	7.0	5.8	1.4	1.5	0.0
7508	Full Pivot 300	188	3.5	5.5	6.2	3.0	2.9	3.7	14.8	0.0
7510	Corner Pivots A,B,E	36.5	82.2	45.2	50.3	23.9	33.9	16.0	20.9	0.0
7511	Corner Pivots C,D,V(L)	44.5	1.0	26.9	24.5	25.8	20.5	19.0	17.5	0.0
7512	Corner Pivots F,G,H	48.5	0.0	0.0	0.0	21.0	22.3	13.6	23.8	0.0

Table 4. Growing Season (GS) wastewater loading to currently permitted acreage. Values are for wastewater only and do not include supplemental irrigation water. Note fields 316 and 317 did not receive wastewater during GS. Values highlighted in yellow exceed the irrigation water requirement of the crops grown that year.

HMU	Field	Current Acres	N-Load (lb/ac), Wastewater + Fertilizer							
			2003	2004	2005	2006	2007	2008	2009	2010
7501	Full Pivot 315	212	208	78	302	153	241	444	176	219
7502	Full Pivot 316	209		396	335	335	335	218	60	244
7503	Full Pivot 317	199		358	335	335	231	312	120	187
7505	Full Pivot 303	290	138	231	222	193	239	203	144	223
7506	Full Pivot 302	226	30	176	280	303	326	368	190	260
7507	Full Pivot 301	223	466	158	160	366	361	384	245	226
7508	Full Pivot 300	188	313	332	270	226	192	60	288	
7510	Corner Pivots A,B,E	36.5	2,783	1,584	1,369	526	1,230	453	328	154
7511	Corner Pivots C,D,V(L)	44.5	34	755	655	569	691	46	312	152
7512	Corner Pivots F,G,H	48.5				477	824	426	504	145

Table 5. Total Nitrogen loading to each permitted field. Facility ceased production on October 23, 2009. All nitrogen loading in 2010 is from application of supplemental fertilizer. Blank cells = incomplete information in Annual Report.

HMU	Field	Acres	N-Load (% of Crop Uptake)							
			2003	2004	2005	2006	2007	2008	2009	2010
7501	Full Pivot 315	212			121	57	89	164	107	152
7502	Full Pivot 316	209			166	160	180	146	39	167
7503	Full Pivot 317	199			171	169	151	171	75	92
7505	Full Pivot 303	290			296	333	140	153	101	158
7506	Full Pivot 302	226			275	271	253	208	103	179
7507	Full Pivot 301	223			324	421	164	302	83	140
7508	Full Pivot 300	188			614	228	147	13	92	-
7510	Corner Pivots A,B,E	36.5			300	102	413	378	280	96
7511	Corner Pivots C,D,V(L)	44.5			130	91	231	38	236	65
7512	Corner Pivots F,G,H	48.5			-	189	357	355	417	87

Table 6. Total Nitrogen loading to each field expressed as a % of crop nitrogen uptake. The permitted nitrogen loading limit is 150% of crop uptake. Highlighted values exceeded permit limits. Blank cells indicate data provided by facility in the annual reports was insufficient to calculate loading as a percent of crop uptake. Facility ceased operation on October 23, 2010. All nitrogen loading in 2010 was from supplemental fertilizer.

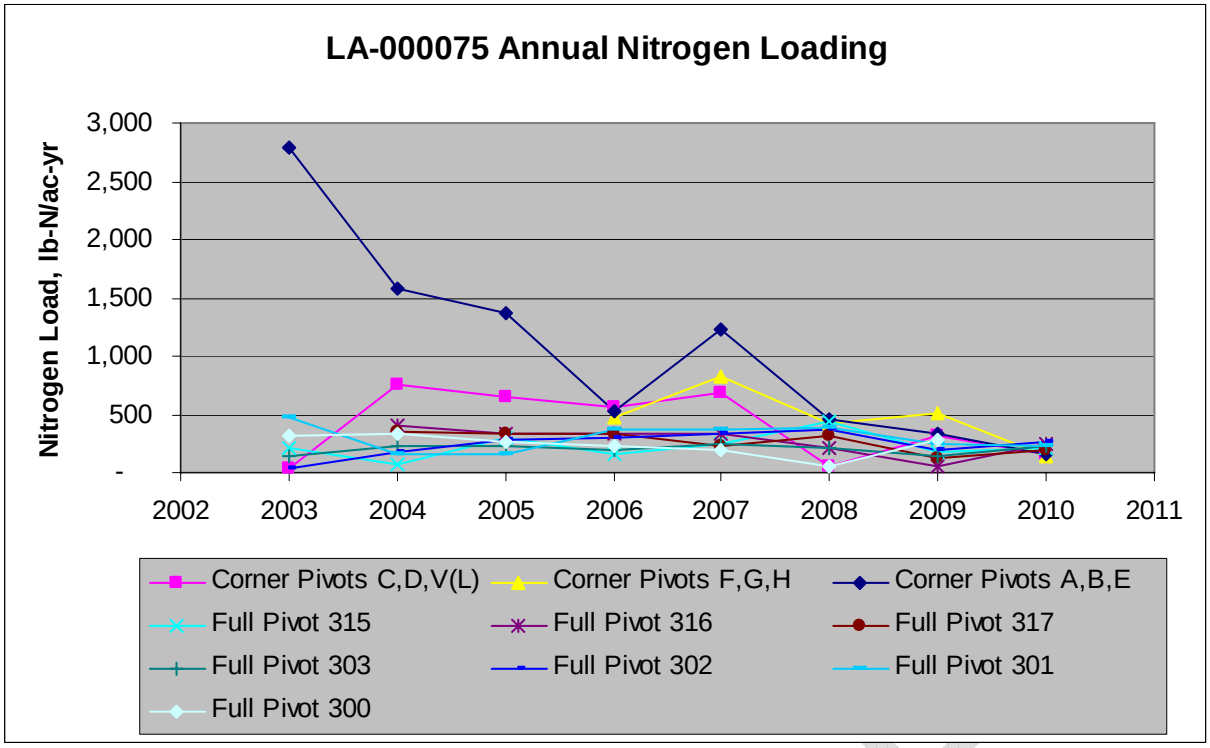

Figure 1. Total Nitrogen Loading to each HMU, lb/ac-yr.

Wastewater generation rates from 2006 – 2009 varied between 0.9 and 1.1 million gallons per day. Average daily wastewater generation during that period was approximately 1.03 MGD, producing on average 155.5 MG during the 151-day Non-Growing Season (April and 220.4 MG during the 214-day Growing Season. Wastewater quality from 2006 – 2009 remained fairly steady and the values presented in Table 7 are for the purposes of this permit renewal and are assumed to apply to future operations if and when the facility reopens.

	pH (s.u.)	Total N (mg/L)	Total P (mg/L)	COD (mg/L)	E.C (umhos/cm)	TDIS (mg/L)
Average	5.0	103	21	3429	1407	612
Std. Deviation	1.0	37	10	1423	600	355

Table 7. Wastewater Quality 2006 – 2009.

The average wastewater generation rate of 1.03 mgd and the average wastewater quality presented in Table 7 result in an estimated average 'site-wide' loading for the new permitted acreage of 1,462 acres as shown in Table 8. It is important to note that Table 8 assumes a theoretically achievable loading rate based upon uniform wastewater loading across the entire 1,462 acres. As discussed below, historical practices at this facility show some fields – especially corner pivots - being heavily overloaded while other fields – primarily Pivots #316 and #317 – are significantly under-utilized. But the site-wide loading shown in Table 3 does present what could be achieved using management and planning techniques that emphasize wastewater treatment.

	WW (MG)	WW (in/ac)	Total N (lb/ac)	Total P (lb/ac)	COD (lb/ac-day)	NVDS/TDIS[2] (lb/ac)
NGS	155.53	3.9	91	19	20	543
GS	220.42	5.6	130	26	20	770
Annual	375.95	9.5	221	45	20	1313

Table 8. Estimated average loading for permit renewal. This estimate assumes all acreage is loaded uniformly across the entire 1, 462 acre site. Non-Volatile Dissolved Solids (NVDS) is a representative term for TDIS.

Soils:
The March 17, 2003 staff analysis for LA-000075-03 classifies soils on the land treatment site as Becreek Braelly Fine Sandy Loam, Becreek Fine Sandy Loam, Matheson-Malm Complex, Wolverine Fine Sands, and Grassy Ridge-Matheson Complex. These soils are described as having a permeability range of 0.91 – 8.87 inches/hour with available water holding capacity of 0.06 – 0.13 inch/inch with an average AWC of 4.57 inches across the site.

