California Regional Water Quality Control Board, Colorado River Basin
Prosecution Team Evidence
on the matter of
Administrative Civil Liability Complaint R7-2014-0041
Exhibit 31

HERON INNOVATORS
The Clear Advantage

REPORT OF WASTE DISCHARGE

NATIONAL BEEF
57 EAST SHANK ROAD
BRAWLEY, CA 92227

BRIAN WEBB; GENERAL MANAGER

BY: DAVID RICKARD, PE
JOHN BARSOTTI

HERON INNOVATORS
The Clear Advantage

June 28, 2011

Doug Wylie
Sr. Water Resources Control Engineer
Colorado River Basin
Regional Water Quality Control Board
73-720 Fred Waring Drive. Suite 100
Palm Desert, CA 92260

RE: Your letter dated 5/27/11; National Beef Company Report of Waste Discharge, Brawley, Imperial County.

Mr. Wylie

Attached please find a copy of a report detailing the progress of our current investigations at the Brawley facility of National Beef Inc. The report is in two sections; the first details current and planned modifications to the existing wastewater treatment facility, while the second shows the results of our investigations regarding the quality of the biological sludges produced and their suitability for land application as Class B bio-solids.

As you are aware, the treatment system at the National Beef facility which discharges to the City of Brawley sewerage system violated the provisions of the City's sewer use ordinance on numerous occasions during 2010 and early 2011 with regard to BOD, suspended solids and ammonia. Investigations of the treatment system indicated that the major cause of the violations encountered was caused by the inability to adequately handle the solids generated by the activated sludge system. A Suspended Air Flotation system and a belt filter press became operational in May of 2011 and have resulted in correction of the violations with regard to both BOD and suspended solids. The ammonia concentrations leaving the plant have been reduced to approximately one-half the former concentrations but remain above permitted levels. Additional modifications to the system, as detailed in the report, are expected to reduce the ammonia level to below that stipulated in the Brawley Sewer Ordinance by October, 2011.

Evaluation of the sludges produced by the activated sludge system indicate that from both a chemical and biological standpoint they exceed the quality required for their use as Class B biosolids. A permit application and an additional Form 200 will be submitted for such use upon completion of our investigations.

If you have questions, please call the undersigned. Thank you for your attention to this matter.

M. David Rickard

M. David Rickard, PE
Registration Number C-24237

JC

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE
GENERAL INFORMATION FORM FOR
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

I. FACILITY INFORMATION

RECEIVED
JUN 30 2011
REGION 7

A. Facility:

Name: National Beef California LP			
Address: 57 Shank Road			
City: Brawley	County: Imperial	State: CA	Zip Code: 92227
Contact Person: Brian Webb		Telephone Number: 760.351.2700	

B. Facility Owner:

Name: National Beef Packing LLC			Owner Type (Check One) 1. ☐ Individual 2. ☑ Corporation
Address: 12200 Ambassador			3. ☐ Governmental Agency 4. ☐ Partnership
City: Kansas City	State: MO	Zip Code: 64163	5. ☐ Other:
Contact Person: Carey Hoskinson		Telephone Number: 816.713.8500	Federal Tax ID: 48-1129505

C. Facility Operator (The agency or business, not the person):

Name: National Beef California LP			Operator Type (Check One) 1. ☐ Individual 2. ☐ Corporation
Address: 57 Shank Road			3. ☐ Governmental Agency 4. ☐ Partnership
City: Brawley	State: CA	Zip Code: 92227	5. ☑ Other: Limited Partnership
Contact Person: Brian Webb		Telephone Number: 760.351.2700	

D. Owner of the Land:

Name: National Beef California LP			Owner Type (Check One) 1. ☐ Individual 2. ☐ Corporation
Address: 57 Shank Road			3. ☐ Governmental Agency 4. ☐ Partnership
City: Brawley	State: CA	Zip Code: 92227	5. ☑ Other: Limited Partnership
Contact Person: Brian Webb		Telephone Number: 760.351.2700	

E. Address Where Legal Notice May Be Served:

Address: National Beef California LP		
City: Brawley	State: CA	Zip Code: 92227
Contact Person: Brian Webb		Telephone Number: 760.351.2700

F. Billing Address:

Address: National Beef California LP		
City: Brawley	State: CA	Zip Code: 92227
Contact Person: Barbara Berrelleza		Telephone Number: 760.351.2722

Form 200(6/97)

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

II. TYPE OF DISCHARGE

Check Type of Discharge(s) Described in this Application (A or B):

☐ **A. WASTE DISCHARGE TO LAND** ☐ **B. WASTE DISCHARGE TO SURFACE WATER**

Check all that apply:

- ☐ Domestic/Municipal Wastewater Treatment and Disposal
- ☐ Cooling Water
- ☐ Mining
- ☐ Waste Pile
- ☐ Wastewater Reclamation
- ☐ Animal Waste Solids
- ☐ Land Treatment Unit
- ☐ Dredge Material Disposal
- ☐ Surface Impoundment
- ☐ Industrial Process Wastewater
- ☐ Animal or Aquacultural Wastewater
- ☐ Biosolids/Residual
- ☐ Hazardous Waste (see instructions)
- ☐ Landfill (see instructions)
- ☐ Storm Water
- ☑ Other, please describe: Discharge to POTW

III. LOCATION OF THE FACILITY

Describe the physical location of the facility.

1. Assessor's Parcel Number(s)	2. Latitude	3. Longitude
Facility: 047010029000	**Facility:** 32 deg. 59' 49"	**Facility:** 115 deg. 31' 14"
Discharge Point: SAME	**Discharge Point:** SAME	**Discharge Point:** SAME

IV. REASON FOR FILING

- ☐ New Discharge or Facility
- ☐ Changes in Ownership/Operator (see instructions)
- ☐ Change in Design or Operation
- ☐ Waste Discharge Requirements Update or NPDES Permit Reissuance
- ☐ Change in Quantity/Type of Discharge
- ☑ Other: RWQCB REQUEST; 5/27/11

V. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Name of Lead Agency: City of Brawley

Has a public agency determined that the proposed project is exempt from CEQA? ☐ **Yes** ☑ **No**

If Yes, state the basis for the exemption and the name of the agency supplying the exemption on the line below.

Basis for Exemption/Agency: UPGRADE OF EXISTING TREATMENT SYSTEM

Has a "Notice of Determination" been filed under CEQA? ☐ **Yes** ☐ **No**

If Yes, enclose a copy of the CEQA document, Environmental Impact Report, or Negative Declaration. If no, identify the expected type of CEQA document and expected date of completion.

Expected CEQA Documents:

☐ **EIR** ☐ **Negative Declaration** **Expected CEQA Completion Date:** _____

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE
GENERAL INFORMATION FORM FOR
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

VI. OTHER REQUIRED INFORMATION

Please provide a COMPLETE characterization of your discharge. A complete characterization includes, but is not limited to, design and actual flows, a list of constituents and the discharge concentration of each constituent, a list of other appropriate waste discharge characteristics, a description and schematic drawing of all treatment processes, a description of any Best Management Practices (BMPs) used, and a description of disposal methods.

