November 25, 2013

M E M O R A N D U M

TO: R. Todd Crutcher, P.E., DEQ, Boise Regional Office

FROM: Larry L. Waters, P.E., DEQ, State Office of Technical Services

SUBJECT: Staff Analysis for Draft Industrial Reuse Permit I-063-03 (formerly LA-000063-02)
The Amalgamated Sugar Company LLC (TASCO) – Nampa 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 reuse permits. This memorandum addresses draft permit I-063-03 for the industrial wastewater treatment and reuse system owned and operated by The Amalgamated Sugar Company LLC (TASCO) – Nampa Facility. TASCO's Nampa Facility treatment and reuse system is currently permitted under the terms of permit LA-000063-02.

2. SUMMARY OF EVENTS

The Department of Environmental Quality (DEQ) issued Permit LA-000063-02 to TASCO on May 15, 1996. The permit is for continued operation of the wastewater land application system serving the TASCO Nampa facility. This facility is located at 138 West Karcher Avenue, Nampa, Idaho in Canyon County. The purpose of the draft permit is to renew permit LA-000063-02, which expired on May 14, 2001.

A permit renewal application from TASCO was received by DEQ on January 16, 2001. To supplement the permit renewal application, TASCO provided DEQ with a Groundwater Study Report on June 14, 2001. DEQ sent a letter of determination of an incomplete permit renewal application to TASCO on May 1, 2002. The letter outlined several items related to the permit application contents, preliminary technical report, and the plan of operation requirements that were not provided in the application. The letter required a response from TASCO within thirty (30) calendar days. In response to the Incompleteness Determination letter, TASCO submitted documents on May 31, 2002 and October 25, 2004. The May 31, 2002 submittal addressed the permit application contents along with additional groundwater monitoring results. A more thorough discussion of the permit application contents along with preliminary technical report and the plan of operation requirements were submitted in the October 25, 2004 submittal. An updated Groundwater Study Report was submitted to DEQ on June 30, 2004 in response to DEQ's review of the previously submitted groundwater studies. On June 28, 2006, DEQ sent a letter to TASCO stating that the permit application was complete.

Since then, DEQ put this permit renewal on hold as TASCO and DEQ worked through a ten (10) year environmental improvement Compliance Agreement, which encompassed all three of the TASCO facilities in Idaho. On September 9, 2011, DEQ sent TASCO a letter requesting an updated permit application. A revised permit application was submitted to DEQ on December 29, 2011. These documents and

previously submitted annual reports largely serve as the basis for the terms and conditions contained in the draft permit.

As required by the *Recycled Water Rules*, the draft permit will be presented for a public comment period. After the comment period, DEQ will provide written responses to all relevant comments and prepare a final permit for the TASCO Nampa wastewater treatment and reuse facility.

3. PROCESS AND SITE DESCRIPTIONS

TASCO Nampa generated approximately 181 million gallons annually (MGA) of industrial wastewater from their sugar beet processing facility in the 2010/2011 time period. Throughout this permit term, since 1996, the permittee has primarily discharged to the City of Nampa Publicly Owned Treatment Works (POTW), and since 2007 all of the wastewater generated at the facility has been discharged to the City of Nampa POTW and none has been discharged to the land application sites.

3.1 Process Description

There are three main wastewater streams at the TASCO Nampa facility. These three wastewater streams are the City Pretreatment System effluent, the Cooling/Condenser Water, and the Flume Water systems. In the 2010/2011 time period, 46% of the water discharged to the City of Nampa POTW came from the City Pretreatment System, 46% came from the Cooling/Condenser Water System, and 8% came from the Flume Water System. Site maps are included in the draft permit, and can be referred to as a supplement to the following descriptions.

- The City Pretreatment System consists of excess water from beet processing, tank wash down water, and water from factory floor drains. This water is pretreated in aeration ponds and is clarified prior to being discharged to the City of Nampa POTW. Water from this system discharges to the City of Nampa POTW continuously all year long.

- The Cooling/Condenser Water System is primarily a closed loop system where contact and non-contact condenser water is sent to three cooling water ponds to reduce temperature, and re-cycled back to the plant for re-use. Cooling water can also be sent to the City Pretreatment System or land applied.

- The Flume Water System is also primarily a closed loop system, during beet processing, where flume water is used to transport and clean the beets prior to processing. Two hydro-separators and a clarifier are used to remove sediment and organic material from the flume water and the underflow is sent to the mud ponds for further settling. Clarified water from the mud ponds is returned to the Flume Water System. Clarified flume water is also used for sluicing precipitated calcium carbonate (PCC) from the vacuum filters and sluicing boiler fly ash to the mud ponds during the beet campaign. Slaked lime is added to the flume water to keep the pH at or above 10 S.U. Following the beet campaign, the flume water is drained to the Flume Retention Pond where it is aerated prior to being discharged to the City of Nampa POTW. The aerated flume water can also be land applied if needed. During inter-campaign periods, fly ash from the boilers is sluiced to the Fly Ash Pond for clarification in a separate closed loop system. The clarified effluent is recirculated back to the boilers to sluice more fly ash.

The majority of the wastewater flows generated at the facility are produced during the beet campaign, in the fall and winter months, which coincides with the non-growing season (NGS). As a result, the wastewater production timing does not benefit crop production during the crop growing season (GS). In addition, the volume of wastewater produced exceeds the NGS hydraulic loading rate limits. The most cost effective solution thus far has been to send the wastewater to the City of Nampa POTW. However, the facility has requested that the existing wastewater reuse permit be renewed as a backup to discharging to the City of Nampa POTW.

3.2 Site Soils

The wastewater reuse area consists of 118 acres currently divided into four management units (MU). The wastewater reuse site soils are approximately distributed as shown in Table 1 below:

Table 1: TASCO – Nampa Facility, Reuse Site Soils

Soil Number	AWC (inches/foot of soil)	% Total Acres	Soil Name	Soil Description
PhA	2.12	9.4	Power silt loam, 0 to 1 % slopes	Silt loam to 60 inches.
PhB	2.12	5.6	Power silt loam, 1 to 3 % slopes	Silt loam to 60 inches.
PpA	1.79	55.5	Power-Purdam silt loam, 0 to 1 % slopes	65% power silt loam - Silt loam to 60 inches. 25% purdam silt loam - Silt loam to 10 inches, silty clay loam 10-13 inches, silt loam 13-24 inches, cemented material 24-38 inches, and stratified very gravelly sandy loam below.
PtB	0.99	29.5	Purdam-Sebree silt loam, 1 to 3 % slopes	70% purdam silt loam - Silt loam to 10 inches, silty clay loam 10-13 inches, silt loam 13-24 inches, cemented material 24-38 inches, and stratified very gravelly sandy loam below. 20% sebree silt loam - Silt loam to 1 inch, silty clay loam 1-18 inches, silt loam 18-29 inches, cemented material 29-45 inches, and very gravelly sand below.

Note: information taken from the USDA web soil survey located at http://websoilsurvey.nrcs.usda.gov

A soil map of the facility can be found in Appendix A.