The May 23, 2008 permit application states that an onsite soil survey was completed in 1993 and as part of this permit renewal, Idahoan Foods' consultant performed another soil survey to include new pivots #313 and #314. The new soil survey states there are 3 distinct soil units under the permitted area that they've classified as Soils A, B, and C. According to the soil survey information in the permit application, the site is generally comprised of sandy and silty loams. Soil Unit A and Soil Unit B contain 30% - 70% gravel below approximately 2 feet. Soil Unit C contains loam soils down to a depth of 5 feet. Data provided in Appendix E of the application show that 86% of the 1,462 acres included in this permit renewal consist of the more permeable Soil Units A and B. Only 14% of the proposed acreage consists of the loam Soil Unit C. The weighted average AWC for the revised 1,462 acres, using data presented in the permit application soil survey, is 9.7 inches.

Hydrogeology and Ground Water Quality:
The site is on the Eastern Snake River Plain Aquifer. The regional aquifer ranges between 130 – 230 feet below ground surface and generally flows south to southwest. The hydraulic gradient of the regional aquifer is very flat. Water level data from 2007 – 2009 show a gradient of 0.00005 – 0.00009 ft/ft with consistent flow toward the southwest with aquifer elevations generally varying by less than 0.5 ft across the site. In July 2010 the monitoring well casing elevations were 'checked' (not surveyed) by Larsen Farms using a GPS with RTK (Real Time Kinematics) base-station system. The gps manufacturer advertises a maximum achievable *horizontal* accuracy of +/- 1 inch is possible under perfect conditions. Vertical accuracy is not specified in the manufacturer's literature, nor was the actual vertical accuracy determined or provided with the results. Generally, the vertical accuracy of a RTK GPS system is 2-3 times *less* accurate than horizontal measurements and is also directly affected by the distance between the based station and the portable instrument. The gps wellhead measurements were not anchored to a known benchmark for comparison, the distance between the RTK base station and wellheads wasn't reported, and the vertical accuracy calculations and results were not provided so the actual elevation accuracy is unknown at this time. It is possible the reported well elevations may have a limited accuracy of +/- 2-3 inches which is significant considering the flat gradient at this facility is less than 6 inches total across the site. The monitoring wells should be resurveyed by a licensed surveyor upon completion of the other monitoring well refurbishment and construction activities to ensure wellhead elevations are surveyed to a confirmed accuracy appropriate for the ground water conditions at this site. It appears a second order, category 1 or 2 survey may be

necessary to achieve the vertical accuracy needed for the monitoring wells at this facility.

As shown in Figure 2 below, the down-gradient regional aquifer monitoring wells GW-007501, GW-007502, GW-007503, and GW-007507 show significant impacts for nitrate nitrogen. Wells 7501, -02, and -03 are all generally down gradient of the historically overloaded pivot corners A, B, C, D, E, and L and historically underutilized pivots #316 and #317 which are quite sandy fields generally used by Larsen Farms for agronomic purposes and fertilized with supplemental fertilizer rather than wastewater. Coincidentally these are the same fields that Idahoan has requested dropping from the new permit because 1) the corners were historically overloaded, and 2) pivots 316 and 317 were rarely ever used for wastewater treatment and instead used by Larsen Farms for agronomic purposes. Pivots 313 and 314 are being added to Idahoan's permit in exchange for Idahoan ceding control of pivots 316 and 317 back to Larsen Farms for Larsen's own agronomic use.

A Ground Water Investigation Report and was submitted as part of the current permit LA-000075-03. DEQ's review of the Report and the facility's Water Quality Improvement Plan is included in Appendix 2 of this Staff Analysis. DEQ's review indicates the Investigation Report is missing critical information to support the facility's conclusions regarding the cause of the impacts. Also, it is unclear if the facility's plan to load the site more uniformly has been implemented, or if it's effective, since ground water nitrate concentrations continue to climb in some wells as shown in Figure 2, below. Prior to re-starting production at this facility, staff recommends the permittee submit a water quality improvement plan that accurately indentifies the causes of the ground water contamination and provides specific actions the permittee will implement to reduce nitrate concentrations to comply with the Ground Water Quality Rule requirements.

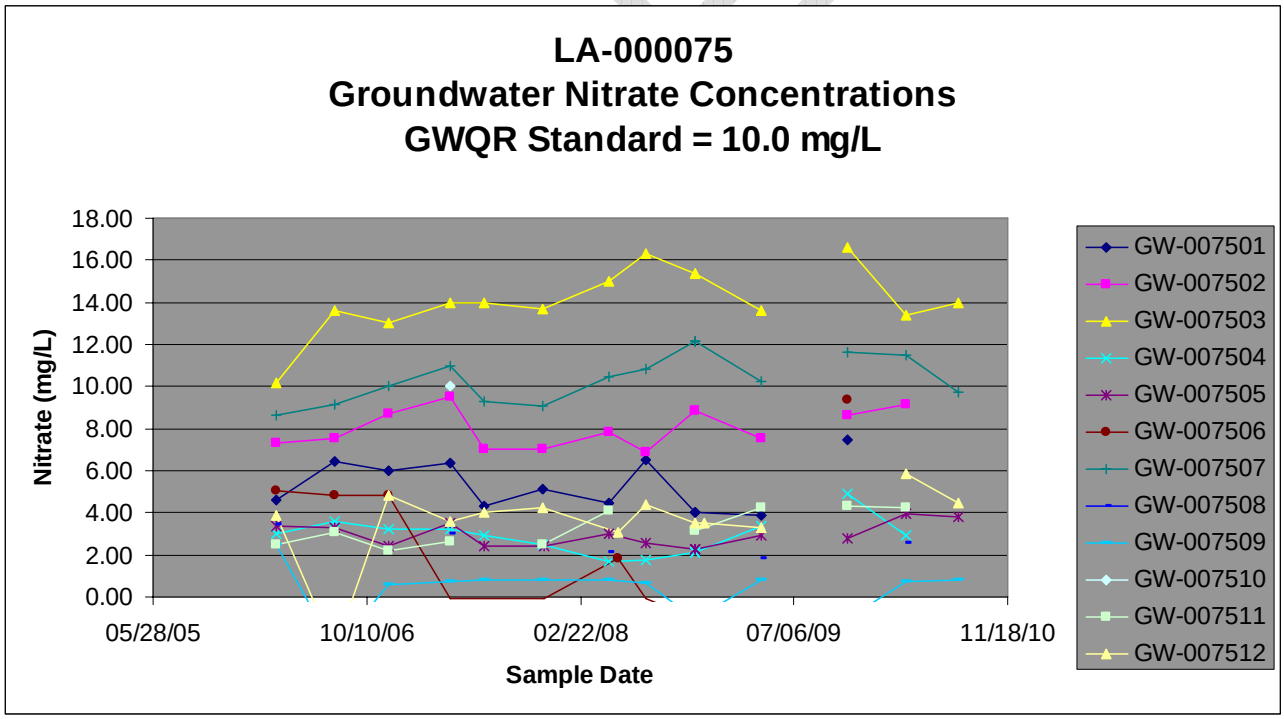

Figure 2. Monitoring well nitrate concentrations at Idahoan Foods – Dubois.

Although ground water nitrate concentrations continue to increase in some wells, Figure 3 shows that

with the exception of perched well GW-007506 (known to be impacted by wastewater disposal in the old ponds), ground water TDS levels have remain fairly steady.

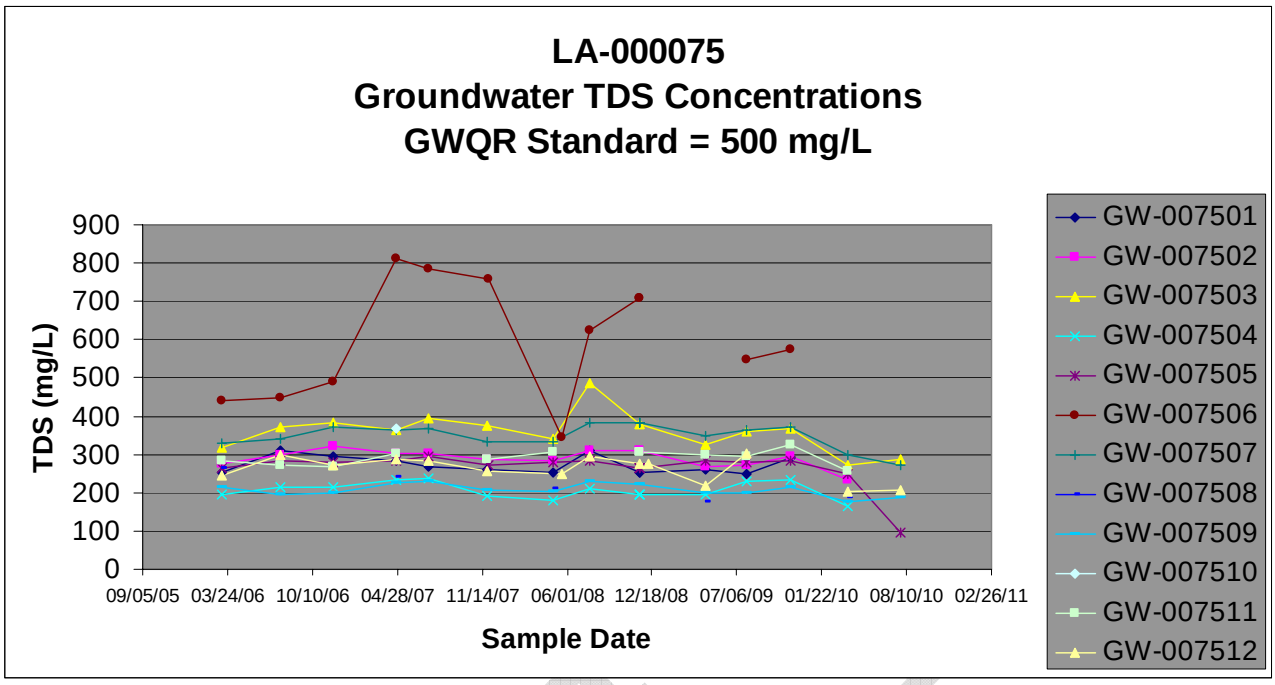

Figure 3. Monitoring Well TDS concentrations at Idahoan Foods – Dubois.