Also include a site map showing the location of the facility and, if you are submitting this application for an NPDES permit, identify the surface water to which you propose to discharge. Please try to limit your maps to a scale of 1:24,000 (7.5' USGS Quadrangle) or a street map, if more appropriate.

VII. OTHER

Attach additional sheets to explain any responses which need clarification. List attachments with titles and dates below:

_____

_____

_____

You will be notified by a representative of the RWQCB within 30 days of receipt of your application. The notice will state if your application is complete or if there is additional information you must submit to complete your Application/Report of Waste Discharge, pursuant to Division 7, Section 13260 of the California Water Code.

VIII. CERTIFICATION

"I certify under penalty of law that this document, including all attachments and supplemental information, were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Print Name: BRIAN WEBB Title: GM/VP

Signature: _____ Date: 6.28.11

FOR OFFICE USE ONLY

Date Form 200 Received:	Letter to Discharger:	Fee Amount Received:	Check #:

Form 200 (6/97)

Introduction

National Beef Brawley (NBB) operates a meat packing plant located at 57 East Shank Road in Brawley, CA. The plant consists of holding pens, six beef processing areas and an on-site treatment system for pretreatment of 1.4 MGD of process wastewater prior to discharge to the City of Brawley's sewerage system. Restrooms, locker rooms and other areas that produce sanitary wastes are separately sewered so that no sanitary waste enters the pretreatment system.

The system as originally configured consists of (2)-dissolved air flotation (DAF) units, typically operating in parallel, and three large ponds as shown in Figure 1. The first pond has a net volume of 9.5 million gallons, is covered and provides anaerobic treatment to ferment organic materials first to fatty acids and then to methane and carbon dioxide and to hydrolyze organic amines (primarily proteins) to ammonia and low molecular weight organics. The methane and carbon dioxide produced are contained beneath the pond cover and, after treatment for the removal of hydrogen sulfide, are used to power a 700 HP boiler. Excess methane is combusted by an on-site flare.

From Pond 1 the wastewater flows to a second 2.9 million gallon basin which is equipped with Eight (8) - 40 HP and Five (5) - 75 HP surface aerators. Here, additional organic material is converted to carbon dioxide, water and new cell mass. Additionally, ammonia present in the wastewater and released by amine hydrolysis is oxidized to nitrate , i.e. nitrification.

Wastewater leaving Pond 2 flows into a baffle clarifier inset within a third un-aerated lagoon having a capacity of 6.2 million gallons, Pond 3. Returned Activated Sludge (RAS) and Waste Activated Sludge (WAS) are pumped from the clarifier base built into the inlet of pond 3. Clarified water overflows the clarifier into the larger pond volume where remaining solids are settled. From Pond 3, the treated wastewater was released to the City of Brawley sewerage system.

FIGURE 1

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Waste Characteristics

A record of the wastewater parameters determined by the City at their manhole just downstream of the NBB discharge is shown in Appendix B. This data shows the recent history of compliance and violation of the NBB discharges Since May of 2010.

The average concentration observed from analyses of 31 composite samples of the DAF effluent and of the material leaving Pond 1 (anaerobic treatment) collected between November 2010 and May 2011 are shown in Table I. During this period, the flow rate to the system averaged 1.3 MGD.

Stream	BOD	COD	TSS	TKN	Amm	Alk.	O&G	VFA
DAF Effluent	2,431	5,543	1,091	200	123	613	139	659
Pond 1 Effluent	895	2,317	559	160	136	690	31	411

Table I
Mean Concentration (Mg/L)
DAF Effluent and Pond 1 Effluent

The waste is characterized by high concentrations of BOD, TSS Total Kjeldahl Nitrogen (TKN) and Ammonia (NH_3).

Based on the above values the loadings of the various constituents to the ponds in pounds/day is given in Table II.

Pond	BOD	COD	TSS	TKN	Amm
1 Anaerobic	26,357	60,097	11,829	2,168	1,334
2 Aerobic	9,704	25,121	6,061	1,735	1,475

Table II
Pond Loadings (Mg/L)

Preliminary anaerobic treatment was effective in removing both BOD and suspended solids showing reductions of 63.1% and 49.1% respectively.

The values shown for volatile fatty acids (VFA) are well within the range for the growth of methanogenic microorganisms so that conversion of substantial BOD would be expected along with the production of substantial amounts of methane gas.

Both TKN and ammonia are reported as nitrogen so that the amount of organic nitrogen can be calculated as the difference between TKN and ammonia. Determining the differences for both the feed and effluent and calculating a percentage decrease indicates that the pond converted an average of some 64% of the organic nitrogen to ammonia.

Summary of Events

The plant's ability to manage solids generated during the treatment process and ultimately meet their discharge limits were compromised by a design decision to store WAS in one corner of Pond 3; while discharging from the far corner of the pond. Pond 3 was such a large basin that it seemed to have almost infinite capability to provide storage while sustaining enough detention to continue its primary duty of settling solids that escaped the inset clarifier. This arrangement was effective for a period of time, however by mid 2009, the solids stored in Pond 3 reached a critical point were biological processes ongoing in the settled solids, coupled with lack of pond detention began limiting its (pond 3's) ability to clarify water prior to discharge. This resulted in a high TSS and associated BOD in the effluent. In June of 2009 an effort was made to increase the available volume in Pond 3 by dredging out the accumulated solids. Between June and August, 187 dry tons of solids were removed and delivered to California Biomass in Thermal, California for conversion to compost. A second dredging effort began in January 2010 and by the end of March an additional 914 tons had been removed. At approximately 3 tons per day of sludge wasting into pond 3, NBP calculated 390 days of added sludge storage capacity was gained in pond 3.

This created a additional volume within the pond to support settling of solids and storage of WAS and was successful in returning solids/BOD discharge results to an acceptable range; albeit for a short window of time.

In an effort to reduce solids loading to pond 3, the RAS flow was increased to 1,000 gpm (Recycle Ratio = 1) and the concentration of MLSS in Pond 2 increased to a level of ~10,000 mg/l. The rationale being that an increase in RAS to pond 2 would increase the endogenous respiration in the pond hence minimizing the need to waste sludge to Pond 3.

By late December of 2010 high TSS levels were being observed in the pond 3 discharge to the City. National Beef and the City of Brawley discussed the high TSS discharges in January and NBB undertook the installation of clarification and belt press equipment to bring the TSS discharges within permit limits.

In March of 2011 the elevation of the overflow line from Pond 3 to the City manhole was raised 18". This again created an additional volume within the pond to support settling of solids and help partially control TSS discharge limits while the settling clarifier and belt press systems were being installed.

In April 2011 the belt press was commissioned and the wasting of sludge into pond 3 effectively stopped. At the end of April 2011 the SAF clarification equipment was commissioned. This allows NBB to pump all pond 3 effluent discharged to the City through the SAF clarifier for TSS removal. Since the SAF's commissioning, TSS levels discharged to the City have be in compliance.