3.3 Surface Water

The closest natural surface water body to the facility is Indian Creek which is located approximately 1,500 feet southwest of the facility and is separated from the facility by Interstate 84. Two ditches cross through the reuse area. The ditch that crosses through the northern reuse

area, field F, is called the County Noble Drain and is mainly used to drain off high ground water and is connected to other drains downstream of the site. The County Noble Drain is buried east of field F near the Flume Retention Pond. The other ditch that crosses the reuse area south of the facility is called the Middle Lateral which borders the southern end of field A and crosses fields B and C. This lateral is the main source of supplemental irrigation water to the reuse areas.

3.4 Ground Water

Seasonal high ground water in the area ranges from 5.5 to 17.5 feet below the ground surface, based on static water levels taken at the facility, in April and October of each year, between 1997 and 2011. With the above seasonal high ground water elevations, the effects of wastewater reuse and facility pond seepage on ground water quality are of concern. Based on the information supplied in the permit application, DEQ has calculated the pond seepage to the ground water, which is summarized in Table 4. As shown in Table 4, approximately 73 MGA of pond water seeps into the ground water. Most of this seepage is from the cooling ponds which seep approximately 66 MGA. To better understand the wastewater constituents that may be seeping into the ground water via unlined ponds, staff recommends adding sampling of wastewater influent to each of the pond systems, in section 5.1 of the draft permit, monthly during the first year of the permit and annually thereafter during the time of the year when the flows into each pond are at the maximum (i.e., during the beet campaign). A discussion of ground water data, including all data collected from 1997 to the present, is included in the December 29, 2011 permit application and is also discussed further in section 4.3 of this document. The results of the discussion in section 4.3 of this document show that down-gradient total dissolved solids (TDS) levels in the ground water exceed the Ground Water Quality Standards (GWQS) in IDAPA 58.01.11, "Ground Water Quality Rule."

Currently there are twelve (12) ground water monitoring wells (Wells B, D, G, H, I, J, K, M, P, T, U and DM-5) in use at the TASCO Nampa facility that require monitoring as per the current permit. Previously used monitoring wells DM-2, DM-6 and the Skateland well have been removed and are no longer available for use as a result of the freeway expansion and other recent construction projects in the area. An additional ten (10) wells (A, C, E, F, L, N, S, DM-1, DM-3, and DM-4) have been used for ground water analysis but are not required to be monitoring under the current permit. Wells O, Q and R have been abandoned according to the Idaho Department of Water Resources requirements and are no longer available for use.

4. PERMITTING DISCUSSION

The following sections outline the staff recommended changes to be made to the terms of the current permit. The recommended changes are based on requests made in the permit renewal application, items completed as required in Permit LA-000063-02, TASCO's past performance with respect to permit requirements, reviews of TASCO's annual reports, 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 current permit, and remain applicable to the facility, are not addressed in this document. Corrected typographical errors and other minor changes to the facility information or table of contents are also not addressed in this document.

The effective permit duration specified in the draft permit will be for a five (5) year period. Since it has been almost twelve (12) years since the last permit expired, and because of the ground water quality

concerns at the facility, the terms and conditions in the permit will need to be reviewed following completion of the compliance activities discussed below.

4.1 **Permit Limits and Conditions**

A review of the facility's annual reports show that TASCO has conducted their activities at the reuse site within the permit limits and conditions throughout the previous permit cycle and through the 2011 reporting year.

The following limits and conditions were changed or added to the draft permit:

- The current permit combines fields C, D, and E together. The facility will no longer be using fields D and E as this area will be used as a stockpile area. Therefore, fields D and E have been eliminated in the draft permit.

- Staff recommends splitting field F into two management units as the soils on the east side of this field is significantly different than the soils on the west side (AWC is much lower on the east side), which makes it almost impossible to take a representative composite soil sample. With this soil difference, the non-growing season hydraulic loading rate would be limited by the soils on the east side. In addition, the east and west sides of field F are separated by the Noble drain which makes separating the east side from the west side more desirable.

- The current permit states that the growing season hydraulic loading rate shall be no greater than the irrigation water requirement (IWR). The wording in section 4.2 of the draft permit has been changed so that the growing season hydraulic loading rate is substantially at the IWR. This was changed to be consistent with other permits and to allow some hydraulic loading flexibility.

- To be consistent with other permits, the non-growing season (NGS) hydraulic loading rate will be specified in the draft permit for each management unit. The NGS hydraulic loading rate (HL_{ngs}) is based on the available water holding capacity (AWC) of the soil (which varies by soil type), the precipitation (P), and the evaporation (E) from the soil surface. Expressed mathematically, $HL_{ngs} = AWC – P + E$. The NRCS Soil Survey for Canyon County shows that the soils found at the facility are Power Silt Loam, Power-Purdam Silt Loam, and Purdam-Sebree Silt Loam. AWC for each soil type is shown in Table 1 in inches/foot. Using the current management units (MU) shown in Table 2 below and using the soil map in Appendix A, the soils available water holding capacity (AWC) in some MU's vary significantly enough that some parts of the field in the NGS are being over utilized and other parts are underutilized. By separating some of the MU's in the draft permit, as discussed above, the HL_{ngs} will be more easily implemented across the land application site. New serial numbers will be assigned in the draft permit for each MU as shown in Table 2.

  The HL_{ngs} for each of the MU's are shown in Table 2 below. Calculations for the HL_{ngs} can be found in Appendix B. In calculating these values, precipitation and evaporation data were taken from the Bureau of Reclamation Agrimet system station in Nampa Idaho and the Agrimet system precipitation data was compared with the precipitation data from

the Western Regional Climate Center specific for Nampa Idaho to confirm the data. AWC values in Table 2, for each MU, are weighted averages of the AWC's in Table 1, taking into account that available soil depth may be limited by the seasonal high ground water table, allowing for a buffer distance of two feet between ground water and the soil water storage area for soils PhA and PhB (resulting in a maximum soil depth of a five feet root zone depth or the seasonal high ground water depth minus two feet) and cemented soil layers for soils PpA and PtB (resulting in a reduced depth for root zone limiting layers such as cemented soil layers).

Table 2: TASCO – Nampa Facility, Non-growing Season Hydraulic Loading Rate

Current Hydraulic Management Unit	New Hydraulic Management Unit	AWC (in)	NGS Hydraulic Loading Rate (in/ac)	NGS Hydraulic Loading Rate (MG)
MU-006301 (Field A)	MU-063-11 (Field A)	9.28	9.67	6.25
MU-006302 (Field B)	MU-063-12 (Field B)	7.59	7.98	4.49
MU-006303 (Fields C, D, & E)	MU-063-13 (Field C)	7.00	7.39	7.18
MU-006304 (Field F)	MU-063-14 (Field F West)	8.95	9.35	3.81
	MU-063-15 (Field F East)	4.28	4.68	2.87
Total				24.6

Note: NGS Hydraulic Loading Rate in MG is applicable only if all acreage in that management unit is used.

- Since the reported TDS levels in the ground water exceed the GWQS's in IDAPA 58.01.11, "Ground Water Quality Rule", a non-volatile dissolved solids (NVDS) loading limit will need to be specified in the draft permit to help control TDS levels in the ground water. Since background levels up-gradient of the site are at or above the GWQS's for TDS, staff recommends using an NVDS loading limit equal to what the crops can take up in a given year. Typical TDS crop uptake values for an alfalfa crop ranges between 1,000 and 1,200 pounds per acre per year (lbs/ac-yr). The draft permit will reflect an NVDS loading limit of 1,200 lbs/ac-yr in the permit limits and conditions section which DEQ and TASCO agreed upon in a meeting held on Friday, October 25, 2013. This NVDS loading limit is for recycled water only and does not include supplemental irrigation water used during the growing season. Ground water monitoring data collected up and down gradient of the site will be reviewed annually to provide assurance that this loading rate limit is adequate.