Although the historically heavily overloaded corners will no longer receive wastewater, these corners and pivots 316 and 317 will revert to Larsen Farms for agronomic purposes with no permitted restrictions or controls on nitrogen loading. Data provided in Annual Reports indicates these sandy-soiled fields may likely continue to receive supplemental nitrogen fertilizer applications at rates that exceed levels that DEQ would permit for wastewater treatment. Because the department still considers wastewater application practices to have cause ground water degradation at the site – including the fields proposed for removal from the new permit – staff recommends that the Water Quality Improvement Plan address ground water quality under these fields too. Staff also recommends all monitoring wells continue to be sampled through the next permit cycle to track changes in ground water quality under all fields historically permitted and/or used for wastewater treatment. During the temporary cessation, wells may be monitored once per year in October. Upon re-starting production and wastewater generation at the facility, ground water monitoring will revert to 3 times per year.

Perched water has been present at GW-007506 and shows significant impacts for iron, manganese and TDS. This well has also shown consistently low nitrates and sporadically high COD levels which is indicative of wastewater impacts. The location of perched monitoring well GW-07506 is also generally down gradient of the old disposal ponds. The last 3 monitoring events show GW-07506 has been dry since discontinuing use of the ponds, providing evidence that the impacted perched water may likely be caused by historical wastewater discharges to the leaky ponds. Use of the ponds has ceased and perched water is dissipating and not expected to return in GW-007506 as long as the old disposal ponds are permanently removed from service (no wastewater or irrigation water storage in the ponds). Staff recommends GW-007506 continued to be monitored in the new permit cycle to provide confirmation. To prevent additional hydraulic head from pushing any more nitrogen into the ground

water underneath these ponds, staff recommends the unpermitted disposal ponds be deconstructed and permanently destroyed and leveled to prevent any further use as either wastewater ponds or irrigation storage ponds.

Of the twelve monitoring wells currently in use, 1 is the public water supply for the plant (GW-007512), 4 surround the fields south of the plant and are proposed for removal from the permit (GW-007501, -02, -03, and -04), 1 is a perched well (GW-007506) expected to remain dry, leaving six monitoring wells surrounding the 1, 462 acres. Of these six remaining wells, 2 are consistently dry (GW-007508 and GW-007510) and in need of refurbishment or replacement, as discussed in Section 4.1. The addition of Pivots #313 and #314 will require the installation of a new up-gradient monitoring well to monitor potential ground water impacts from wastewater application to these fields. There is a feedlot along the northeast boundary of Pivot #313 and a surface water sink from Camas Creek approximately ¼-mile northeast of Pivot #314. Both could contribute positively or negatively to the up-gradient water quality of the site. Staff recommends this new monitoring well be installed prior to re-starting production and wastewater generation at this facility. DEQ must review and approve the plans and specifications prior to construction of this new well.

Surface Water:
Streams near the site are Beaver Creek and Camas Creek. Beaver Creek runs on the north and west sides of the site and is approximately 450 ft away and across 3 roadways (Old Highway 91 and both sides of Interstate 15). Surface runoff from the wastewater treatment fields to Beaver Creek is not possible. Beaver Creek is an intermittent stream that is generally dewatered for agricultural purposes and a 'losing stream' along this reach, so wastewater activities do not have the potential to impact Beaver Creek at this location.

Camas Creek is located approximately 1-mile up- and side-gradient of the permitted acreage, east and southeast of the site. Because wastewater activities are either up- or side-gradient, impacts to Camas Creek are not expected.

Public Water Supplies:
The facility's production well is identified as a public water supply (PWS # 7170013). This well is also sampled as part of the permitted monitoring well network. Blaine Larsen Farms Beaver Creek Ranch (PWS # 7170001) is the nearest off-site public water supply and is located approximately 1-mile down-gradient from wastewater land application field MU-007505 (Pivot #303). Both of these wells exhibit nitrate concentrations in the 3 – 5 mg/L range, although Beaver Creek Ranch nitrate concentrations continue to trend upward. Both PWS systems are regulated by Eastern Idaho Public Health District.

4. PERMITTING DISCUSSION

The following sections outline changes made to the terms of the draft renewal permit, based on changes requested by the permittee, evaluations of past performance with previous permit requirements, and/or updates required by changes to the *Recycled Water Rules* or any other applicable regulatory standards. Terms and conditions that are unchanged from the previous permit and remain applicable to the facility are not addressed in this document.

4.1 Compliance Schedule for Required Activities – Section E

Because this facility is temporarily not operating, wastewater is not being generated or applied to the land treatment fields. Non-Growing Season hydraulic applications are no longer occurring. And total nitrogen loading rates (wastewater + fertilizer) currently consist only of fertilizer applications at rates common for agricultural practices in this area. Therefore, staff have created the compliance schedule in a manner that requires quick completion of some tasks deemed critical during the temporary cessation, and deferment of the remaining tasks until such time as the facility begins preparations to re-start production and wastewater generation.

1. Monitoring Well GW-007504 access agreement: The up-gradient monitoring well GW-007504 is located northeast of Pivot #316. Corner Pivot E was constructed at a later date and is located over the top of GW-007504. Although Corner E is currently permitted by Idahoan, Larsen Farms operated this pivot in 2010 and Idahoan staff chose not to enter this field to collect the required ground water sample in July 2010 to avoid disturbing Larsen's crop. GW-007504 is an up-gradient well evaluated in conjunction with the heavily impacted down gradient wells GW-007502 and GW-007503 and will need to continue to be monitored during the new permit cycle. However, Corner E is reverting to Larsen Farms and will no longer be a permitted field under Idahoan's control, yet Idahoan will be required to enter this field to collect ground water samples during the Growing Season. Staff recommends that Idahoan present evidence of a legal contract or agreement with Larsen Farms that provides Idahoan personnel and equipment access to GW-007504 at any time to collect samples. Some crop damage is expected if Larsen Farms does not provide a dedicated vehicle access route to the well. This access agreement should be submitted to DEQ within 30-days of permit issuance. If an agreement cannot be reached between the permittee and the Larsen Farms, then a new replacement well needs to be constructed on property owned or controlled by Idahoan Foods as a replacement and GW-007504 should be properly abandoned in accordance with Idaho Department of Water Resources rules.

2. Disconnect Wastewater Mainline at Plant: The processing facility is currently not being operated by Idahoan foods, and the permitted fields are being managed by Larsen Farms. Staff recommends the wastewater mainline exiting the plant be disconnected and capped off on the exterior of the building for quick, visible confirmation by DEQ during drive-by inspections that waste products are not being pumped from the facility to the permitted fields. This cap can be constructed for simple re-connection if and when the facility begins production at some point in the future. Staff recommends this compliance activity be completed within thirty days of permit issuance.

3. Disposal Pond Closure: The two wastewater disposal ponds located in the northwest corner of MU-007501 (Pivot #315) are not authorized for wastewater disposal. Inspections indicate the unauthorized ponds have been used for wastewater disposal and data indicate the ponds may be a contributor to perched water impacts in monitoring well GW-007506. Staff recommends that the two disposal ponds be permanently remove through disconnection and/or removal of piping connections between the disposal ponds and the wastewater distribution system (perhaps already completed), demolition of the berms, and 'leveling' of the site to prevent any future use, storage, or disposal in the ponds. This D&D

activity will help to naturally attenuate any nutrient buildup in the soils under the ponds, and future cropping of the leveled site will also speed up the mitigation and recovery of any high soil nitrate concentrations that may be present at this location. Similar mitigation has occurred at another unpermitted facility where a feedlot was removed from service. At that facility soil nitrate levels (and ground water nitrate impacts) has been significantly reduced. Similar results would be expected at this facility. Staff recommends pond closure be completed by October 31, 2011 to help mitigate ground water impacts at this facility.

4. Refurbish Wells: Up-gradient monitoring well GW-007508 and down-gradient monitoring well GW-007510 have been consistently dry for most sampling events since March 2006. Staff recommends these wells be deepened and re-screened or replaced to ensure representative ground water will be available for collection and sampling year round. The refurbished wells should be completed and ready for use by March 31, 2012.

