



INNOVATIVE
AG SERVICES

Cactus Ranch

2023 Annual Report

<input checked="" type="checkbox"/> Report Form	<input type="checkbox"/> NA Attachment H
<input checked="" type="checkbox"/> Attachment A	<input type="checkbox"/> NA Attachment I
<input checked="" type="checkbox"/> Attachment B	<input type="checkbox"/> NA Attachment J
<input checked="" type="checkbox"/> Attachment C	<input type="checkbox"/> NA Manure Tracking Manifests
<input checked="" type="checkbox"/> Attachment D	<input type="checkbox"/> NA New or Revised Waste Water Agreements
<input checked="" type="checkbox"/> Attachment E	<input checked="" type="checkbox"/> Groundwater Monitoring Samples
<input checked="" type="checkbox"/> Attachment F	<input type="checkbox"/> NA Monitoring Well Report
<input checked="" type="checkbox"/> Attachment G	<input type="checkbox"/> NA Owner/Operator Change Form

Enclosed are the required documents to be submitted to the Regional Water Quality Control Board Central Valley Region in compliance with Order No. R5-2013-0122 Waste Discharge Requirements, General Order for Existing Milk Cow Dairies for July 1, 2024.

(See attached delivery confirmation)

Annual Report

Cactus Ranch 2023

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

Facility Information:

Name of Dairy Cactus Ranch
Facility Address 8800 Lansing Avenue, Hanford CA 93230

Owner/Operator as of 12/31/2023

Operator Name EJ de Jong
Operator Phone (559) 816-5950
Owner Name EJ de Jong
Owner Phone (559) 816-5950

1. Beginning and end dates of the annual reporting period: crops harvested January 1, 2023 through December 31, 2023.
2. Maximum and average number and type of animals (see Attachment A).
3. Estimated amount of total manure and process wastewater generated by the facility (see Attachment A).
4. Estimated amount of total manure and process wastewater applied to each land application area (see Attachment B).
5. Quantified ratio of total nitrogen applied to land application areas and total nitrogen removed by crop harvest (see Attachment B).
6. Estimated amount of total manure and process wastewater transferred to other persons by the facility (see Attachment C).
7. Total number of acres and the Assessor Parcel Numbers for all land application areas that were not used for application of manure or process wastewater (see Attachment D).
8. Total number of acres and the Assessor Parcel Numbers for all land application areas that were used for land application of manure and process wastewater (see Attachment D).

9. Summary of manure and process wastewater discharges from the production area

Provide a summary of all manure and wastewater discharges from the production area to surface water or to land areas (land application areas or otherwise) when not in accordance with the facility's Nutrient Management Plan, that occurred during the annual reporting period, including the date, time, location, approximate volume, a map showing discharge and sample locations, rationale for sample locations, and method of measuring discharge flows:

- No discharges occurred during the reporting period.
 Yes. _____ Number of discharges occurred (see Attachment H).



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10. Summary of storm water discharges from the production area

Provide a summary of all storm water discharges from the production area to surface water, that occurred during the annual reporting period, including the date, time, approximate volume, duration, location, a map showing discharge and sample locations, rationale for sample locations, and method of measuring discharge flows:

No discharges occurred during the reporting period.

Yes. _____ Number of discharges occurred (see Attachment I).

11. Summary of discharges from the land application area

Provide a summary of all discharges from the land application area to surface water, that occurred during the annual reporting period, including the date, time, approximate volume, location, source of discharge (i.e. tailwater, wastewater or blended wastewater), a map showing discharge and sample locations, rationale for sample locations, and method of measuring discharge flows:

No discharges occurred during the reporting period.

Yes. _____ Number of discharges occurred (see Attachment J).

12. Nutrient Management Plan update

Has the NMP been updated, and if so, was it updated by a Certified Nutrient Management Specialist?

No.

Yes, the new NMP was developed and approved by a Certified Nutrient Management Specialist.

13. Manure/Process Wastewater Tracking Manifests

Did you sell, give away, or otherwise remove manure or process wastewater from your property?