- The maximum chemical oxygen demand (COD) loading rate will remain the same in the draft permit except the units on the maximum COD loading rate will be changed to lbs/acre-day to be consistent with current DEQ guidelines. Therefore, the draft permit will show a growing seasonal average COD loading rate of fifty (50) lbs/acre-day and a non-growing seasonal average COD loading rate of twenty five (25) lbs/acre-day.

4.2 Monitoring and Reporting Requirements

The following additional items were included in the draft permit to be consistent with current DEQ rules:

- Visual observation of field conditions
- Crop type and yield
- Plant tissue analysis/crop uptake analysis
- Backflow device testing
- Records retention

Most of the monitoring requirements specified in the draft permit are during land application of recycled water only. Staff recommends, in section 5 of the draft permit, to analyze soils constituents during the first and last year of the permit, even when wastewater is not land applied, in order to maintain knowledge of site soil properties over time. Monitoring wells will need to be monitored whether or not wastewater is land applied, as the data collected from these wells are needed to monitor possible ground water effects resulting from wastewater seepage from the facility pond systems.

All of the monitoring requirements are located in Section 5 of the draft permit.

4.3 Compliance Schedule for Required Activities

The following discussion is of the activities conducted by the permittee with regard to the compliance activities in the current permit, and includes recommendations for compliance activities to be included in the draft permit.

Table 3: TASCO – Nampa Facility, Compliance Activity Summary from LA-000063-02

Compliance Activity	Description	Due Date	Current Status
(1)	Seepage Test Data	May 15, 1997	All ponds were seepage tested between 1997 and 2009 except city ponds #0, 4, and 5, and the old Noble drain pond.
(2)	Capital Improvement Plan	May 15, 1997	The original Capital Improvement Plan was submitted in June 1997 and an updated plan was submitted in May 2000.
(3)	Total Dissolved Solids (TDS) Management Plan	When land applied TDS exceeds 4,000 lbs/acre/year	No land application activities exceeded the specified TDS loading of 4,000 lbs/acre/year.
(4)	Well Location Acceptability Analysis (WLAA)	When wastewater hydraulic loading rate exceeds 20 million gallons /year	No land application activities exceeded the specified hydraulic loading rate of 20 million gallons/year.
(5)	Buffer Zone Plan	May 15, 1998	The original Buffer Zone Plan was submitted to DEQ on July 13, 1998.

			The plan was revised and resubmitted on February 28, 2002. DEQ approved the plan on April 23, 2002. (Note: buffer zones shown in section 4.4 of the draft permit reflect those specified in this plan along with DEQ standard buffer zones.)
(6)	Nuisance Odor Management Plan	May 15, 1997	The Nuisance Odor Management Plan was submitted to DEQ for review on May 13, 1997.
(7)	Waste Solids Management Plan	May 15, 1997	The original Waste Solids Management Plan was submitted to DEQ in May 1997. An updated plan was submitted in December 2011 as part of the permit renewal application.
(8)	Plan of Operation	May 15, 1998	The Plan of Operation was submitted to DEQ on July 15, 1998, and an update was included in the permit renewal application submitted in December of 2011.
(9)	Reduce/Minimize Land Application Effects to Ground Water (TDS, Iron, and Manganese)		There have been no land application activities over the last five years. However, high TDS, Iron, and Manganese concentrations continue to be recorded during ground water monitoring.
(10)	Construction of Monitoring Well U	September 1, 1997	Completed in 1997

As can be seen in Table 3, all compliance activities specified in the current permit have been completed except for compliance activity (1). Compliance activities (3) and (4) were not required since the specified TDS and hydraulic loading rates were not exceeded. Although no land application has occurred over the last five years, high concentrations of TDS, Iron, and Manganese continue to be recorded in the ground water.

Table 4 below shows the most current seepage tests performed as reported in TASCO's current permit application.

Table 4: TASCO - Nampa Facility Seepage Test Data

Existing Ponds	Corresponding Serial Number in the Draft Permit	Reported Seepage Rate (in/day)	Pond Seepage (MG/year)	Date of Seepage Test	Liner
City Pond #0	LG-063-01	Not seepage tested	N/A	N/A	None
City Pond #1	LG-063-02	0.14	0.68	3/25/2003	None
City Pond #2	LG-063-03	0.14	1.08	3/25/2003	None

City Pond #3	LG-063-04	0.119	0.51	7/16/2007	None
City Pond #4	LG-063-05	Not seepage tested	N/A	N/A	None
City Pond #5	LG-063-06	Not seepage tested	N/A	N/A	None
Flume Return Pond/Noble Drain	LG-063-07	0.073	0.22	6/14/1999	None
Old Noble Drain	LG-063-08	Not seepage tested	N/A	N/A	None
Donut Pond	LG-063-09	0	0	6/17/2002	Bentonite liner
Cooling Ponds	LG-063-10, 11, and 12	0.224	66.26	4/22/2005	None
Flume Retention Pond	LG-063-13	0	0	7/29/2009	Poly liner
Mud Ponds	LG-063-14, 15, and 16	0.081	3.43	2/4/1997	None
Fly Ash Pond	LG-063-17	0.383	0.73	3/3/1997	None
Flume Surge Treatment Pond	Abandoned in 2003	NA	NA	Abandoned in 2003	NA
Total			72.91		

In general, DEQ's practice is to require, at a minimum, seepage testing of industrial ponds every five (5) years. However, because some of the ponds are difficult to isolate, the reported seepage test results may not be reliable. Since the underlying goal of seepage testing is determining pond seepage effects on ground water and a monitoring well network exists at the facility, staff recommends eliminating the seepage testing requirement from the draft permit and putting a bigger effort into ground water monitoring, determining the source of any potential facility impact on the elevated levels of constituents of concern in the ground water, and changes that can be made to reduce these impacts at the source if needed.

The Plan of Operation (PO) was reviewed with the reuse permit application. Although many of the items listed in the PO checklist were addressed, some of the items were not addressed or were not presented with enough detail to be adequate. The PO is a living document and should be updated as changes occur. The purpose of this manual is to provide any operator (whether familiar or unfamiliar with the facility) the needed information to operate the facility by using only the manual. As a result, staff recommends updating the PO and submitting it to DEQ for review and approval. The PO should comply with the requirements stated in the Recycled Water Rules IDAPA 58.01.17.300.05, incorporate the requirements of this permit, and address applicable items in the latest revision of the PO checklist located in the DEQ Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater, dated September 2007 (DEQ Guidance). The PO should be updated as needed to reflect current operations. Updating this manual should not be delayed and should be completed as soon as possible. However, to allow TASCO time in completing the manual, the draft permit will require this activity to be completed twelve (12) months after permit issuance.