5. Well Elevation Survey: As discussed in Section 3 of this Staff Analysis, the vertical accuracy of the gps well elevations determined in 2010 was not calculated or determined and does not appear to be accurate enough for the flat gradient aquifer at this location. A new well elevation survey should be completed by a licensed surveyor within 30-days after completion of the refurbished wells discussed above. The survey should be completed by April 30, 2012.

The remaining compliance activities are primarily related to, and affected by, wastewater land application practices. Therefore, these remaining activities have been deferred for completion at a later time, either 60-days or 30-days prior to facility startup:

6. Notification of Return to Operations: Staff recommends the permittee provide written notice to DEQ of the intent to restart operations 90-days prior to the anticipated startup date. This will help the transition to the full suite of monitoring and help track the completion of the remaining compliance activities that are due either 60- or 30-days prior to startup.

7. Disconnect Pipelines from Unpermitted Fields: To ensure that the permittee has complete control of the wastewater and supplemental irrigation systems used to treat wastewater on the permitted fields, and to prevent the unauthorized land application of wastewater on fields no longer permitted, staff recommends all wastewater and supplemental irrigation pipelines serving unpermitted acreage be physically removed or permanently disconnected prior to restarting production at this facility. This will isolate the wastewater treatment unit processes (wastewater and supplemental irrigation) to only those fields under the control of the permittee to ensure permit compliance. Staff recommends the pipeline disconnects be completed at least 60 days prior to startup of the facility.

8. Install New Monitoring Well: To determine the ambient up-gradient ground water quality above the new fields (Pivots #313 and 314), staff recommends a new monitoring well be installed up-gradient of these two fields prior to restarting production and land application. There is a feedlot adjacent to the northern boundary of Pivot #313 and a surface water seep from Camas Creek approximately ¼-mile east of the pivots in the non-production sagebrush ground east of these pivots. The new monitoring well must be positioned to

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determine ambient ground water quality that is not impacted by the feedlot operations. Staff recommends the pipeline disconnects be completed at least 60 days prior to startup of the facility.

9. Install Flow Meters on Pivots: Annual Report data from 2003 – 2010 has been difficult confirm the actual flows to each HMU. To improve the effectiveness of monitoring and reporting all wastewater and supplemental irrigation water applications to each field for permit compliance, staff recommends that a flow meter be installed on each pivot within each HMU. During the current temporary cessation period the land owner (Larsen) will be using the permitted fields for agronomic practices only (no NGS hydraulic loading), wastewater will not be applied, and over-irrigation during the growing season is not expected as it would be a detriment to the agronomic operations. Staff is not concerned about irrigation rates exceeding Irrigation Water Requirements until wastewater generation begins again upon re-starting production in the facility. Staff recommends installation of the meters at least 60 days prior to startup of the facility.

10. Install Flow Meters on Supplemental Irrigation Diversions: Five supplemental irrigation wells will be used to provide supplemental irrigation to the ten HMU's in the draft permit. In order to document the total volume of irrigation water extracted from these wells and applied to the permitted fields, staff recommends a flow meter be installed at each irrigation well. For the same reasons expressed in #8 above regarding flow meters on the pivots, staff recommends installation of the meters on the irrigation diversions (wells) at least 60 days prior to startup of the facility.

11. Backflow Assembly Installation: Appropriate backflow assemblies should be installed at all supplemental irrigation diversions connected to the wastewater distribution system. Wastewater is not currently being generated by the facility, another compliance activity requires disconnection of the wastewater line at the plant to prevent transfer of wastewater to the fields during the shutdown, so cross-connections are not an immediate concern. Therefore, staff recommends installation and certified testing of the assemblies be completed at least 60 days startup of the facility or any wastewater distribution through the system.

12. Water Quality Improvement Plan: Ground water impacts are present. The facility submitted a Ground Water Investigation Report in 2006 that suspected a nearby septic tank system and agricultural practices contributed to the ground water impacts. However, the investigative report did not identify or confirm the sources of contamination or the ambient ground water quality. Additionally, the Water Quality Improvement Plan did not specifically indentify the processes and procedures that would be implemented to improve ground water quality under the land treatment site. DEQ's review of the 2006 report is included in Appendix 2 of this Staff Analysis. Staff recommends that a Water Quality Improvement Plan be submitted that specifically identifies the source(s) of contamination between the up-gradient and down-gradient wells of the land treatment site, and identifies the actions, procedures, and schedule for bringing ground water quality into compliance with the Ground Water Quality Rule, IDAPA 58.01.11. Ground water constituents that need to be addressed include nitrate, total dissolved solids, iron, and manganese. Because of the facility's temporary cessation, NGS hydraulic applications are not occurring, and

nutrient loading rates consist only of supplemental fertilizer at agronomic rates, staff believes ground water improvements are expected during the current cessation period. The water quality improvement plan should be designed and prepared just prior to return to production to ensure that it accurately represents the water quality conditions at that time. This plan should be submitted at least 60 days prior to startup of the facility.

13. Plan of Operation: Current practices are adequate for the limited monitoring and reporting recommended during the current shutdown period. However, equipment, processes, personnel, water quality, and other factors have the potential to change prior to re-starting production at this facility which would require further changes and corrections to any Plan of Operation we require soon after permit issuance. So staff recommends and updated Plan of Operation be deferred until at least 60 days prior to startup of the facility to incorporate the actual conditions and operations that will be in place at that time.

14. Pre-Startup Inspection: The facility is currently shut down, equipment may have been (and could be) altered or removed from the facility which could affect the wastewater treatment processes known to exist at this time. And the permitted wastewater treatment fields, pumps, and irrigation equipment are currently being operated, managed, and have the potential to be altered by an unpermitted entity (Larsen Farms). Therefore, staff recommends that a pre-startup inspection be performed at least 30-days before this facility starts production to inspect and confirm the unit operations that will be in place at that time.

4.2 Permit Limits and Conditions – Section F

During Temporary Cessation: The permitted nitrogen loading limit has been modified to state nitrogen fertilizer shall be applied in substantial accordance with agricultural fertilizer Best Management Practices that maximize ground water protection and improve (reduce) ground water nitrate concentrations in impacted areas. All other limits and conditions remain unchanged and are applicable to the temporary cessation period.

Upon Startup: Permit loading limits and conditions remain unchanged in the new permit. Nitrogen loading is 150% of crop uptake. COD loading is seasonal average 50 lb/ac-day. No TDS loading limits are specified due to steady ground water TDS concentrations. Growing Season hydraulic loading is maintained at the Irrigation Water Requirement (IWR) using an 80% efficiency for all pivots. The permit renewal application provided on-site soil testing results that identify an available water capacity (AWC) of 8.7 in/ac – much greater than previously estimated – resulting in a proposed Non-Growing Season Hydraulic Loading rate of 8.7 inches/acre, more than double the currently permitted limit of 3.99 in/ac. Due to the sandy to gravelly nature of the soils and the presence of ground water contamination (including increasing ground water nitrate concentrations in some down gradient wells), staff does not recommend increasing the NGS hydraulic loading rate. Thus the new permit specifies essentially the same NGS loading rate as the previous permit of 4.0 inches/acre. This limit allows a total NGS hydraulic application of 158.8 million gallons on 1,462 acres.

Buffer zones, fencing and posting, runoff, waste solids, odor, wellhead protection, grazing and construction plan conditions remain the same. New conditions include the requirement for quality assurance/quality control approval and the requirement to install, test, and maintain backflow prevention devices at all cross connections with the wastewater distribution system. All of these topics

should be addressed and included as 'chapters' or 'sections' within the updated Plan of Operation required by Section E. Compliance Activities.

4.3 Monitoring and Reporting – Sections G & H

During Temporary Cessation: The monitoring and reporting requirements during the temporary cessation have been simplified to accommodate the lack of wastewater generation and NGS loading at this facility. Monitoring during the temporary cessation has been reduced to ground water monitoring and mapping once per year, tracking crop yields and fertilization rates, and supplemental irrigation application rates. These parameters provide adequate information regarding the land owner's operation of the permitted fields during the shutdown period, and ground water quality will continue to be tracked to see if the reduced loading (lack of wastewater) and agricultural BMP's are mitigating ground water impacts as anticipated.