Further investigation showed that the Plant's challenges in achieving discharge goals are largely due to the inability to remove solids from the system and that existing pond capacities are more than adequate. This is supported by the following:

- Assuming the entire volume of Pond 2 to be effective[1] under these conditions, the Mean Cell Residence Time is approximately 25 days; more than adequate for BOD conversion and complete oxidation of the ammonia even at the high loading being encountered.

- A series of grab samples collected from Pond 2 in April and May of 2011were analyzed for total BOD, BOD after filtration, and total suspended solids. The results of these analyses are shown in Table III. The data shows that the conversion of soluble BOD was very high and that nearly all the BOD present was associated with the suspended matter.

Date	BOD	sBOD	TSS
4/12/11	1680	26	7998
4/21/11	1140	162	12412
5/4/11	2160	148	8322
5/5/11	2280	60	13026
5/12/11	2205	14	12166
Means	1893	82	10785

Table III
Pond 2 Mixed Liquor Suspended Solids
Total BOD & Soluble BOD (Mg/L)

The data confirms that the addition of an effective measure for removal of suspended matter from Pond 2 and 3 is the best means of bringing the overall system into compliance with regard to BOD and Suspended Solids.

In early 2011, equipment was purchased and installed to directly treat and thicken WAS for off-site disposal and the treatment of solids in pond 3 water prior to discharge to the City. Since this equipment has been operational both the Total Suspended Solids and BOD discharge results have remained below the maximums imposed by the City of Brawley. The current configuration of the system is shown in Figure 2.

[1] This assumes that at the high recycle ratio being employed the behavior of the pond will approach that of a completely mixed system.

FIGURE 2

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The final compliance parameter impacting the site was ammonia. Since the installation of the Pond 3 inset clarifier in October 2007, ammonia seemed not be an issue, however more recently reported concentrations above the 30 Mg/L limit, have been more common. The data indicated that a lack of dissolved oxygen (DO) in pond 2 was compromising the Pond's ability to oxidize ammonia to nitrate, i.e. its ability to effectively complete the process of Nitrification.

In April of 2011, a profile of the DO concentrations at multiple locations and depth for Pond 2 showed an average DO of 0.3 mg/l. While this is adequate for conversion of BOD to carbon dioxide, water and new cell mass, it was insufficient for ammonia oxidation.

The new equipment installed in early 2011 allowed for more aggressive management of the treatment system solids. In an effort to reduce Pond 2 solids to a level that would minimize endogenous respiration and increase DO, RAS was gradually reduced in May to a low of 181 gpm (R = 0.19). The dissolved oxygen levels of the pond were monitored daily and grab samples from two locations in the Pond were monitored for ammonia. The results of these analyses are shown in Figure 3.

Note: DO concentrations are multiplied by 10 for clarity of presentation.

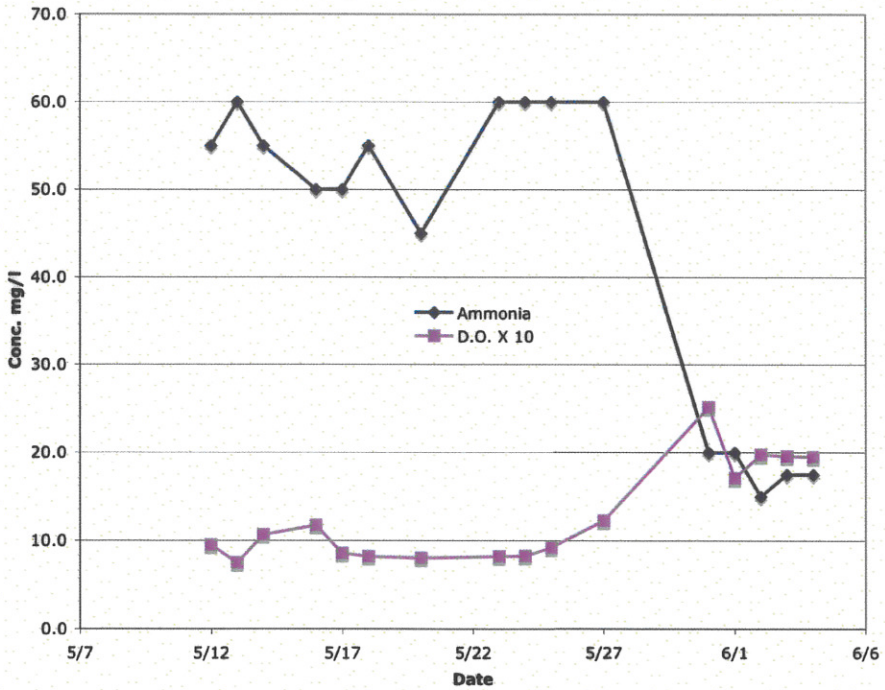

Figure 3
Pond 2 Ammonia and Dissolved Oxygen Concentrations

The table shows that ammonia oxidation began to increase substantially as the dissolved oxygen increased to a value above 1.5 mg/l.

Figure 4 more clearly illustrates the relationship between D.O. and ammonia,

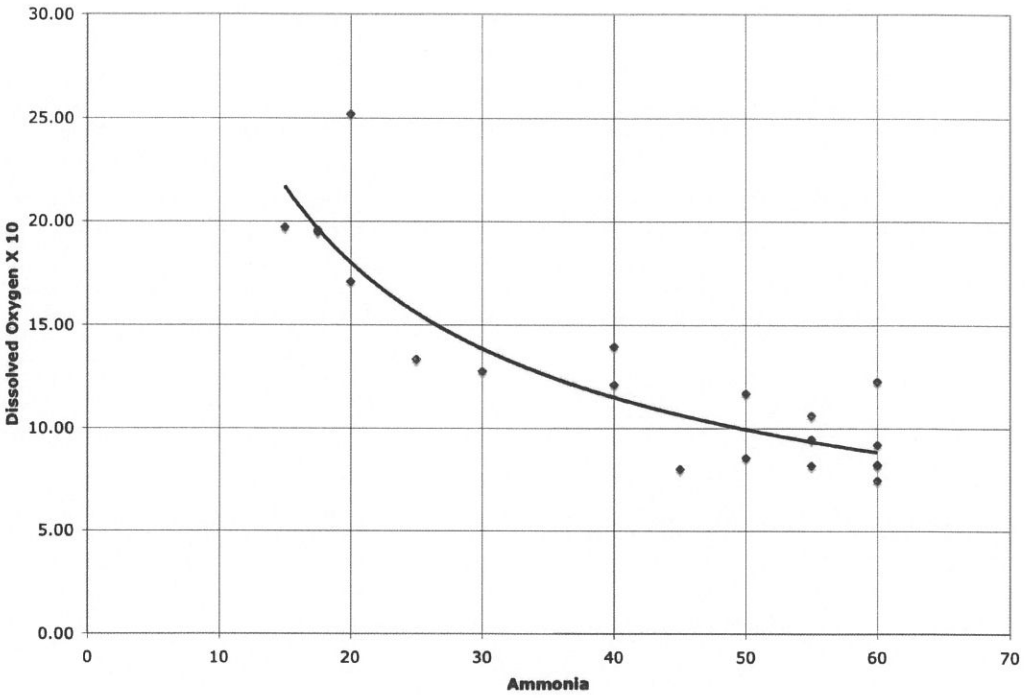

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Figure 4
Pond 2: Ammonia vs. D.O.