No.

Yes, see attached manifests.

14. Written Agreements

Any process wastewater transferred to a third party that receives process wastewater from your dairy for its own use must have a written agreement consistent with State requirements. Attach copies of revised and/or new agreements not submitted previously. Do not resubmit agreements submitted previously.

Not applicable; no written agreements.

No changes in agreement(s).

Yes, a new or revised agreement is attached.

15. Laboratory Analyses for Discharges

If you answered Yes to items #9, 10, or 11 above, attach copies of all laboratory analyses for all discharges (manure, process wastewater or tailwater), surface water (upstream and downstream of a discharge), and storm water, including chain-of-custody forms and laboratory quality assurance/quality control results, as applicable. (Results for Manure and process wastewater, storm water, and/or storm water are provided).

Not Applicable.

Yes, provided with Attachment H, I, or J for #9, 10 and 11, respectively.

16. Tabulated Nutrient Analytical Data

Attach tabulated analytical data for samples of manure, process wastewater, irrigation water, soil, and plant tissue. The data shall be tabulated to clearly show sample dates, constituents analyzed, constituent concentrations, and detection limits (see Attachment E).



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17. Record-Keeping Results

Attach results of the Record-Keeping Requirements for the production and land application areas specified in Record-Keeping Requirements. These include:

- * Records documenting any corrective actions taken to correct deficiencies noted as a result of the inspections required in the Monitoring Requirements. Deficiencies not corrected in 30 days must be accompanied by an explanation of the factors preventing immediate correction.
- * Records of the date, time, and estimated volume of any overflow or bypass of the wastewater storage or conveyance structures.
- * Expected and actual crop yields (see Attachment F).
- * Identification of crop, acreage, and dates of planting and harvest for each field (see Attachment F).
- * Dates, locations, and approximate weight and moisture content of manure applied to each field (see Attachment B).
- * Dates, locations, and volume of process wastewater applied to each field (see Attachment B).
- * Whether precipitation occurred, or standing water was present at the time of manure and process wastewater applications and for 24 hours prior to and following applications (see Attachment G).
- * Total amount of nitrogen, phosphorus, and potassium actually applied to each field, including documentation of calculations for the total amount applied (see Attachment B).

18. Groundwater Monitoring Section

Groundwater monitoring results are attached.

Monitoring Well results are attached, if applicable.

A. All dischargers must attach groundwater information for supply wells and subsurface (tile) drainage systems including the location of sample collection and all field and laboratory data, including all laboratory analyses (including chain-of-custody forms and laboratory quality assurance/quality control results).

B. Dischargers who have monitoring well systems shall include all laboratory analyses (including chain-of-custody forms and laboratory quality assurance/quality control results) and tabular and graphical summaries of the monitoring data. Data shall be tabulated to clearly show the sample dates, constituents analyzed, constituent concentrations, detection limits, depth to groundwater and groundwater elevations. Graphical summaries of groundwater gradients and flow directions shall also be included. Each groundwater monitoring report shall include a summary data table for all historical and current groundwater elevations and analytical results. The groundwater monitoring results shall be certified by a California registered professional.

19. Storm Water Reporting Section

No significant discharges of storm water occurred from the land application areas.

Yes, significant discharge(s) of storm water occurred from land application areas. The following information shall be submitted for those discharges.

It was not possible to collect any of the required samples or perform visual observations due to adverse climatic conditions.

20. Mortality Management Practices

* Dead cows are picked up and disposed of by rendering service.