Upon Startup: Upon startup of the facility, the full suite of monitoring and reporting requirements will begin to track the treatment operations for compliance with permit limits and conditions. The full monitoring and reporting requirements in the new permit remain essentially unchanged from the previous permit. Generally, the facility is required to monitor the volumes of wastewater and supplemental irrigation water applied on the land application site on a daily basis, while wastewater compliance sampling is required on a monthly basis each month effluent is being applied to the site. Wastewater monitoring parameters from the previous permit have been carried over into the draft renewal permit with the only change being the discontinuation of quarterly TDIS monitoring in favor of the simpler and more effective monthly TDS, VDS, NVDS monitoring and the removal of the daily temperature and field condition reporting during the NGS. The permittee will continue monitoring ground water three times per year in the dedicated monitoring wells. Soil monitoring twice per year will be continued in the new permit as well. The facility is also required to conduct flow calibrations in the first year of the new permit and then when changes occur to the pipeline or processes that could affect the accuracy of the meters. The permit language was modified slightly to clarify that the intent is (and always has been) to determine the installed accuracy of the meters and not to submit bench-test calibration results from the manufacturer. Other monitoring requirements listed in Section G include estimating the monthly irrigation water requirement of each crop, tracking individual crop yields and nutrient uptake rates; monthly, seasonal, and annual hydraulic loading rates, and annual nutrient loading rates.

The permittee is also required to continue submitting an annual report that includes 1) all monitoring conducted under the terms of the permit, 2) the status of compliance activities required by the permit, and 3) an interpretive discussion of the monitoring data with particular respect to any potential environmental impacts. The annual report is due by January 31st of each year, and should address operations conducted from November 1st through October 31st of the preceding land application year.

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5. RECOMMENDATIONS

Based on review of applicable state rules, staff recommends that DEQ issue draft Wastewater Reuse Permit No. LA-000075-04 for a public review and comment period. The draft permit contains effluent quality requirements for the wastewater treatment system, as well as terms and conditions required for operation of the reuse system. Monitoring and reporting requirements to evaluate system performance and to determine permit compliance have been specified, and compliance activities have been incorporated into Section 4 of the permit.

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Appendix 1
Site Maps

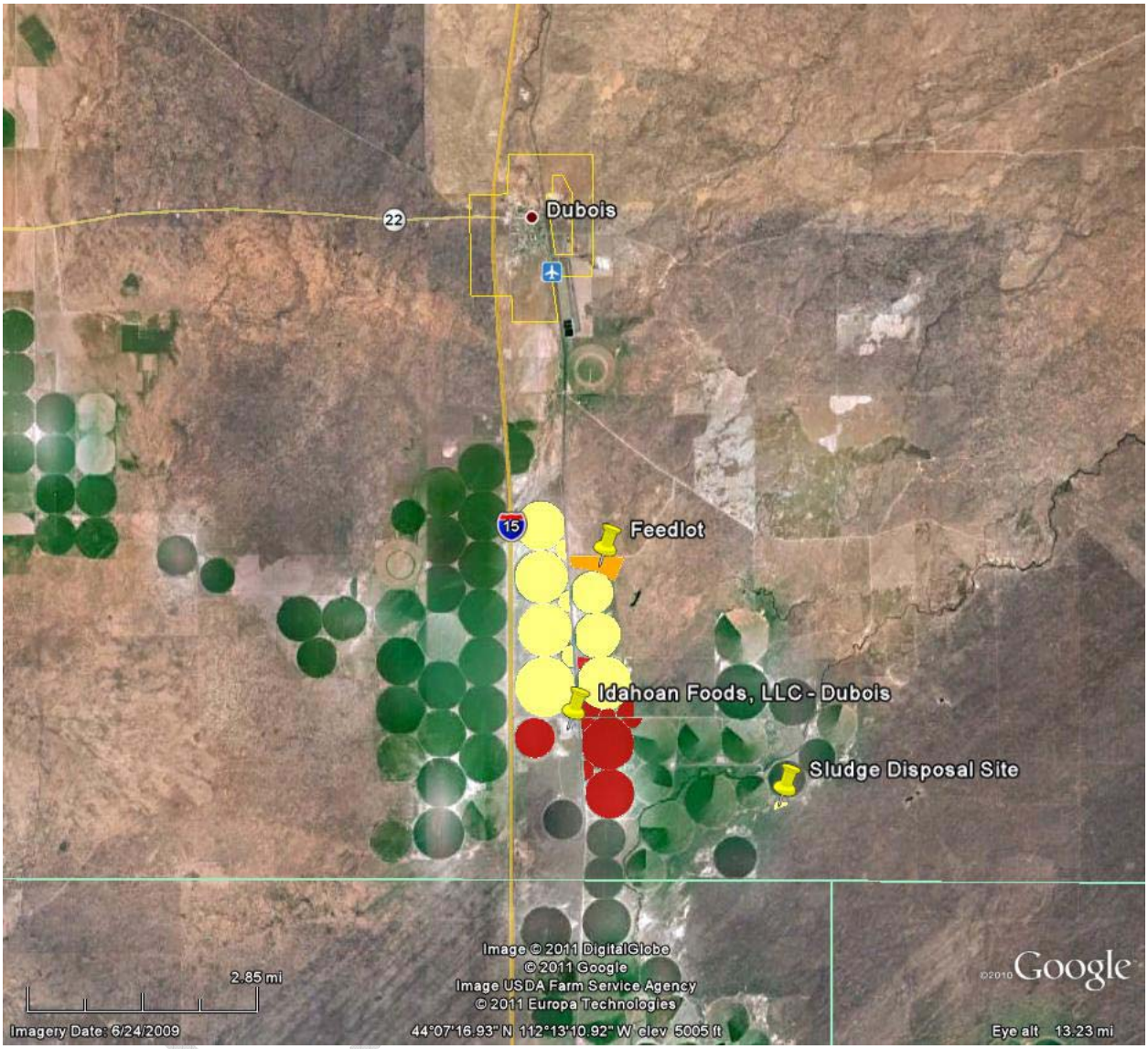

Figure 4. General Location of Idahoan Foods – Dubois, LA-000075. Yellow Fields are proposed for new permit LA-000075-04. Red Fields are currently permitted under LA-000075-3 and are proposed for removal from the new permit. Red fields will revert from Idahoan Foods control back to the land owner Larsen Farms for Larsen's agronomic purposes.

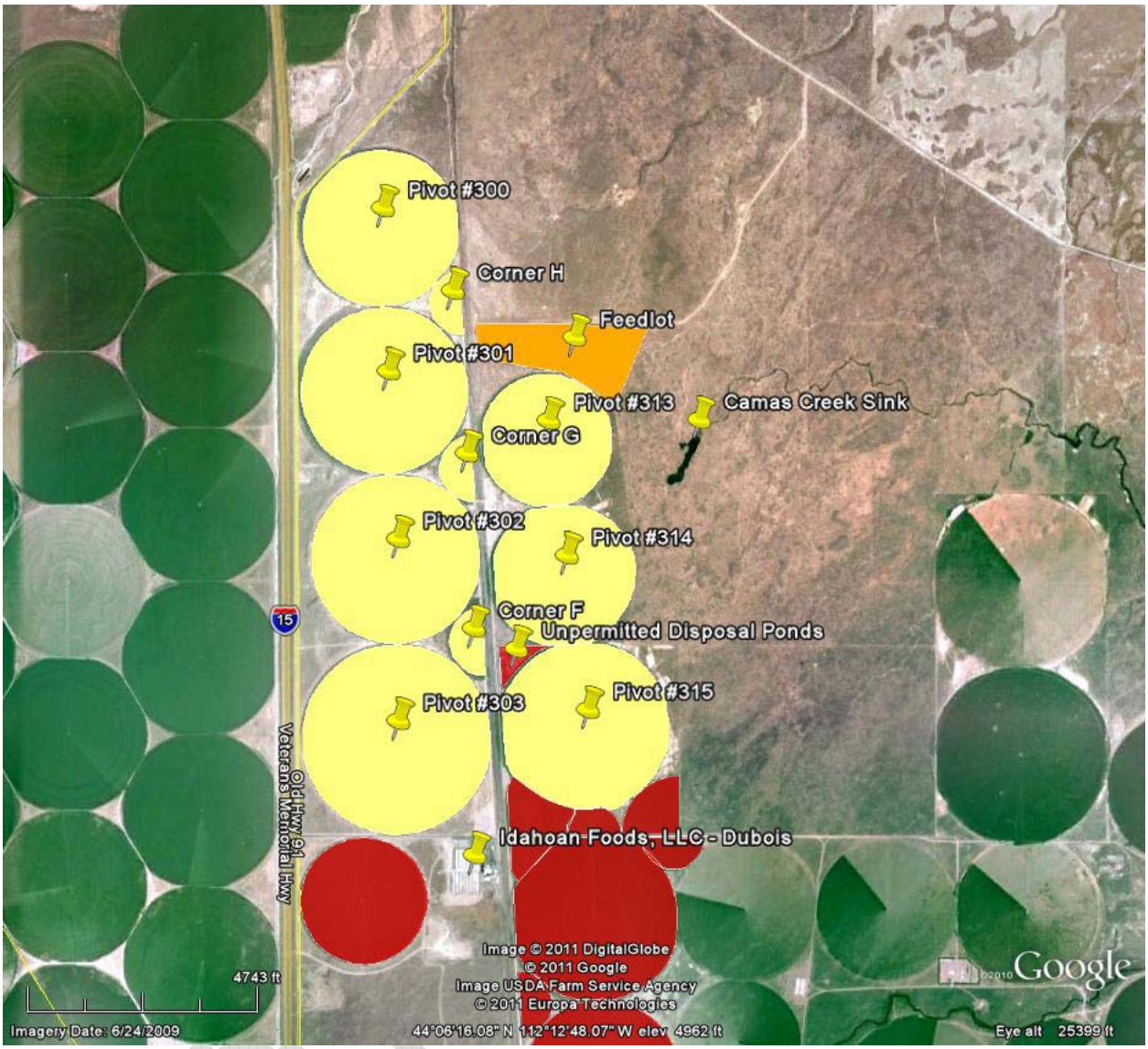

Figure 5. Idahoan Foods – Dubois, LA-000075-04. Yellow Fields will be permitted. Red fields will be removed from new permit (not permitted). Ground Water generally flows south-southwest.