The new permit will require a compliance activity for a Quality Assurance Project Plan (QAPP) that will address all sampling, monitoring and reporting requirements of this permit, as well as a description of approved sample collection methods, appropriate analytical methods, and companion quality assurance/quality control (QA/QC) protocols. The plan should cover field activities; data verification and validation; and data storage, retrieval and assessment. The permit will require that a QAPP be developed and implemented six (6) months after permit issuance.

Although no land application of recycled water has occurred at the site over the last five years, approximately 73 MG of wastewater seepage per year is entering the ground water through unlined ponds. A summary of the monitoring well constituent analysis as ground water flows through the site from up-gradient to down-gradient wells is located in Table 5 below. Ground water flow lines have been drawn in perpendicular to the contour lines shown on the maps located in Appendix E to visually show which wells are up-gradient to each down-gradient well. Additional tables in Appendix D show ground water constituent levels in the up-gradient wells B, D, M, and P and down-gradient constituent levels in wells DM-5, G, H, I, J, K, T, and U. The ground water contour maps in Appendix E represent typical flows in April and October and show how ground water flow through the site varies during the year. The DEQ staff analysis in comparing up-gradient wells to down-gradient wells is found in Table 5 below. Most of the wells appear to have elevated levels of TDS, iron, and manganese, with well K showing elevated nitrate levels. Well K is in the northeast corner of the site and only covers a small corner of field F, so high nitrate levels in well K may be a result of off-site influences.

Staff emphasizes, as recommended in section 3 above, the importance of sampling wastewater influent into each of the pond systems. Staff recommends sampling influent to the ponds at various frequencies depending on the constituent being monitored. This can be used when the potential influence of the facility operations on the ground water constituents of concern is being studied, and help pinpoint which facility process or processes may need examined more closely. Therefore, staff recommends adding the wastewater influent to each pond system as a monitoring point in section 5.1 of the draft permit to determine constituent ground water loading through pond seepage. Also, because TASCO has the ability to change the discharge location of wastewater streams and to transfer water from one wastewater system to another, staff recommends that a condition be added to section 4.5 of the draft permit requiring that records of these activities, where these activities change the water quality in the respective lagoon system, be kept, and submitted to DEQ in the annual report.

Staff also recommends including compliance activities in the draft permit that will require TASCO to conduct a monitoring well network analysis, develop a ground water study plan, and implement the ground water study and produce findings and recommendations. The monitoring well network analysis portion would involve the verification of the construction of all permitted monitoring wells using the Rules for Well Construction (IDAPA 37.03.09) as a guide to insure that well monitoring results are accurate and not effected by surface contaminants, and verify that the existing wells are located properly to adequately monitor the potential effects of pond seepage, land application activities, and other facility activities on ground water quality. The ground water study plan will need to be prepared by a licensed professional with hydrogeological and geochemical experience, with the goal of determining if the ground water quality across the facility site complies with the Ground Water Quality Rule. The ground water study implementation, finding and recommendations portion will lead to a determination of the potential effects of site activities on ground water quality, and may make recommendations for site management

improvements based on the study findings.

Table 5: TASCO - Nampa Facility - Monitoring well constituent analysis as ground water flows through the site from up-gradient to down-gradient wells, with concerns in red (see Appendix D for a complete table of data for each monitoring well).		
Up-gradient Well	Down-gradient Well	DEQ Staff Analysis
P	DM-5	Slight decrease in nitrate with DM-5 being below the GWQS since October 2007. Increase in TDS with DM-5 being above the GWQS. Increase in iron with DM-5 being mostly above the GWQS since April 2007. Slight decrease in manganese with no detection in DM-5. Increase in chloride but well below the GWQS.
B	G	Decrease in nitrate and TDS with both being below the GWQS's since April 2002 in well G. Decrease in iron and manganese with both being mostly above the GWQS's since October 2006 in well G. Fluctuating chloride but well below the GWQS.
B	H	Some fluctuation in nitrate with mainly a decrease and well H being below the GWQS since October 2008. Fluctuation in TDS with well H being above the GWQS every April since 2008. Increase in iron with well H being above the GWQS since October 2001. Decrease in manganese with well H being mostly above the GWQS since October 2001. Some fluctuation in chloride but well below the GWQS.
P	I	Decrease in nitrate with well I mostly below the GWQS. Increase in TDS with well I being mostly above the GWQS. Increase in iron and manganese with well I being above the GWQS since April 2002 for iron and April 2001 for manganese. Mostly an increase in chloride but below the GWQS.
M	J	Decrease in nitrate with well J being mostly below the GWQS. Significant increase in TDS with well J being above the GWQS. Fluctuation in iron with well J being mostly above the GWQS since October 2006. Increase in manganese with well J being above the GWQS. Increase in chloride with well J being mostly below the GWQS since October 2004.
M	K	Fluctuation in nitrate with mostly an increase in recent years and well K being mostly above the GWQS since April 2008. Increase in TDS with well K being above the GWQS. Fluctuation with mostly a decrease in iron with well K mostly above the GWQS since June 2006. Fluctuation with mostly an increase in manganese with K being above the GWQS. Increase in chloride with well K being below the GWQS since October 1997.
D	T	Decrease in nitrate with well T being below the GWQS since April 1999. Mostly an increase in TDS with well T being below the GWQS since April 2001. Increase in iron and manganese with well T being above the GWQS since June 2006 for iron and October 2001 for manganese. Increase in chloride but well below the GWQS.
B	U	Decrease in nitrate with well U being below the GWQS since April 2007. Significant increase in TDS with well U being above the

		GWQS. Decrease in iron and manganese with well U mostly above the GWQS since June 2006 for iron and above the GWQS for manganese. Increase in chloride with well U being below the GWQS since October 2001.

Note: This table is a DEQ interpretation of the data shown in appendix C as ground water flows from an up-gradient monitoring well to a down-gradient monitoring well. It should also be noted however that overall ground water quality has improved some over the last several years.

5. FUTURE SYSTEM IMPROVEMENTS

TASCO is evaluating the feasibility of replacing the cooling ponds with a cooling tower system. This project would involve a detailed evaluation of the cooling system and would involve a detailed water balance of the facility. The installation of a lined condensate pond may be required as part of this project.

TASCO also plans to install an improved chip and tailings recovery screening process that will remove up to 50% of the beet fibers from the flume system. The recovered chips will be processed for sugar recovery while the fiber will be used as cattle feed. This should reduce odors associated with cleaning the mud ponds.

These improvements, when implemented, should help reduce the effects of wastewater seepage from the facility ponds on the overall ground water quality.

6. RECOMMENDATIONS

Based on review of applicable state rules, staff recommends that DEQ issue draft Permit I-063-03 for a public review and comment period. The draft permit contains effluent quality requirements for the wastewater treatment system, hydraulic and constituent loading limits, and terms and conditions required for operation of the reuse system. Compliance activities have been incorporated into Section 3 of the draft permit to address outstanding compliance issues. Finally, monitoring and reporting requirements have been included to demonstrate compliance with the permit conditions, and demonstrate protection of human health and the environment with respect to operation of the facility.