Implemented Corrective Measures

Data showing that soluble BOD concentrations in pond 2 were low supported the premise that BOD concentrations being discharged to the sewer were associated with the TSS. To resolve the TSS/BOD issues, in April/May 2011 NBB completed installation and start-up of a belt filter press for the direct treatment of WAS for off-site disposal; eliminating the load to pond 3 and a Suspended Air® Flotation (SAF) for the removal of TSS from Pond 3 water prior to discharge to the City Sewer. WAS from Pond 3's inset clarifier now is pumped directly to the belt filter press for dewatering and solids removal; the filtrate from this unit is discharged into Pond 3. Water from Pond 3 is pumped to the SAF system where the solids are removed prior to discharge to the City sewer. Solids from the SAF are pumped to the filter press for dewatering along with the WAS from the inset clarifier. Solids from the filter press are discharged to roll off bins and transported to a permitted facility in Thermal, California owned by California Bio-mass. As of June 6, 2011 more than 377 dry tons of sludge have been removed and disposed of in this manner.

Although insufficient data is available (due to the short window of operation), to fully characterize the SAF effluent, preliminary information indicates that the system is now in full compliance with the requirements for both BOD and TSS. This is confirmed by a series of compliance samples taken and analyzed by the City of Brawley during April and May as shown in Table IV.

Date	BOD	TSS	Ammonia
04/13/11	109	107	99
04/15/11	210	234	81
04/20/11	78	106	82
04/22/11	145	179	85
04/27/11	57	76	86
04/29/11	53	96	80
Monthly Mean	**109**	**133**	**85**
05/04/11	36	67	46
05/06/11	44	63	40
05/14/11	56	37	69
05/20/11	30	32	70
05/27/11	46	43	88
Monthly Mean	**42**	**48**	**63**

Table IV
Results of City Composite Samples

National Beef has been in compliance with requirements for BOD and Total Suspended Solids during both months (April/May). The SAF system was commissioned during the week of May 1 and resulted in lowering the levels of both these parameters by over 50%. Ammonia concentrations during May were still above required maximums but showed considerable improvement.

LONG TERM CORRECTIVE ACTION

The modifications to the system made to date have brought the facility into compliance with regard to BOD and TSS. Efforts planned for implementation in the immediate future are aimed at reducing the ammonia level in the effluent to allow compliance with the limit established by the Brawley sewer use ordinance.

Figure 3 showed that reduction in the suspended solids level in Pond 2 to allow development of an autotrophic population capable of oxidizing ammonia have resulted in a decrease in the ammonia nitrogen in the effluent from Pond 2 to the level required for discharge. Continued operation in the current configuration should gradually allow the ammonia nitrogen to be reduced to the level desired. This containment measure appears capable of achieving compliance in the short-term. Additional short-term modifications intended to provide higher levels of DO in pond 2 are being evaluated to increase the robustness of the current solution. However, in the long-term the plant intends to implement those changes illustrated in Figure 5. This configuration calls for a portion of Pond 3 to be partitioned off with sheet piling to receive the overflow from the existing Pond 3 clarifier. A new suction line would be installed to convey water from behind the partition to the SAF system for dewatering prior to discharging the clarified water to the City sewer. Solids from the SAF unit would be pumped to the belt filter press for additional dewatering prior to land disposal. Return activated sludge would continue to be removed from the existing Pond 3 clarifier and returned to the head of Pond 2. WAS will continue to be directed to the belt filter press with the filtrate returned to either pond 2 or into the SAF for treatment prior to discharge. If necessary for mixing, additional water from the new partition may also be mixed with the return sludge flow to provide mixing.

The actual flows for both RAS and WAS will require fine-tuning once the modifications have been made. The goal here will be to maintain the Sludge Age or Mean Cell Residence Time in Pond 2 at a level consistent with the maintenance of an active autotrophic population to provide a high level of ammonia oxidation. Depending on the results obtained, it may also be necessary to increase Pond 2 aeration to maintain a dissolved oxygen level above 3 mg/l.

FIGURE 5

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Continuing Work in Progress

Sludge Classification

It was noted earlier that no long term, cost effective method of disposing of the net bio-mass solids produced by Pond 2 has been identified. However, the value of this sludge as a soil conditioner was recognized; previous sludge analysis showed high concentrations of both nitrogen and phosphorus. In addition, the local agricultural demand for such materials appears high. As a result, among other tasks, Heron was charged with investigating the permitting requirements for disposal of solids on local farms for use on crops not intended for human consumption.

Based on input from the RWQCB, NBB is in the process of assessing the materials ability to meet the requirements of the State Water Quality Control Board General Order No. 2004 – 00112 – DWQ. The requirements of the Order, identical in this matter to those of EPA rule 503, dictate a sampling and analysis effort to be performed for the purpose of classifying the sludges; in this case, sludge being produced from the site filter press and of the material currently contained/stored in Pond 3. This effort culminated in May of 2011 and resulted in the preparation of a report, furnished to National Beef. A copy is attached to this report as Appendix A.

This evaluation concluded that heavy metals were not present in significant concentrations and that the level of fecal coliforms present were far below the established thresholds rendering them suitable for land disposal as a Class B Bio-solids.

Potential sites totaling 945 acres have been identified as suitable for receipt of this material and plans are now underway to collect and analyze the samples from potential disposal sites as required by the State Water Quality Control Board. Upon completion of this activity, copies of the relevant permit applications and the attached report will be furnished to the State and County authorities for the purpose of securing authorization to land apply the solids.

Additional Measures for Ammonia Oxidation

Although the site's ability to oxidize/treat Ammonia now appears to be more in control, there has been a relatively short window to evaluate the effectiveness of the current containment measures. Recognizing this lack of certainty, National Beef has authorized Heron to conduct bench level investigations of chemical oxidation of ammonia in the SAF effluent. Both chlorine and hydrogen peroxide are known to oxidize ammonia to nitrogen gas and will serve as the oxidants of choice in this effort, if needed.

If chlorine is added to a wastewater containing ammonia, a series of compounds form that are known as chloramines with the exact mixture of these being dependent on the molar ratio of chlorine added to ammonia present. If sufficient chlorine is used the chloramines then are further oxidized yielding free chlorine and nitrogen gas. This process is known as "Break Point Chlorination". Evaluation of this process is planned and will be pursued as future events might require.

Hydrogen peroxide is reported to react directly with ammonia oxidizing the latter to nitrogen gas. The bench testing will evaluate if Hydrogen Peroxide would be an effective oxidizer and the cost implications of its use, should additional ammonia removal capability be required.