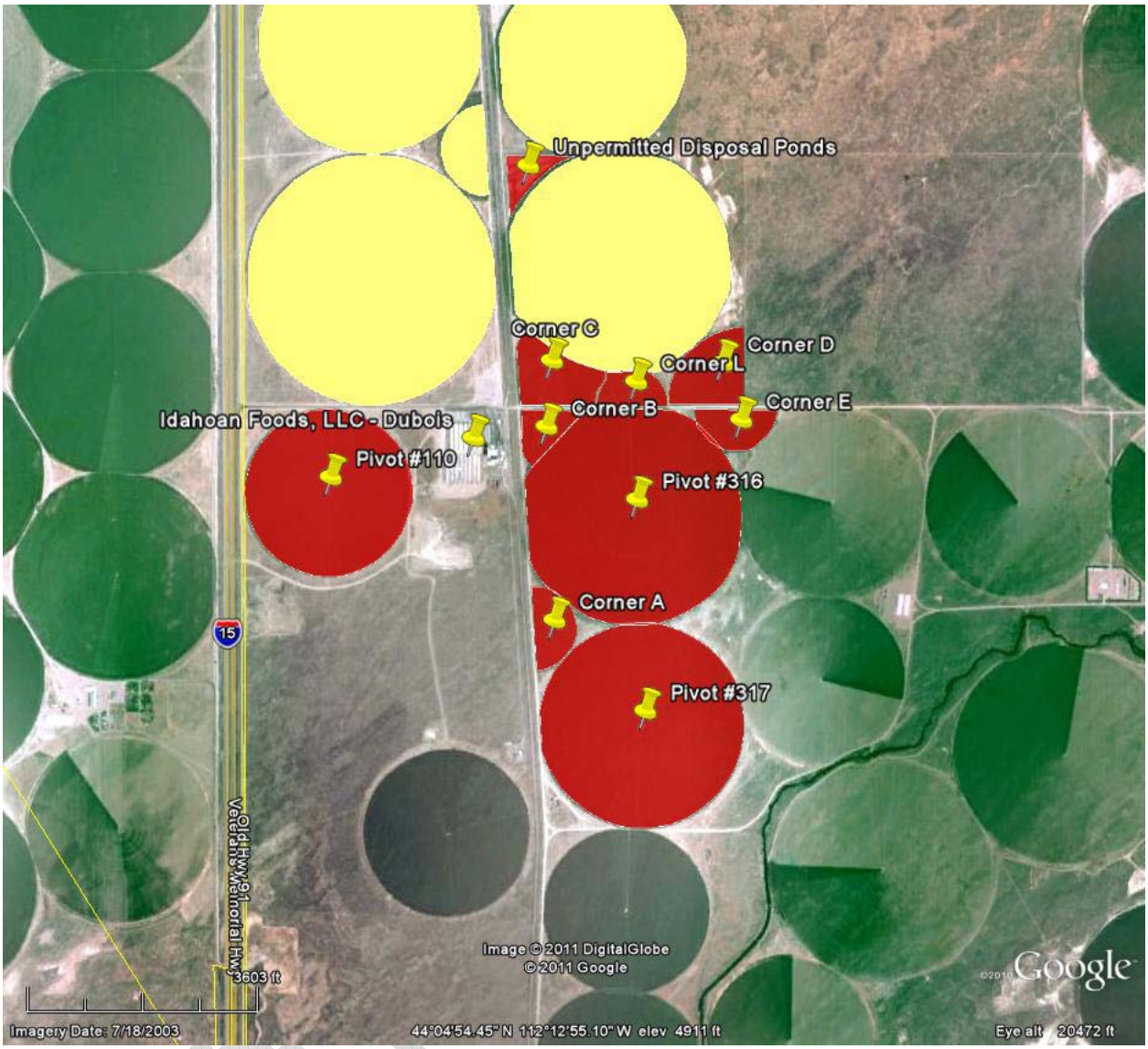

Figure 6. Idahoan Foods – Dubois, LA-000075-04. Red Fields – with the exception of Pivot #110 – are removed from new permit and will revert to Larsen Farms control for agronomic purposes. Pivot #110 has never been permitted for wastewater land treatment.

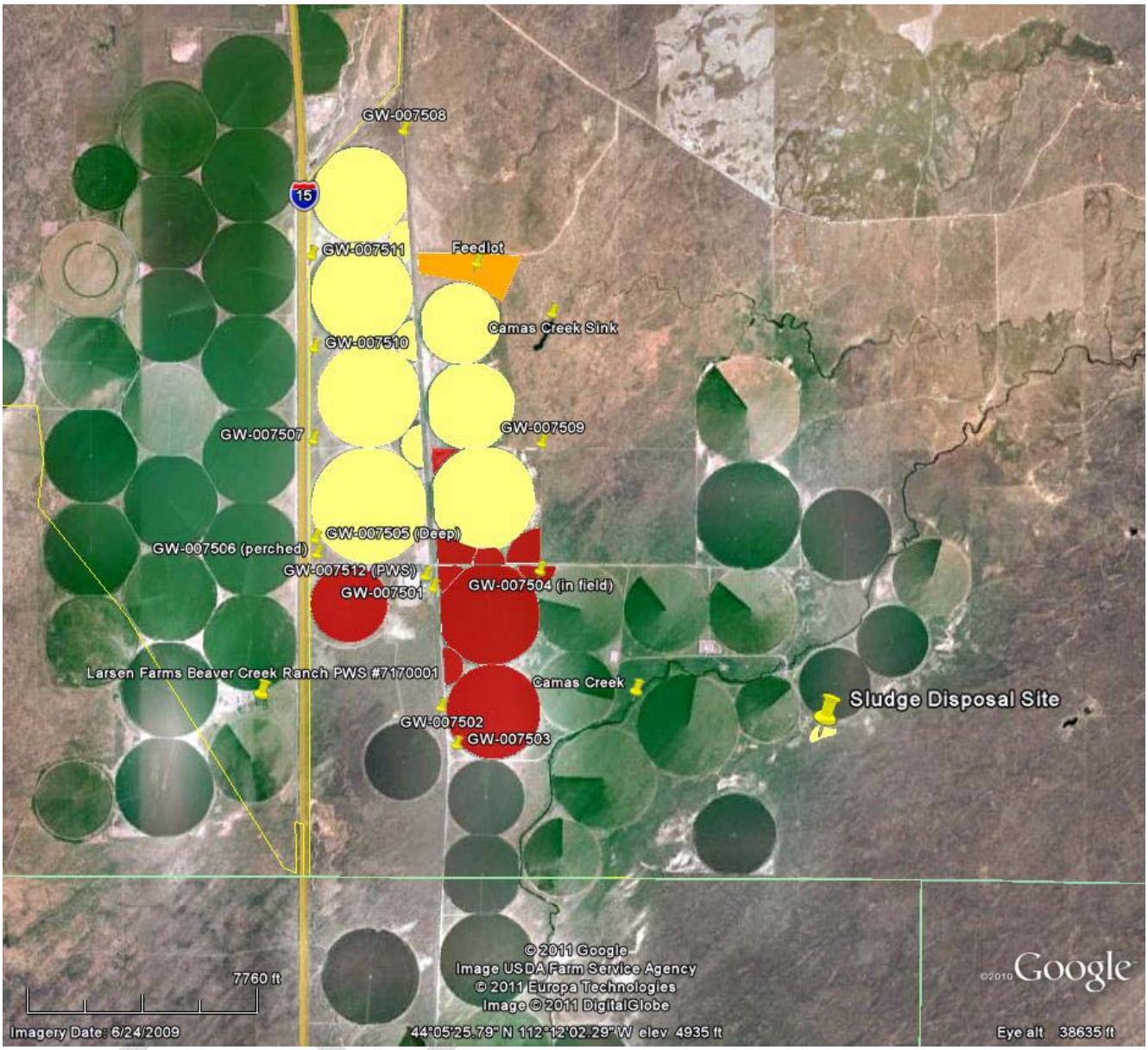

Figure 7. Idahoan Foods – Dubois, LA-000075-04. Monitoring Well Locations. Well Locations shown here are approximate.