APPENDIX A: Facility Soil Map

APPENDIX B:
HLR_{ngs} for TASCO Nampa

HL_{ngs} = AWC – P + E.
(terms defined in section 5.1 of the draft permit)

	Average E (inches)	Average P (inches)
November	1.54	1.2
December	0.79	1.43
January	0.79	1.27
February	1.52	0.99
March	3.53	1.32
Average	1.634	1.242

Note: precipitation and evaporation data were taken from the Bureau of Reclamation Agrimet system station in Nampa Idaho, using average values, and the Agrimet system precipitation data was compared with the precipitation data from the Western Regional Climate Center specific for Nampa Idaho to confirm the data.

	Soils	AWC (inches)	% Field	Weighted AWC (inches)
Field A	PhA/PpA	10.6/8.00	49.1/50.9	9.28
Field B	PpA/PtB	8.00/3.88	90.1/9.9	7.59
Field C	PpA/PtB	8.00/3.88	75.7/24.3	7.00
Field F_{west}	PpA/PhB	8.00/10.55	62.5/37.5	8.95
Field F_{east}	PpA/PtB	8.00/3.88	9.8/90.2	4.28

Note: Initial AWC values were taken from the NRCS Soil Survey for Canyon County. Soil depth was limited by the high ground water table and cemented soil layers. AWC's are based on a maximum soil depth of a five feet root zone depth, depth to seasonal high ground water allowing a two foot buffer for soils for soils PpA and PtB, or a reduced depth for root zone limiting soil layers, such as cemented soil layers, for soils PpA and PtB.

	Weighted AWC (inches)	HLR_{ngs} (inches)	MG
Field A	9.28	9.67	6.25
Field B	7.59	7.98	4.49
Field C	7.00	7.39	7.18
Field F_{west}	8.95	9.35	3.81
Field F_{east}	4.28	4.68	2.87
Total			24.60

APPENDIX C:

Constituent concentration data collected from monitoring wells from 1996 to the present.

TASCO Nampa Monitoring Wells			(GWQS in parenthesis)		ND = not detected		Red = at or above GWQS				
	Well DM-5 (down-gradient well)						Well B (up-gradient well)				
Date	Nitrate (10)	TDS (500)	Fe (0.3)	Mn (0.05)	Cl (250)		Nitrate (10)	TDS (500)	Fe (0.3)	Mn (0.05)	Cl (250)
Apr-96											
Apr-97	7.19	598	ND	ND	42		15.1	492	ND	1.7	33
Oct-97	6.65	545	ND	ND	35		11.3	476	ND	2.74	21
Apr-98	8.21	742	ND	ND	42		9.79	514	ND	ND	63
Nov-98	6	670	ND	ND	32		20.8	572	ND	2.32	46
Apr-99	ND	530	0.09	ND	93		14.6	554	ND	1.96	47
Oct-99	5.65	706	ND	ND	77		8.24	944	0.11	7.54	217
Apr-00	3.84	632	0.05	ND	52		5.6	1310	0.06	5.44	367
Oct-00	3.59	642	ND	ND	86		28.9	612	ND	3.69	105
Apr-01	3.45	666	ND	ND	62		13.9	884	ND	3.48	222
Oct-01	4.21	652	ND	ND	58		30	550	0.09	2.92	39
Apr-02	4.05	670	ND	ND	53.7		16.3	475	ND	2.36	27.2
Oct-02	6.72	710	ND	ND	48.8		57.7	873	ND	4.22	34.3
Apr-03	7.4	720	0.3	ND	43		19	550	ND	2.1	26
Oct-03	9.1	690	ND	ND	46		32	570	ND	2.6	32
Apr-04	15.2	726	0.14	ND	41		18.6	446	0.08	4.5	26
Oct-04	15.2	730	0.19	ND	43		24.7	508	0.14	2.2	32
Apr/May-05	15.1	664	ND	ND	39		13.4	490	ND	1.8	81
Dec-05	12.6	638	ND	ND	45		11.3	846	ND	4.95	144
Jun-06	13.1	660	0.05	ND	42		9.4	554	ND	2.17	77
Oct-06	12.3	598	0.17	ND	47		15.3	448	2.14	3.3	67
Apr-07	11.3	592	0.96	ND	44		12.4	476	1.07	3.87	62
Oct-07	9.3	552	0.74	ND	41		3	552	12.3	8.34	80
Apr-08	8.1	570	0.14	ND	49		7.2	874	1.05	5.86	135
Oct-08	5.9	658	0.5	ND	54		4.5	534	0.8	3.1	59
Apr-09	9.2	570	0.57	ND	43		7.6	624	0.29	4.06	71
Oct-09	5	554	0.5	ND	51		3.5	488	0.55	2.91	57
Apr-10	8.2	484	0.8	ND	33		7.1	484	0.23	2.97	41
Oct-10	5.7	570	0.5	ND	51		7	480	7.11	6.81	52
Apr-11	5.6	550	0.39	ND	49		9.2	420	0.67	1.82	33
Oct-11	6.9	552	1.23	ND	43		11.3	432	3.28	3.51	29

	Well D (up-gradient well)						Well G (down-gradient well)				
Date	Nitrate (10)	TDS (500)	Fe (0.3)	Mn (0.05)	Cl (250)		Nitrate (10)	TDS (500)	Fe (0.3)	Mn (0.05)	Cl (250)
Apr-96	8.72	618	ND	ND	60		1.23	618	ND	ND	142
Apr-97	8.33	534	ND	ND	43		2.1	432	ND	ND	134
Oct-97	20	588	ND	ND	21		5.27	516	ND	ND	141
Apr-98	1.9	624	ND	1.75	118		4.79	628	ND	ND	167
Nov-98	9.8	528	ND	ND	27		3.37	390	ND	ND	42
Apr-99	6.96	622	0.05	ND	34		3.44	492	ND	0.63	89
Oct-99	12.8	612	0.22	ND	48		3.09	326	ND	1.93	45
Apr-00	14.2	560	ND	ND	44		1.7	604	ND	0.11	132
Oct-00	14.3	400	ND	ND	32		2.09	298	ND	ND	34
Apr-01	12.4	460	ND	ND	30		2.51	508	ND	ND	63
Oct-01	10.8	436	ND	ND	20		1.67	368	ND	0.13	21
Apr-02	8.59	408	0.09	ND	20		ND	508	0.37	2.16	58.7
Oct-02	7.82	445	0.63	0.01	14.1		0.9	395	0.03	0.17	17.8
Apr-03	7.2	390	0.35	ND	14		0.47	480	0.12	0.24	34
Oct-03	5.4	340	0.25	ND	10		0.77	330	ND	0.03	18
Apr-04	7.4	380	3.3	0.08	13		0.22	440	0.19	0.93	34
Oct-04	5.9	356	0.25	0.04	12		1.6	290	0.06	0.02	11
Apr/May-05	5.2	330	2.8	0.06	13		0.47	368	ND	0.01	30
Dec-05	5.7	308	0.05	ND	14		1.3	328	ND	ND	26
Jun-06	5.3	314	0.06	ND	9		2	362	ND	ND	23
Oct-06	7.8	318	0.19	ND	13		2.3	296	1.43	1.51	21
Apr-07	6.2	284	0.16	ND	12		0.7	420	0.72	0.74	28
Oct-07	8.1	248	0.95	ND	12		1.52	340	1.62	1.38	23
Apr-08	9.9	362	1.44	ND	12		4.9	396	2.4	2.25	25
Oct-08	7.3	366	0.23	ND	10		2.4	338	0.52	0.31	20
Apr-09	8.2	334	0.17	ND	14		2.3	440	0.23	0.17	39
Oct-09	5.1	316	0.14	ND	10		2.3	378	0.4	0.36	28
Apr-10	6.9	280	0.25	ND	13		1.7	390	0.29	0.37	30
Oct-10	9.3	422	0.89	ND	13		2.2	314	0.44	0.55	24
Apr-11	6.6	322	0.1	ND	12		3.3	406	0.22	0.5	33
Oct-11	6.9	300	0.37	ND	12		2.5	344	0.87	2.68	33