Additional Measures for Reducing Total Nitrogen

As taken here, total nitrogen is that measured by the Total Kjeldahl Nitrogen (TKN) test and represents the nitrogen present as the sum of the nitrogen contained in organic materials plus ammonia. Because of this, reductions in total nitrogen can be achieved by increasing the amount of ammonia oxidation or by reducing the amount of organic nitrogen present. At this time, the amount of organic nitrogen that will remain in Pond 2 effluent after the MLSS is reduced to the proper level is unknown. Also unknown is the minimum concentration of ammonia which will remain in Pond 2 as the D.O. continues to increase and full nitrification is achieved. Evaluation of these matters will continue and when Pond 2 achieves steady state operation the need for additional measures will be determined. For example, as discussed above, if Pond 2 is unable to achieve a D.O. concentration of 3 mg/l, consideration will be given to various options that provide additional DO to the Pond.

CONCLUSIONS

Substantial progress has been made in reducing the discharge levels of BOD and suspended solids in the effluent from the National Beef plant through the addition of a SAF solids separation system and a belt filter press. The system is now in full compliance with regard to these parameters.

Continuing work is required to reduce the levels of ammonia and TKN. Reconfiguration of the system as shown in Figure 5 will likely allow compliance with ammonia standards.

Additional work remains to insure the plant can maintain compliance with both the ammonia and TKN requirements of the City of Brawley.

Appendix A
Sludge Classification Report

Introduction

National Beef Brawley (NBB) owns and operates a meat packing facility at 57 East Shank Road in Brawley, California that processes approximately 2,400 head of cattle per day. That plant discharges approximately 1.5 million gallons a day of wastewater from its beef processing and livestock operations (It's important to note that the industrial operations wastewater discharge is isolated from all sanitary sewage that maybe generated in the plant). The industrial wastewater is treated in the following manner before being discharged to the Brawley municipal plant:

- Two 12 X 53 foot dissolved air flotation (DAF) units that receive raw waste and provide removal of fats, grease and suspended solids.
- A 9.5 million gallon, covered anaerobic pond where fats, proteins are hydrolyzed to simpler organic materials with production of methane and carbon dioxide, designated as Pond 1.
- A 2.9 million gallon aerobic pond where the organic material is removed by oxidation and conversion to microbial cell mass and oxidation of ammonia to nitrate, designated as Pond 2.
- A clarifier is set into a third 6.2 million gallon pond at its inlet. designated, Pond 3.
- Pond 3, water is treated through a SAF™ Flotation Cell removing solids before discharge to the sanitary sewer. Skimmed solids are pumped over to a belt press for thickening
- WAS is pumped to a belt press were solids are thickened to ~20% solids

After treatment in the above system the wastewater flows to the sewerage system owned and operated by the City of Brawley for additional treatment prior to discharge to the New River.

Return activated sludge (RAS) is pumped from the clarifier in Pond 3 back to the head of Pond 2 at a rate of approximately 1.5 MGD to provide the microbial population for conversion of the organic material and oxidation of ammonia and to provide mixing.

The belt press recently commissioned (4/11) has provided the site a vehicle for removing solids from the treatment system; a problem that had plagued the plant over the last few years. These solids and those that have accumulated/stored in pond 3 over the years are what require disposal and the subject of this report.

Earlier investigations of the sludge produced at National Beef (See Appendix A) indicated that the material, high in both nitrogen and phosphorus, had a potential use as a soil amendment/conditioner in crops not produced for direct human consumption.

For this reason, Heron Innovators Inc. (HII) was retained by NBB to review requirements needed to facilitate solids disposal locally via land application. HII then approached Imperial County Regulators who deferred the matter to the Regional Water Quality Control Board (RWQCB). The Regional Board has asked NBB to assess if the sludge meets the requirements of a Class B sludge under the provisions of Title 40 of the Code of Federal Regulations (CFR) Part 503, often referred to only as Part 503.

This Report encompasses the result of that investigation for solids generated both as part of the treatment process as waste activated sludge (WAS) and those that have been previously stored in pond 3.

II Regulatory Requirements

As a technical matter the sludges generated at NBB are better suited for regulation under 40 CFR part 57, however, the Board has elected to have the material reviewed for compliance under part 503; a more stringent rule normally applied to sludges generated from municipal sewage treatment plants. California has adopted General Order No. 2004-0012-DWQ in response to the Federal Rule 503. This standard, like Rule 503, is normally applied to municipal/domestic solids and as a result is more stringent. It is this requirement that is used as a basis for evaluating NBB solids in this report.

Federal Rule 503, establishes maximum concentrations for 10 heavy metals, which may be present in solids deposited on agricultural land. The comparable State requirements list the same concentrations for nine of these metals eliminating chromium for the list. For the purposes of this evaluation, the Federal requirements will be used; as it represents the more stringent requirement. Table 1, lists the maximum concentrations of heavy metals allowable in biosolids applied on land where access to the public is limited.

Metal	Maximum Concentration mg/kg	Metal	Maximum Concentration mg/kg
Arsenic	75	Mercury	57
Cadmium	85	Molybdenum	75
Chromium	3000	Nickle	420
Copper	4300	Selenium	100
Lead	840	Zinc	7500

Table 1
Maximum Permissible Concentrations
Of Heavy Metals for Land Disposal

From a biological standpoint, the sludge must show a most probable number (MPN) of fecal coliforms of less than 2 million per gram of volatile solids.

III Test Methodology and Results

Sludge samples were collected during the period from April 20 through April 26, 2011and again during the period from May 9 through May 12, 2011. Samples of the contents of Pond 3 were collected from a boat at random locations in the pond using a "sludge judge". The sampler was lowered in the pond to a depth of approximately 3 - 4 feet and allowed to fill with material. This was then transferred to a bucket that was taken to shore and the samples transferred to new, clean, prelabeled 8 oz jars.

The solids collected from the belt press were scoop sampled directly into new, clean pre-labeled 8 oz jars.

All samples were placed on ice immediately after being collected; no special sterile protocols were followed.

Analyses were performed on all of the April samples for the 5 metals previously mentioned, total suspended solids (TSS), volatile suspended solids (VSS) and fecal coliform.

The samples collected in May were analyzed for the remaining metals considered to be of importance in evaluation of solids for land disposal.

Solids Determination

Tables 2 and 3 show the results of the analyses for total and volatile suspended solids. Mass units are in milligrams/kilogram of sample.

Date	Time	TSS	VSS	% Volatiles
4/20/11	10:30	180,000	120,000	66.7
4/22/11	10:30	200,000	150,000	75.0
4/22/11	14:30	170,000	120,000	70.6
4/25/11	10:30	180,000	130,000	72.2
4/25/11	14:30	180,000	130,000	72.2
4/26/11	9:30	190,000	140,000	73.7
4/26/11	11:30	210,000	160,000	76.2
Mean Values		187,143	135,714	72.4

Table 2
Suspended and Volatile Suspended Solids
Belt Press

Date	Time	TSS	VSS	% Volatiles
4/20/11	10:00	6,900	4,700	68.1
4/22/11	10:00	16,000	11,000	68.8
4/22/11	14:00	19,000	14,000	73.7
4/25/11	10:00	17,000	11,000	64.7
4/25/11	14:00	14,000	9,500	67.9
4/26/11	9:00	15,000	11,000	73.3
4/26/11	11:30	15,000	9,700	64.7
Mean Values		14,700	10,129	68.7

Table 3
Total and Volatile Suspended Solids
Pond 3

Based on these results, the belt press produced a cake having a solids content of almost 19% and a volatile content over 72% .