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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Same as Owner

Signature of Operator of Facility

EJ de Jong

Signature of Owner of Facility

EJ de Jong

Print Name

EJ de Jong

Print Name

Title and Date

6/17/2024

Title and Date



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Cactus Ranch 2023
Estimated Manure and Nutrients Generated (Attachment A)

Animal Type	Maximum No. of Head	Average No. of Head*	Housing Type	Weight	Total Manure Produced (tons/year)	NITROGEN	PHOSPHORUS	POTASSIUM	SALTS
						Net (LB) Available for Land Application			
Hol Heifers(15-24)	550	536	Dry Scrape	1,000	5,595.05	74,343.20	11,738.40	35,215.20	138,043.58
	550	536			5,595.05	74,343.20	11,738.40	35,215.20	138,043.58

* The Average No. of Head is used to calculate manure and nutrient production

Estimated Amount of Total Process Wastewater and Nutrients Generated

Total Gallons of Process Wastewater Generated***	Average TKN Concentration (mg/L)*	Average Total Phosphorus Concentration (mg/L)*	Average Potassium Concentration (mg/L)*	Average Total Dissolved Solids (mg/L)*	Total Nitrogen Generated (lb)**	Total Phosphorus Generated (lb)**	Total Potassium Generated (lb)**	Total Salt Generated (lb)**
738,597	326.75	71.08	941.50	4,705.00	2,010.33	437.29	5,792.59	28,947.57

* The average Total Kjeldahl Nitrogen, Total Phosphorus, Total Potassium, and Total Salt concentrations are based on an average of all process wastewater sample results for the year.

** The total pounds of Nitrogen, Phosphorus, Potassium and Total Dissolved Solids generated = Average Concentration (mg/L) X Total Gallons of Wastewater Generated X 8.33 X 0.000001.

*** The total gallons of process wastewater generated is calculated as the total gallons of process wastewater applied to all land application areas (Attachment B) plus the total gallons of process wastewater transferred offsite (Attachment C).



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Cactus Ranch 2023
Nutrient Applications (Attachment B)

Field Name: MR1

Wheat, 61 Acres Planted on 11/03/2022

Date	Event/Source	Amount Applied/Yield (per Acre)	Units	Lab Sample Data				Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)
				% Moist.	Nitrogen	Phos.	Potass.							
10/12/2022	Fertilize - UN32	15.00	Gallons		32.00	0.00	0.00	%		2,439	0	0	0	
10/12/2022	Ground Water: Well Avg	4.60	Acre Inches		0.23			mg/L			15	0	0	19,041
01/01/2023	Atmospheric Deposit	14.00	Pounds		100.00			%			854			
04/10/2023	Surface Water: Lakeside	5.80	Acre Inches		0.90			mg/L			72	0	0	7,202
04/10/2023	Waste Water: Main Lagoon	0.20	Acre Inches		166.00	107.00	1,110.0	mg/L		331,282	458	295	3,063	11,894
05/14/2023	Harvest	18.80	Tons	62.40	1.64	0.35	2.28	%						14,143
Acre Inches Applied:		10.60		Totals:					331,282	3,838	295	3,063	38,137	14,143
Season Nitrogen Ratio:		0.27		Lbs Per Acre:					63	5	50	625	232	



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Cactus Ranch 2023
Nutrient Applications (Attachment B)

Field Name: MR1

Corn, 61 Acres Planted on 06/16/2023

Date	Event/Source	Amount Applied/Yield (per Acre)	Units	Lab Sample Data				Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)
05/31/2023	Surface Water: Lakeside	5.30	Acre Inches	0.90			mg/L			66	0	0	6,582	
07/07/2023	Fertilize - UN32	35.00	Gallons	32.00	0.00	0.00	%			5,691	0	0	0	
07/07/2023	Surface Water: Lakeside	6.00	Acre Inches	0.90			mg/L			74	0	0	7,451	
07/24/2023	Surface Water: Lakeside	5.80	Acre Inches	0.90			mg/L			72	0	0	7,202	
08/13/2023	Surface Water: Lakeside	5.50	Acre Inches	0.90			mg/L			68	0	0	6,830	
09/06/2023	Surface Water: Lakeside	5.30	Acre Inches	0.90			mg/L			66	0	0	6,582	
09/22/2023	Surface Water: Lakeside	5.20	Acre Inches	0.90			mg/L			65	0	0	6,457	
10/14/2023	Surface Water: Lakeside	5.00	Acre Inches	0.90			mg/L			62	0	0	6,209	
11/02/2023	Harvest	23.70	Tons	66.70	1.14	0.21	0.90	%						10,976
Acre Inches Applied:		38.10		Totals:						6,165	0	0	47,314	10,976
Season Nitrogen Ratio:		0.56		Lbs Per Acre:						101	0	0	776	180