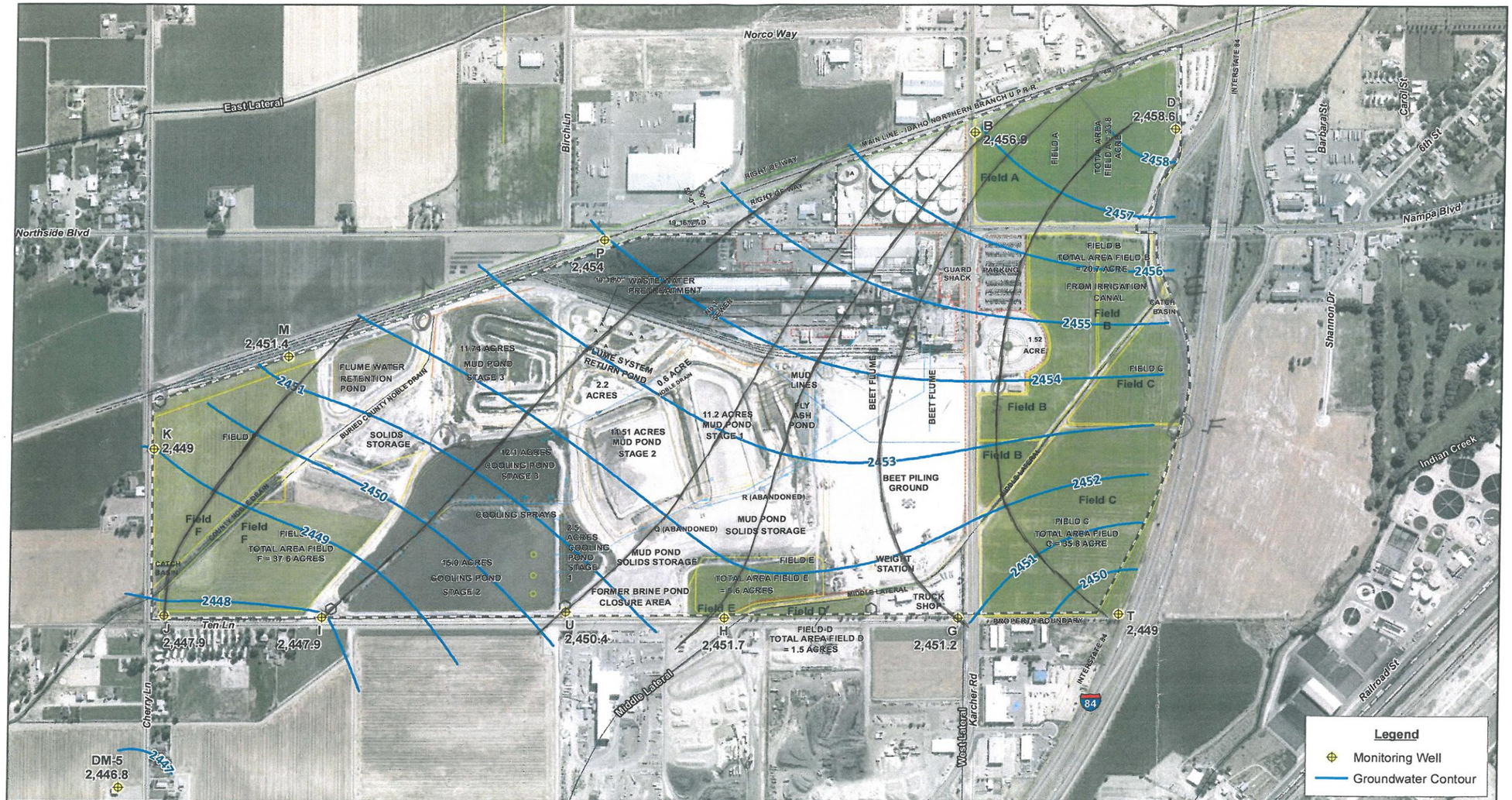
	Well H (down-gradient well)						Well I (down-gradient well)				
Date	Nitrate (10)	TDS (500)	Fe (0.3)	Mn (0.05)	Cl (250)		Nitrate (10)	TDS (500)	Fe (0.3)	Mn (0.05)	Cl (250)
Apr-96	29.4	1690	ND	0.59	578		ND	940	1.13	6.07	85
Apr-97	8.81	960	0.11	ND	110		0.54	712	0.61	3.81	64
Oct-97	4.63	872	ND	ND	967		1.69	950	0.45	3.88	120
Apr-98	2.36	1760	ND	0.9	483		0.34	916	0.98	5.05	116
Nov-98	2.4	754	ND	ND	6		4.89	1050	ND	4.04	12
Apr-99	1.15	1060	ND	0.63	132		2.87	434	1.08	3.44	37
Oct-99	8.17	774	0.42	0.88	22		0.21	822	0.58	3.01	107
Apr-00	6.11	1130	0.09	0.28	138		1.15	910	0.67	4.5	124
Oct-00	2.26	202	ND	ND	9		2.32	106	0.16	ND	8
Apr-01	1.64	808	0.06	ND	92		1.03	886	ND	4.01	101
Oct-01	0.83	440	0.37	0.64	27		1.34	968	0.14	3.78	103
Apr-02	0.13	840	11.1	4.61	126		1.46	933	0.36	3.66	107
Oct-02	1.81	298	2.46	0.46	7.72		1.9	345	2.28	0.19	12.8
Apr-03	0.63	580	0.81	0.11	59		ND	980	1.8	6.2	100
Oct-03	1.5	160	1.6	0.23	7		ND	960	2.9	6.5	110
Apr-04	0.68	518	2.7	0.83	82		ND	578	3	8.2	110
Oct-04	2.7	308	0.95	0.65	8		ND	578	0.38	3.3	56
Apr/May-05	3.07	380	4.1	0.53	34		ND	932	1.5	6.9	100
Dec-05	3.2	484	4.88	0.9	28		<0.2	854	1.68	7.07	102
Jun-06	1.9	164	0.14	<0.05	3		<0.2	896	1.86	5.76	102
Oct-06	5.7	240	30.5	2.16	9		<0.2	652	2.32	4.54	91
Apr-07	14.9	842	1.03	0.31	70		<0.2	902	2.01	6.91	105
Oct-07	15.2	566	40.9	3.02	20		<0.2	846	2.71	6	127
Apr-08	16.8	872	35.3	2.8	70		<0.2	876	2.6	7.37	135
Oct-08	4.3	400	5.33	0.66	15		<0.2	880	2.16	5.36	119
Apr-09	7	646	49.1	2.5	67		0.5	904	1.94	7.09	143
Oct-09	4.3	408	18	0.65	11		0.4	794	1.99	4.51	96
Apr-10	7	666	1.44	0.13	57		<0.2	828	1.94	6.93	117
Oct-10	3.2	356	4.28	0.3	9		6.8	448	0.87	1.69	10.3
Apr-11	5.1	538	3.42	0.44	48		10.5	706	1.25	4.5	11.3
Oct-11	4.1	372	9.16	0.4	13		<0.2	254	0.52	0.8	9