The solids level of the material in Pond 3 averaged 1.5% solids of which 69% were volatile.

Fecal Coliform

All the samples taken were analyzed for fecal coliform by the multiple tube fermentation method. The results are shown in Table 4 and 5.

Date	Time	MPN
4/20/11	10:30	>16,000
4/22/11	10:30	>16,000
4/22/11	14:30	900,000
4/25/11	10:30	<200,000
4/25/11	14:30	1,300,000
4/26/11	9:30	300,000
4/26/11	11:30	500,000

Table 4
Most Probable Number of
Fecal Coliform in
Belt Press Solids

Date	Time	MPN
4/20/11	10:00	16,000
4/22/11	10:00	>16,000
4/22/11	14:00	16,000
4/25/11	10:00	30,000
4/25/11	14:00	14,000
4/26/11	9:00	13,000
4/26/11	11:30	24,000

Table 5
Most Probable Number of
Fecal Coliform
In Pond 3 Material

Explanation of Coliform Results - Multiple Tube Fermentation Analyses

The laboratory when encountering a new, never analysed before sample will have to first make a guess regarding the concentration of the organisms they might first expect to find. Samples are serial dilluted and placed in fermentation tubes. The tubes are then incubated for 48 hours and those showing the presence of gas (carbon dioxide) are scored positive and those without gas are scored negative (fermentation resulting in gas production indicates that the tube received at least one viable bacteria). The most probable number of organisms present is then determined from statistical tables based on a Poisson distribution. A positive result in all tubes, implies that the original estimate was too low, reporting the value as greater than the minimum number that statistically could have given that result. If none of the tubes shows positive for carbon dioxide then the original estimate was too high and only the maximum number which could account for that result can be reported. As shown in Tables 4 and 5, the analyst guessed low on the some of the early samples. Since the actual MPN could be anything higher than the number shown the results must be ignored and not used in analysis. On the other hand, where the guess was too high as was the case in the belt press sample taken in the morning of April 25, the number shown represents the maximum number that could have been present and can be used in a conservative evaluation of the data.

Because the results of MPN analyses do not follow a normal statistical distribution, arithmetic averaging cannot be used to determine a valid mean for multiple samples. Rather a geometric or logarithmic mean is representative of results obtained from these analyses. In determining the geometric mean of the values shown in Tables 6 and 7, all values showing as greater than a given number were deleted before the mean was calculated. Where the value is reported as less than a given number that number was used in the calculation of the mean. Calculations performed in this manner gave an MPN for the belt press solids of 511,754 MPN per kilogram of sample. Dividing this by the volatile suspended solids and multiplying by 1,000 then gives the MPN per gram of volatile solids. For the belt press solids this calculation yielded a value of 3,763 MPN/gm VSS.

The same calculation was performed on the samples taken from Pond 3 (log mean MPN = 17,959) and a value of 1,773 resulted. Pond 3 solids will be dewatered. This is taken into account and an absolute maximum value for fecal coliform in the dewatered solids may be determined, by calculating the ratio of the TSS after dewatering to that observed before dewatering and multiplying that ratio by the MPN per gram of volatile suspended solids

before dewatering. Assuming that the belt press will yield the same cake when operated on Pond 3 material, as it does on WAS, a multiplier of 12.73 yields an MPN/gm VSS in the solids being disposed less than 22,570 MPN per gram of VSS. As this number exceeds that observed in the dewatered sludge from the Pond 3 clarifier, it is considered to be a valid maximum value.

Metals Results

Tables 6 and 7 shows the results of the metals analyses performed on the samples collected in April. Values again are given in mg/kg of sample.

Date	Time	Hg	Cd	Cr	PB	AG	Zn
4/20/11	10:30	ND	ND	4.0	ND	ND	87
4/22/11	10:30	ND	ND	5.1	ND	ND	83
4/22/11	14:30	ND	ND	4.8	ND	ND	82
4/25/11	10:30	ND	ND	4.4	ND	ND	89
4/25/11	14:30	NA	NA	NA	NA	NA	NA
4/26/11	9:30	ND	ND	3.8	ND	ND	83
4/26/11	11:30	NA	NA	NA	NA	NA	NA

Table 6
Concentration of Selected Metals
In Belt Press Cake

Date	Time	Hg	Cd	Cr	PB	AG	Zn
4/20/11	10:00	ND	ND	ND	ND	ND	ND
4/22/11	10:00	ND	ND	ND	ND	ND	11
4/22/11	14:00	ND	ND	ND	ND	ND	16
4/25/11	10:00	ND	ND	ND	ND	ND	ND
4/25/11	14:00	NA	NA	NA	NA	NA	NA
4/26/11	9:00	ND	ND	ND	ND	ND	ND
4/26/11	11:30	NA	NA	NA	NA	NA	NA

Table 7
Concentration of Selected Metals
In Pond 3

Tables 8 and 9 show the additional metal analyses performed on the samples collected in May.

Date	As	Cu	Mo	Ni	SE
5/10/11	ND	17.50	ND	ND	ND
5/11/11	ND	16.90	ND	ND	ND
5/12/11	ND	17.2	ND	ND	ND

Table 8
Additional Metal Concentrations
In Filter Cake Press

Date	As	Cu	Mo	Ni	SE
5/10/11	ND	0.60	ND	ND	ND
5/11/11	ND	0.89	ND	0.21	ND
5/12/11	As	0.49	ND	ND	ND

Table 9
Additional Metal Concentrations
In Pond 3

Small amounts of chromium, zinc and copper were the only heavy metals detected. Although a trace of nickel, above the detection limit of 0.2 mg/kg, was observed in one sample from Pond 3, this is considered an anomaly because nickel was not observed to be present in any of the samples from the belt filter press.

Table 10 shows the average concentration of the three metals, chromium, zinc and copper that were present in a sufficient number of the samples taken to permit the calculation of an average value.

Value	Metal		
	Cr	Zn	Cu
Mean Value	4.4	84.8	17.2
Conc. Mg/gm TSS	0.024	0.453	0.092
Max. Allow able	3000	7500	4300

Table 10
Metal Concentrations Present
And Maximum Allowable Concentrtations

Of the metals found in Pond 3 only copper was present at a concentration to permit computation of an average value which was 0.66 mg/kg of sample. Converting this to the concentration per gm of TSS and applying the same dewatering concentration factor as before, a value of 0.57 mg/kg results.