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Appendix 2
Ground Water Investigation Report Review

February 16, 2009

M E M O R A N D U M

TO: Xin D. Chen, Technical Services

FROM: Joe Baldwin, Technical Services

SUBJECT: **RDO Processing LLC,**
Wastewater Land Application Permit LA-000075-03, Compliance Activity CA-075-03 - Ground Water Investigation Report

I have reviewed the above report and have the following comments:

Background

The original Ground Water Investigation Report (GWIR), dated September 30, 2004 (CA-075-03a) and the June 25, 2004 Water Quality Improvement Plan was reviewed by Kathryn (Dallas) Elliott, DEQ Technical Services (TS). Comments were transmitted to the permit holder in a letter dated May 24, 2006 from Tom Rackow, Idaho Falls Regional Office. The GWIR was disapproved because the TS review concluded that wastewater land application activities had caused ground water degradation at the site, the extent of degraded ground water was modeled incorrectly because denitrification was specified in the model without supporting information, and a well possibly impacted by site operations were used to determine ambient ground water quality conditions.

The Water Quality Improvement Plan (CA-075-03b) also was reviewed and was determined to be incomplete because of a lack of a detailed remediation plan for ground water improvement. The review recommended that a more detailed remediation plan along with specific time frames be provided.

It was also noted that the facility should sample the Beaver Creek Ranch Public Water Supply system well, located down gradient of the site, for nitrate and TDS or that nitrate data from District 7 Health Department records should be reviewed to monitor for impacts from wastewater land application. This PWS well is located about 1.1 mile southwest of one pivot and about 1.3 miles west of other pivots where wastewater is applied.

Resubmitted reports

The current report was stamped by a P.E. on October 31, 2006, so this version is over two years old. The report contains 7 maps showing the potentiometric surface around the site from December 3, 2002 through July 26, 2006. No water chemistry data were included in the report, so water quality conditions in 2006 can't be evaluated, nor can present-day water quality conditions be evaluated. However, the report still maintains that the RDO land application practices have not degraded ground water, and contends that up gradient agricultural practices or an undersized septic tank may have caused elevated nitrate and TDS in ground water. Information to support this contention is not presented, so the Department still considers wastewater application practices to have caused ground water degradation at the site. Ambient ground water quality conditions were not addressed in the October 31, 2006 report.

Water Quality Improvement Plan

Four approaches are listed to improve ground water quality:

1. Uniform nitrogen application
2. Uniform hydraulic loading
3. Primary clarification

4. Land expansion

The report indicates that uniform nutrient and hydraulic loading would be implemented by the 2007-2008 growing season. It is unknown if uniform nutrient loading and hydraulic loading was implemented. If the suggestions were implemented the effects can't be evaluated without water chemistry data.

Ground Water Flow Direction

The RDO site is located in the Mud Lake barrier area of the Eastern Snake Plain aquifer where the slope on the water table is extremely low. The RDO site lies within an area bounded by the 4,800 and 4,750 foot contours (Figure 1). The hydraulic gradient within the general area is about 4.3 $X10^{-4}$ ft/ft, or about 2 feet/mile.

This flat gradient is reflected in water levels at monitoring wells at the site. Differences between the highest and lowest water level elevations were compared for each of the seven potentiometric maps in the report (Table 1). The greatest difference between water level elevations occurred for the July and November 2004 maps. For these two maps there with a 0.89 foot elevation difference between wells GW-007511 and GW-007503 which are about 17,600 feet apart. This gives a hydraulic gradient of 5 X 10^{-5} ft/ft, or about 0.3 ft/mile. The facility should verify that the well elevations have been adequately surveyed and water level elevations have been properly collected, given these small elevation differences. Small errors in well head elevations and/or water level measurements can result in incorrect determination of the ground water flow direction.

The maps show that well GW-007508 was dry for 4 of the 7 measurement events (water level listed as <4779.51 feet), and well GW-007510 was dry for 6 of the 7 measurement events (water level listed as <4776.45 feet). These wells should be deepened or replaced so that samples can be collected and water levels measured at each sample event.

Down-Gradient Water System

The Beaver Creek Ranch Public Water Supply (PWS) well is located south west and west of pivots used for wastewater reuse (Figure 2). The 10-year travel time extends about 4,300 feet northeast of the PWS well if the ground water flow direction were to the southwest; the travel time from the pivot to the northeast to the well is about 13.6 years. If ground water flow were consistently to the west, the ground water travel time from the pivot to the east to the PWS well would be about 16.4 years, The facility should continue to review nitrate testing results for the PWS well, since impacts from the site may not have reached the well yet.

Conclusions

Compliance Activity CA-075-03 required that RDO provide information on background water quality, and delineate areas of ground water degradation and beneficial uses of affected ground water. A Ground Water Improvement Plan is required if site operations caused ground water exceed standards in the Ground Water Quality Rule. The original Ground Water Investigation report, dated September 30, 2004 was determined to be complete but the report was disapproved.

The October 31, 2006 GWIR still maintains that up gradient agricultural practices and/or an undersized septic tank are causing elevated nitrate down gradient of the site, but the report does not provide information to prove this point. The October 31, 2006 GWIR still did not address ambient ground water conditions at the site. The report lists nitrate concentrations at the Beaver Creek Ranch PWS from 1980 through 2006 but these data can't be evaluated without knowledge of ambient ground water nitrate up gradient of the RDO site. RDO should continue to either

sample the PWS well or review District Health nitrte data from this well and compare it to nitrte concentration up gradient of the site.

The maps show that well GW-007508 was dry for 4 of the 7 measurement events (water level listed as <4779.51 feet), and well GW-007510 was dry for 6 of the 7 measurement events (water level listed as <4776.45 feet). These wells should be deepened or replaced so that samples can be collected and water levels measured at each sample event.

The facility should verify that the well elevations have been adequately surveyed and water level elevations have been properly collected, given these small elevation differences. Small errors in well head elevations and/or water level measurements can result in incorrect determination of the ground water flow direction.

A WQIP is proposed in the October 31, 2006 report but it is unknown if the plan has been implemented.

cc: Tom Rackow, Idaho Falls RO

Table 1. Water level elevation differences for monitoring wells at RDO wastewater reuse site.

Date	Well	WL Elev
12/3/2002	GW-7508	4784.55
12/3/2002	GW-7509	4784.41
12/3/2002	GW-7504	4784.38
12/3/2002	GW-7510	4784.32
12/3/2002	GW-7507	4784.31
12/3/2002	GW-7511	4784.31
12/3/2002	GW-7501	4784.28
12/3/2002	GW-7505	4784.14
12/3/2002	GW-7502	4784.07
12/3/2002	GW-7503	4783.93
	Max Diff =	0.62
12/3/2002	GW-7506	Dry?

Date	Well	WL Elev
11/17/2003	GW-7504	4781.68
11/17/2003	GW-7509	4781.66
11/17/2003	GW-7501	4781.58
11/17/2003	GW-7511	4781.54
11/17/2003	GW-7507	4781.47
11/17/2003	GW-7505	4781.45
11/17/2003	GW-7502	4781.38
11/17/2003	GW-7503	4781.23
	Max Diff =	0.45
11/17/2003	GW-7506	<4854.06
11/17/2003	GW-7508	<4779.51
11/17/2003	GW-7510	<4776.45

Date	Well	WL Elev
4/6/2004	GW-7508	4783.33
4/6/2004	GW-7511	4783.02
4/6/2004	GW-7509	4783
4/6/2004	GW-7504	4782.97
4/6/2004	GW-7507	4782.91
4/6/2004	GW-7501	4782.9
4/6/2004	GW-7505	4782.79
4/6/2004	GW-7502	4782.62
4/6/2004	GW-7503	4782.47
	Max Diff =	0.86
4/6/2004	GW-7510	<4776.45
4/6/2004	GW-7506	<4854.06

Date	Well	WL Elev
7/15/2004	GW-7511	4779.5
7/15/2004	GW-7509	4779.4
7/15/2004	GW-7504	4779.33
7/15/2004	GW-7501	4779.26
7/15/2004	GW-7507	4779.18
7/15/2004	GW-7505	4779.1
7/15/2004	GW-7502	4778.82
7/15/2004	GW-7503	4778.61
	Max Diff =	0.89
7/15/2004	GW-7508	<4779.51
7/15/2004	GW-7510	<4776.45
7/15/2004	GW-7506	<4854.06

Date	Well	WL Elev
11/7/2004	GW-7511	4779.5
11/7/2004	GW-7509	4779.4
11/7/2004	GW-7504	4779.33
11/7/2004	GW-7501	4779.26
11/7/2004	GW-7507	4779.18
11/7/2004	GW-7505	4779.1
11/7/2004	GW-7502	4778.82
11/7/2004	GW-7503	4778.61
	Max Diff =	0.89
11/7/2004	GW-7508	<4779.51
11/7/2004	GW-7510	<4776.45
11/7/2004	GW-7506	<4854.06