	Well J (down-gradient well)						Well K (down-gradient well)				
Date	Nitrate (10)	TDS (500)	Fe (0.3)	Mn (0.05)	Cl (250)		Nitrate (10)	TDS (500)	Fe (0.3)	Mn (0.05)	Cl (250)
Apr-96	0.94	2700	ND	7.64	81		1.88	1970	ND	6.09	628
Apr-97	0.32	2280	0.14	6.32	714		4.71	2060	0.05	4.55	670
Oct-97	0.33	2090	ND	5.75	641		9.42	1470	ND	1.88	244
Apr-98	0.78	2250	ND	3.76	610		4	1190	ND	1.48	146
Nov-98	0.48	2150	ND	4.54	617		2	1060	ND	0.89	91
Apr-99	ND	2100	0.55	4.69	651		0.47	100	0.2	0.9	140
Oct-99	ND	2060	0.36	4.96	591		1.38	938	0.35	1.4	76
Apr-00	13	2140	0.05	1.87	561		1.34	992	ND	0.5	54
Oct-00	ND	1860	0.07	4.02	575		1.41	918	ND	0.17	61
Apr-01	ND	2060	0.11	3.29	504		0.98	1080	ND	0.26	52
Oct-01	ND	1810	0.12	4.22	417		0.57	1130	ND	0.54	58
Apr-02	0.15	1960	2.93	1.88	704		ND	1180	0.09	0.88	60.9
Oct-02	ND	1870	0.73	4.57	336		0.22	1310	0.16	1.79	73.2
Apr-03	ND	1700	1.9	3	280		0.28	1100	ND	0.83	46
Oct-03	3.2	1600	0.26	3.8	280		0.33	1100	0.18	1.5	69
Apr-04	ND	1570	1.4	3	250		0.36	1050	0.07	0.35	66
Oct-04	0.6	1520	0.53	3.4	210		0.9	906	ND	0.45	58
Apr/May-05	0.2	1360	ND	1.1	230		0.68	1050	ND	0.37	75
Dec-05	3.2	1750	<0.05	1.7	275		3.1	1020	<0.05	0.37	97
Jun-06	0.3	1460	0.06	2.51	184		5.2	1070	0.68	0.98	102
Oct-06	2.7	1560	2.49	2.56	219		9.1	1090	0.06	0.69	128
Apr-07	<0.2	1450	4.32	2.02	160		7.7	982	0.1	0.69	62
Oct-07	3.4	1420	9.99	3.18	161		8.8	932	2.85	2.06	80
Apr-08	1.58	1420	11.9	2.8	181		11	944	3.83	1.88	60
Oct-08	1.7	1420	2.47	2.97	145		11.8	984	1.45	1.55	67
Apr-09	3.5	1360	7.34	2.36	140		14.2	920	0.17	0.67	44
Oct-09	0.2	1230	2.5	2.75	128		11.4	934	0.99	1.05	54
Apr-10	2	1190	0.79	1.81	125		18.3	840	0.21	0.94	35
Oct-10	4.5	1360	0.6	1.96	147		7.9	936	0.28	1.68	65
Apr-11	1.3	1140	<0.05	1.44	63		11.8	908	0.64	1.22	40
Oct-11	0.7	1120	1.31	2.98	61		7.6	844	0.76	3.23	33

	Well M (up-gradient well)						Well P (up-gradient well)				
Date	Nitrate (10)	TDS (500)	Fe (0.3)	Mn (0.05)	Cl (250)		Nitrate (10)	TDS (500)	Fe (0.3)	Mn (0.05)	Cl (250)
Apr-96											
Apr-97	31.3	1100	ND	1.65	226		21.2	580	ND	2.47	580
Oct-97	31	854	ND	0.93	38		19.8	596	ND	ND	19
Apr-98	33.3	938	ND	0.68	78		18.5	566	ND	ND	40
Nov-98	37.1	888	ND	0.19	31		18.8	626	ND	ND	23
Apr-99	30.3	842	0.12	2.92	51		18.2	572	0.16	ND	27
Oct-99	38	848	0.21	8.43	43		17.3	540	0.22	ND	15
Apr-00	34.9	878	0.32	1.21	53		16.2	464	ND	ND	17
Oct-00	34.2	896	ND	0.13	47		10.4	378	ND	ND	11
Apr-01	33.8	828	ND	0.16	41		12.7	402	ND	ND	11
Oct-01	31.8	828	ND	0.21	46		14.4	428	ND	ND	15
Apr-02	23.9	745	1.68	3.87	27		12	435	0.01	ND	12
Oct-02	25	860	0.58	0.67	30		0.22	533	ND	ND	12.3
Apr-03	24	790	ND	0.22	28		14	560	ND	ND	36
Oct-03	22	710	0.11	0.34	23		11	470	0.47	ND	13
Apr-04	25.4	742	0.06	0.7	30		14.3	528	0.12	0.01	53
Oct-04	55.9	1140	1.2	0.37	210		10.9	446	0.15	ND	24
Apr/May-05	17.9	772	ND	0.06	23		10.8	412	ND	ND	15
Dec-05	15.9	732	<0.05	0.13	17		-	-	-	-	-
Jun-06	23.6	814	<0.05	0.24	36		12.6	462	<0.05	<0.05	16
Oct-06	9.9	534	1.38	0.67	12		13.8	456	0.43	<0.05	20
Apr-07	11.8	620	0.22	0.43	14		11.1	408	0.33	<0.05	15
Oct-07	14	574	5.51	2.94	13		10.6	508	2.23	0.06	23
Apr-08	16.4	588	2.8	1.31	19		10.6	468	1.62	<0.05	29
Oct-08	7.7	512	1.12	0.66	18		5.4	456	0.63	<0.05	13
Apr-09	13.7	558	0.63	1.55	20		10.3	464	0.11	<0.05	16
Oct-09	5	450	0.69	0.49	14		6	434	0.27	<0.05	15
Apr-10	12.6	508	1.43	1.7	19		8.5	438	0.26	<0.05	18
Oct-10	5.5	450	0.38	0.3	15		6.8	426	0.39	<0.05	12
Apr-11	15.3	564	1.04	0.44	19		9.8	420	0.29	<0.05	15
Oct-11	5.8	408	2.71	2.72	13		5.9	364	0.16	<0.05	12