IV Conclusions

Analysis of samples of solids cake from a belt press being used to dewater activated sludge (WAS) at the National Beef Facility in Brawley California shows that only the metals chromium and zinc are present. These are at a concentration far below that considered a maximum value for land disposal and should not pose a threat to the Public Health or Safety. This material may be disposed of locally by land application to crops not produced for direct human consumption. Analysis of an additional 3 samples for additional metals showed that only copper was present at detectable levels and well below the maximum allowable levels.

The fecal coliform density of some 4,000 MPN/gm of Volatile Suspended Solids is much lower than the 2×10^6 per gram Total Volatile solids allowed by EPA regulations to for Class B biosolids.

The material currently contained in Pond 3 does not contain a sufficient concentration of chromium, copper or zinc to represent a threat to Human Health or Safety if disposed on by application to local agricultural land.

After dewatering Pond 3 solids will contain a maximum of some 23,000 MPN per gram of Volatile Suspended Solids and easily meet the requirements for classification as a Class B sludge. No metals were present in sufficient concentrations to be of concern for the application of the material after dewatering to local agricultural land.

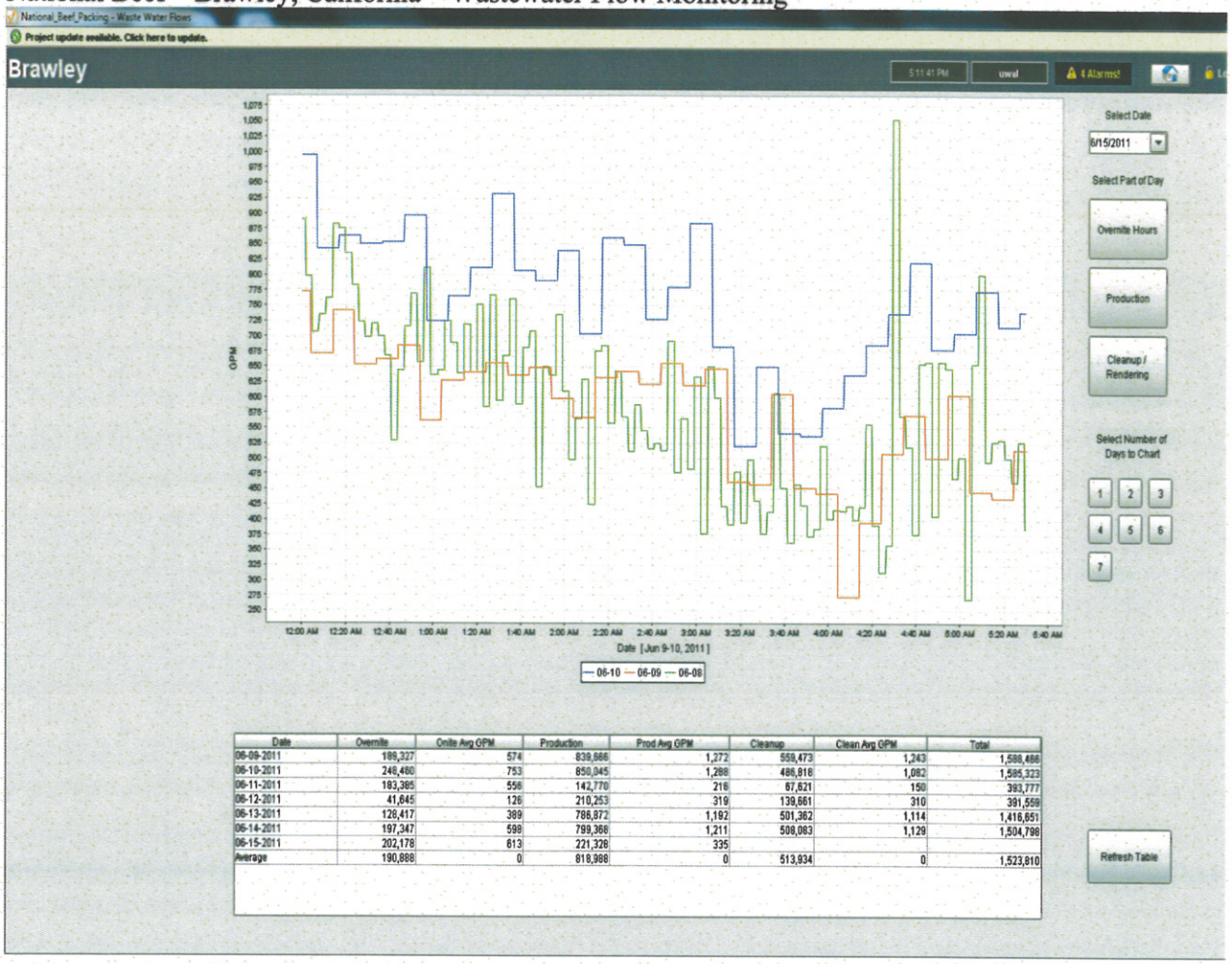
Appendix B
Historical City Wastewater Monitoring