Date	Well	WL Elev
4/26/2005	GW-7501	4782.14
4/26/2005	GW-7508	4782.12
4/26/2005	GW-7511	4781.86
4/26/2005	GW-7504	4781.86
4/26/2005	GW-7509	4781.85
4/26/2005	GW-7507	4781.79
4/26/2005	GW-7505	4781.7
4/26/2005	GW-7503	4781.57
4/26/2005	GW-7502	4781.56
	Max Diff =	0.58
4/26/2005	GW-7510	<4776.45
4/26/2005	GW-7506	<4854.06

Date	Well	WL Elev
7/26/2006	GW-7509	4781.72
7/26/2006	GW-7504	4781.7
7/26/2006	GW-7507	4781.63
7/26/2006	GW-7505	4781.47
7/26/2006	GW-7502	4781.2
7/26/2006	GW-7511	4781.17
7/26/2006	GW-7503	4781.08
7/26/2006	GW-7501	4780.94
	Max Diff =	0.78
7/26/2006	GW-7506	4861.37
7/26/2006	GW-7508	<4779.51
7/26/2006	GW-7510	<4776.45

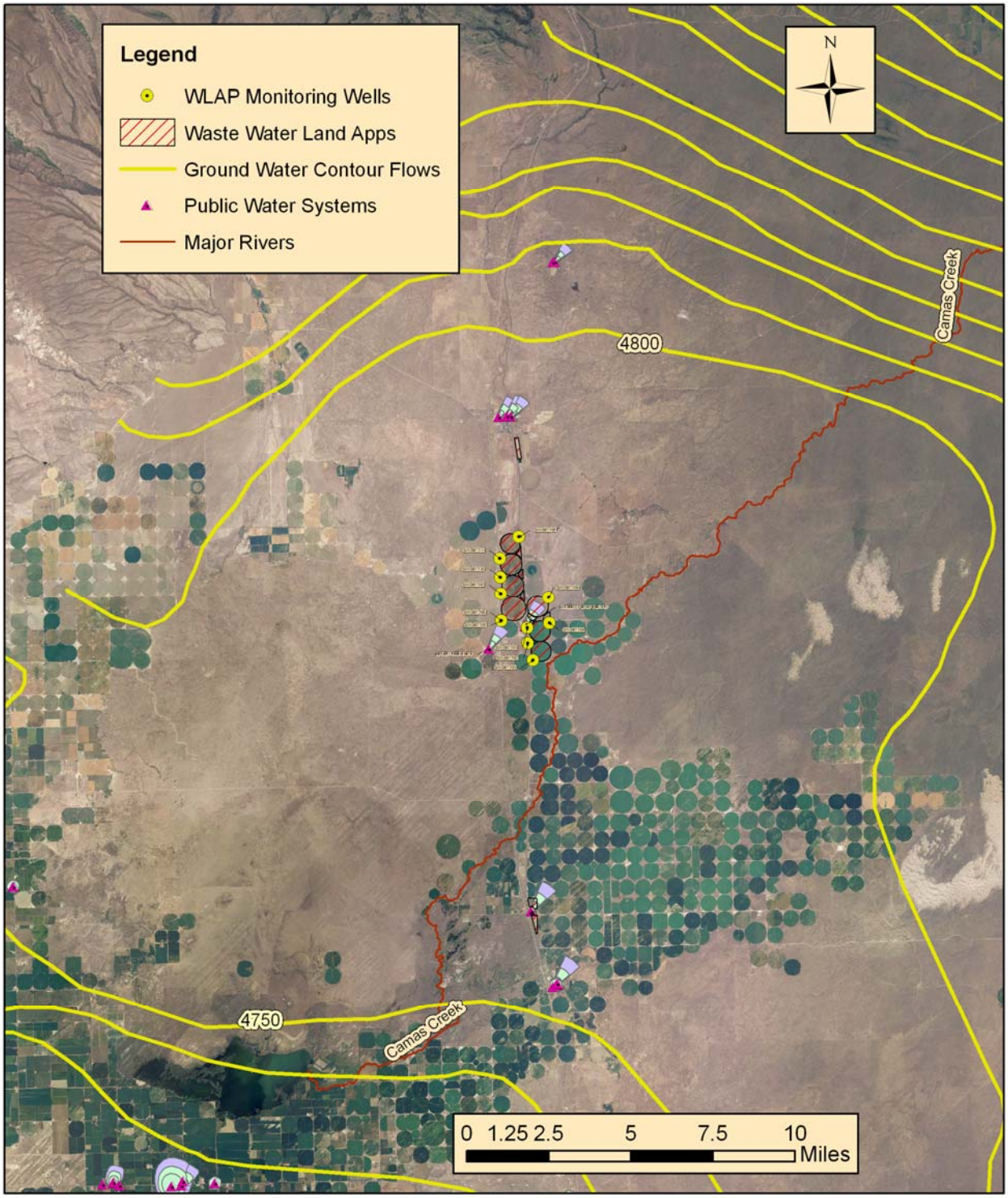

Figure 1. Potentiometric contours for the area around the RDO wastewater reuse site.

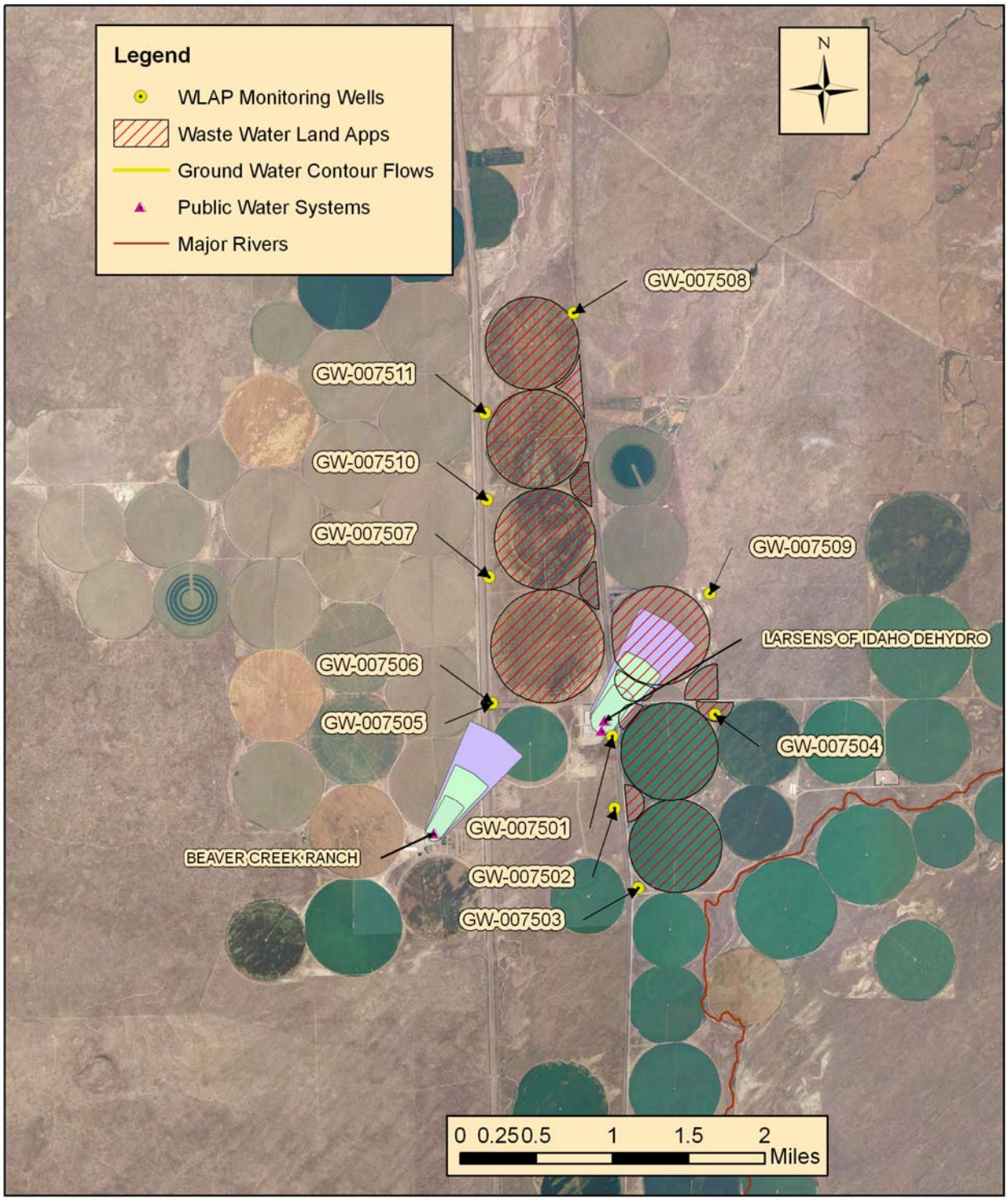

Figure 2. Location of the Beaver Creek Ranch Public Water Supply well with respect to wastewater reuse fields at the RDO site.