	Well T (down-gradient well)						Well U (down-gradient well)				
Date	Nitrate (10)	TDS (500)	Fe (0.3)	Mn (0.05)	Cl (250)		Nitrate (10)	TDS (500)	Fe (0.3)	Mn (0.05)	Cl (250)
Apr-96											
Apr-97	9.6	840	ND	ND	252						
Oct-97	5.11	534	ND	ND	147		0.13	1174	ND	0.96	229
Apr-98	2.35	702	ND	0.58	206		ND	2010	2.89	1.62	641
Nov-98	12.7	1150	ND	2.28	306		44.9	1100	ND	0.2	190
Apr-99	4.68	878	ND	0.23	199		18.5	2060	0.06	0.52	620
Oct-99	3.14	834	0.49	28.2	108		16.1	1980	0.16	0.52	423
Apr-00	1.9	530	0.08	0.18	71		9.65	1430	0.25	0.41	284
Oct-00	0.91	588	ND	0.8	42		14.8	1720	0.05	0.49	269
Apr-01	1.11	382	ND	ND	39		47.6	1670	0.1	0.53	353
Oct-01	0.83	484	ND	0.27	30		18.1	1330	0.08	0.48	233
Apr-02	0.95	288	0.84	2.58	36.7		4.38	850	17.4	0.72	143
Oct-02	0.39	478	0.1	1.24	24.2		6.51	1340	0.48	0.59	129
Apr-03	0.71	340	0.28	2	30		6.6	950	14	0.72	140
Oct-03	0.38	390	0.24	1.3	18		17	1700	25	1.2	220
Apr-04	0.58	318	0.22	1.5	26		19.5	1470	2.7	0.58	240
Oct-04	0.4	332	0.14	1.2	17		21.2	1370	0.2	0.47	200
Apr/May-05	0.81	338	0.2	0.95	26		6.7	910	2.6	0.53	150
Dec-05	0.9	332	ND	0.1	31		22	1340	ND	0.65	218
Jun-06	0.9	376	0.87	3.29	24		12.7	1120	18.1	0.72	175
Oct-06	1	348	15.6	44.9	25		15.2	1160	1.19	0.71	202
Apr-07	0.9	388	7.01	8.26	24		6.7	930	0.72	0.55	187
Oct-07	0.86	446	29.8	4.4	19		9.5	884	13.7	0.81	151
Apr-08	1.01	348	9.62	3.24	28		5	800	9.13	0.74	155
Oct-08	1.2	432	15.6	1.66	22		8.3	840	0.74	0.42	101
Apr-09	2	364	44.1	4.66	29		3.3	698	0.51	0.5	111
Oct-09	1.3	402	82.8	10.6	16		7.6	770	5.1	0.59	97
Apr-10	1.5	328	2.43	1.31	24		3.4	688	0.2	0.69	123
Oct-10	1.2	406	24	6.66	20		3.4	732	5.14	0.5	114
Apr-11	2.3	392	8.21	1.54	23		7.9	912	0.46	0.64	161
Oct-11	1.5	366	10.9	3.34	21		6.1	826	2.76	0.51	135

APPENDIX D: Ground Water Contours with DEQ drawn flow lines for April and October of 2010



Imagery: Bing Maps Web Imagery Service
Source: (c) 2010 Microsoft Corporation and its data suppliers
Other Data Sources: TASCO; Community Planning of SW Idaho (COMPASS)

Figure 4-6. Groundwater Contours, April 2010
The Amalgamated Sugar Company, Nampa, ID

Map Production Date: 12/28/2011
Document: Q:\TASCO\Nampa\map_docs\Site_ledland.mxd

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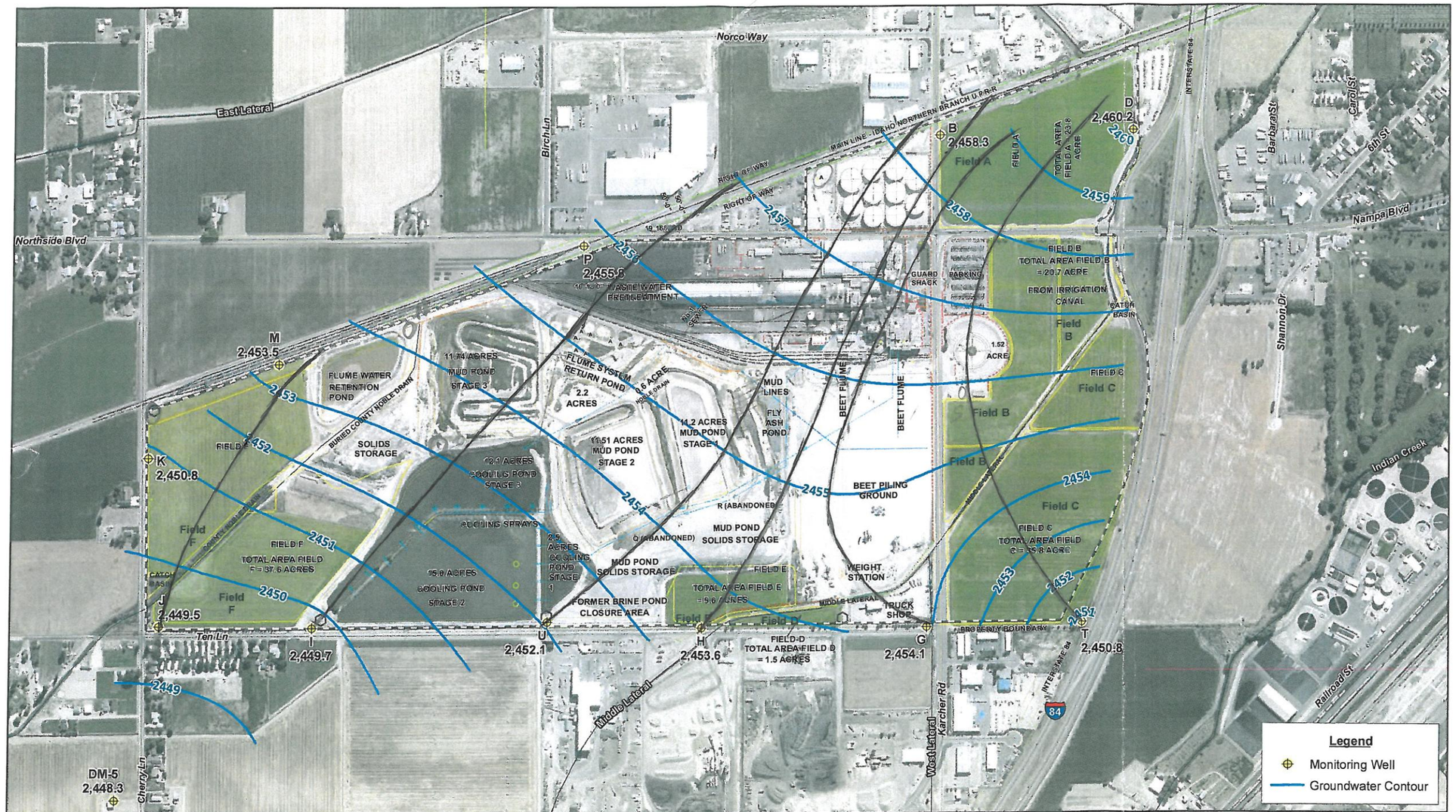

Figure 4-7. Groundwater Contours, October 2010
The Amalgamated Sugar Company, Nampa, ID

Imagery: Bing Maps Web Imagery Service
Source: (c) 2010 Microsoft Corporation and its data suppliers
Other Data Sources: TASCO; Community Planning of SW Idaho (COMPASS)

Map Production Date: 12/28/2011
Document: Q:\TASCO\Nampa\map_docs\Site_ledland.mxd

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