National Beef - Brawley, California - Composite Test Results at City Manhole

Date	Lab Number	City Manhole BOD (mg/L)	City Manhole TSS (mg/L)	City Manhole NH3 (mg/L)	City Manhole TDS (mg/L)	BOD and TSS Limit (mg/L)	NH3 Limit (mg/L)
05/06/10	11547	78.5	18.0	16.80	2,305	250	30
05/13/10	11569	73.5	28.0	17.36	3,359	250	30
05/20/10	11591	88.5	37.5	17.92	2,439	250	30
05/27/10	11616	69.0	46.0	16.24	2,118	250	30
06/03/10	11644	55.5	38.5	12.32	2,318	250	30
06/10/10	11674	180.0	429.0	45.92	2,249	250	30
06/17/10	11699	84.0	1,367.0	72.24	2,957	250	30
06/24/10	11725	165.0	402.0	62.72	3,868	250	30
07/01/10	11748	237.0	701.0	94.08	2,426	250	30
07/03/10	11752	260.0	1,846.0	81.76	2,134	250	30
07/08/10	11783	380.0	2,908.0	43.68	2,167	250	30
07/10/10	11790	83.0	3,627.0	36.96	2,084	250	30
07/15/10	11814	430.0	463.5	38.64	2,140	250	30
07/17/10	11817	440.0	1,076.0	28.88	2,137	250	30
07/22/10	11841	300.0	1,480.5	22.96	2,176	250	30
07/24/10	11847	72.0	475.5	23.52	2,343	250	30
07/26/10	11853	45.0	52.5	28.00	2,264	250	30
07/29/10	11866	69.0	97.5	22.40	2,284	250	30
07/31/10	11870	57.0	111.0	24.08	2,041	250	30
08/05/10	11906	57.0	92.0	11.20	2,178	250	30
08/12/10	11934	55.5	72.0	19.60	2,084	250	30
08/19/10	11963	52.5	107.5	20.16	2,082	250	30
08/26/10	11981	111.0	318.0	23.52	2,039	250	30
09/02/10	12011	55.5	55.0	1.12	2,056	250	30
09/09/10	12045	87.0	130.0	20.52	2,247	250	30
09/16/10	12079	120.0	138.0	21.84	2,126	250	30
09/23/10	12109	87.0	118.5	21.28	2,253	250	30
09/30/10	12137	81.0	116.0	17.92	2,197	250	30
10/07/10	12175	54.0	51.0	31.36	2,257	250	30
10/14/10	12210	66.0	87.0	22.40	2,245	250	30
10/21/10	12243	66.0	63.0	17.92	2,282	250	30
10/28/10	12270	110.0	74.0	16.80	2,634	250	30
11/04/10	12306	48.8	83.0	16.24	2,209	250	30
11/11/10	12346	58.5	320.0	2.80	2,224	250	30
11/18/10	12374	123.0	186.0	6.16	2,167	250	30
11/23/10	12383	66.6	183.0	14.56	2,120	250	30
12/02/10	12414	49.5	64.0	2.64	2,016	250	30
12/09/10	12455	31.5	38.0	17.36	2,058	250	30
12/16/10	12502	198.0	590.0	35.84	2,047	250	30
12/21/10	12517	348.0	843.0	67.76	2,163	250	30
12/28/10	12534	222.0	615.0	46.48	2,213	250	30
01/06/11	12564	90.0	550.0	24.64	2,122	250	30
01/13/11	12597	240.0	3,290.0	23.52	2,054	250	30
01/19/11	12611	420.0	8,114	59.4	1,936	250	30
01/27/11	12636	378.0	3,250	23.5	1,702	250	30
02/03/11	12664	194.0	465	20.2	2,088	250	30
02/10/11	12699	300.0	126	43.2	2,028	250	30
02/17/11	12725	620.0	4,340	58.2	1,902	250	30
02/24/11	12756	443.0	6,006	43.7	1,700	250	30
03/02/11	12774	501.0	2,768	33.6	1,846	250	30
03/03/11	12784	465.0	3,096	27.4	1,804	250	30
03/08/11	12798	266.0	1,119	40.3	1,898	250	30
03/10/11	12827	229.0	3,042	34.7	692	250	30
03/15/11	12842	392.0	1,634	52.6	1,876	250	30
03/17/11	12849	580.0	7,600	52.1	1,992	250	30
03/22/11	12858	548.0	42	40.3	3,633	250	30
03/24/11	12871	72.0	84	52.1	2,064	250	30
03/29/11	12882	102.0	80	81.8	2,345	250	30
03/31/11	12891	171.0	127	54.3	2,125	250	30
04/05/11	12908	100.3	140	89.6	2,201	250	30
04/07/11	12918	258.0	142	84.6	2,179	250	30
04/12/11	12936	109.0	107	98.5	2,091	250	30
04/14/11	12957	210.0	234	81.2	2,180	250	30
04/19/11	12965	78.3	106	81.8	2,134	250	30
04/21/11	12976	145.0	179	84.6	2,247	250	30
04/26/11	12987	56.0	76	86.2	2,214	250	30
04/28/11	13000	53.3	96	79.5	2,233	250	30
05/03/11	13017	36.0	67	46.5	2,076	250	30
05/05/11	13028	44.0	63	40.3	2,034	250	30
05/13/11	13067	56.0	37	68.9	2,121	250	30
05/19/11	13086	30.0	32	70.0	2,045	250	30
05/26/11	13124	45.8	43	88.5	2,084	250	30

Appendix C
SCADA Screen Printout

National Beef – Brawley, California – Wastewater Flow Monitoring



Date	Overnite	Onite Avg GPM	Production	Prod Avg GPM	Cleanup	Clean Avg GPM	Total
06-09-2011	186,327	574	839,866	1,272	559,473	1,243	1,588,466
06-10-2011	248,480	753	850,045	1,288	486,818	1,082	1,585,323
06-11-2011	183,385	558	142,770	216	67,621	150	393,777
06-12-2011	41,645	126	210,253	319	139,661	310	391,559
06-13-2011	128,417	389	786,872	1,192	501,362	1,114	1,416,651
06-14-2011	197,347	598	799,368	1,211	508,083	1,129	1,504,798
06-15-2011	202,178	613	221,328	335			
Average	190,888	0	818,988	0	513,934	0	1,523,810

Linda S. Adams
Acting Secretary for
Environmental Protection

California Regional Water Quality Control Board
Colorado River Basin Region

73-720 Fred Waring Drive, Suite 100, Palm Desert, California 92260
(760) 346-7491 • Fax (760) 341-6820
http://www.waterboards.ca.gov/coloradoriver

Edmund G. Brown Jr.
Governor

CERTIFIED MAIL: 7003 1010 0004 9647 7669

May 27, 2011

Brian Webb, General Manager
National Beef Company
P.O. Box 1211
57 East Shank Road
Brawley, CA 92227

Dear Mr. Webb:

SUBJECT: NATIONAL BEEF COMPANY REPORT OF WASTE DISCHARGE, BRAWLEY, IMPERIAL COUNTY

National Beef Company owns and operates the beef processing plant in Brawley. The plant generates wastes that are being discharged to onsite ponds and to the City of Brawley wastewater treatment plant. Pursuant to Section 13260 of the California Water Code, National Beef Company is hereby requested to submit to this office a Report of Waste Discharge (ROWD) for the onsite discharges of wastes. The ROWD must include a completed Form 200 (attached) and an Engineering Report that includes the following information:

- A complete wastewater flow diagram for the plant, showing the various waste streams generated by onsite operations (e.g., wastewater from pen areas, from the kill floor, from cleaning/washing operations; sludges; etc.) through the pretreatment ponds where each stream is disposed of, including into the City's sewage collection system, and the design criteria for each treatment process;
- Analyses showing the typical physical, chemical, and biological characteristics of each waste stream;
- The average and maximum daily (or monthly as appropriate) flow and volume for each waste stream. In the case of sludge, the report shall specify the quantity of sludge generated in tons/month (or lbs/day as appropriate);
- A description of all offsite disposal methods for the above-mentioned wastes, including their design criteria.

The Engineering Report must be prepared by a California registered civil engineer experienced in the design of industrial wastewater treatment and disposal facilities. The ROWD must be submitted to this office **by June 30, 2011**. Failure to submit a complete ROWD as requested may subject National Beef Company to administrative civil liability of up to one thousand dollars per day ($1000/day) for each day the ROWD is late or incomplete.

Once we receive a complete ROWD, we will draft waste discharge requirements (WDRs) for Regional Water Board consideration of adoption at one of the Regional Water Board's regularly

schedule meetings. To the extent that National Beef Company threatens violation of the WDRs (or any other Regional Water Board order), we will also recommend the Regional Water Board also adopt enforcement to protect water quality and ensure compliance with all Regional Water Board orders.

If you have any questions concerning this matter, please contact me at (760) 346-6585.

Sincerely,

Doug Wylie, P.E.

Doug Wylie, P.E.
Senior Water Resources Control Engineer
Colorado River Basin
Regional Water Quality Control Board

Jla/sw

Enclosure

cc: Gary Burroughs, City Manager, City of Brawley, 383 Main Street, Brawley, CA 92227