Cactus Ranch 2023
Nutrient Applications (Attachment B)

Field Name: MR2

Wheat, 75 Acres Planted on 11/03/2022

Date	Event/Source	Amount Applied/Yield (per Acre)	Units	Lab Sample Data				Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)
				% Moist.	Nitrogen	Phos.	Potass.							
10/12/2022	Fertilize - UN32	15.00	Gallons		32.00	0.00	0.00	%		2,998	0	0	0	
10/12/2022	Ground Water: Well Avg	4.60	Acre Inches		0.23			mg/L		18	0	0	23,411	
01/01/2023	Atmospheric Deposit	14.00	Pounds		100.00			%		1,050				
04/11/2023	Surface Water: Lakeside	5.80	Acre Inches		0.90			mg/L		88	0	0	8,855	
04/11/2023	Waste Water: Main Lagoon	0.20	Acre Inches		166.00	107.00	1,110.0	mg/L		407,314	563	363	3,766	14,624
05/14/2023	Harvest	17.60	Tons	63.00	1.61	0.36	2.41	%						15,727
Acre Inches Applied:		10.60		Totals:					407,314	4,718	363	3,766	46,890	15,727
Season Nitrogen Ratio:		0.30		Lbs Per Acre:					63	5	50	625	210	

Cactus Ranch 2023
Nutrient Applications (Attachment B)

Field Name: MR3

Wheat, 43 Acres Planted on 11/04/2022

Date	Event/Source	Amount Applied/Yield (per Acre) Units	Lab Sample Data				Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)
10/10/2022	Fertilize - UN32	15.00 Gallons	32.00	0.00	0.00	%			1,719	0	0	0	
10/15/2022	Ground Water: Well Avg	5.00 Acre Inches	0.23			mg/L			11	0	0	14,589	
01/01/2023	Atmospheric Deposit	14.00 Pounds	100.00			%			602				
04/09/2023	Surface Water: Lakeside	6.00 Acre Inches	0.90			mg/L			52	0	0	5,252	
05/14/2023	Harvest	19.40 Tons	62.90	1.62	0.35	2.52	%						10,028
Acre Inches Applied:		11.00	Totals:						2,385	0	0	19,842	10,028
Season Nitrogen Ratio:		0.24	Lbs Per Acre:						55	0	0	461	233

Field Name: MR3

Corn, 43 Acres Planted on 06/16/2023

Date	Event/Source	Amount Applied/Yield (per Acre) Units	Lab Sample Data				Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)
05/31/2023	Surface Water: Lakeside	5.30 Acre Inches	0.90			mg/L			46	0	0	4,640	
07/10/2023	Fertilize - UN32	35.00 Gallons	32.00	0.00	0.00	%			4,012	0	0	0	
07/10/2023	Surface Water: Lakeside	6.00 Acre Inches	0.90			mg/L			52	0	0	5,252	
07/24/2023	Surface Water: Lakeside	6.00 Acre Inches	0.90			mg/L			52	0	0	5,252	
08/13/2023	Surface Water: Lakeside	5.50 Acre Inches	0.90			mg/L			48	0	0	4,815	
09/06/2023	Surface Water: Lakeside	5.50 Acre Inches	0.90			mg/L			48	0	0	4,815	
09/22/2023	Surface Water: Lakeside	5.00 Acre Inches	0.90			mg/L			44	0	0	4,377	
10/09/2023	Surface Water: Lakeside	5.00 Acre Inches	0.90			mg/L			44	0	0	4,377	
10/23/2023	Harvest	23.40 Tons	62.30	1.08	0.23	0.99	%						8,194
Acre Inches Applied:		38.30	Totals:						4,347	0	0	33,528	8,194
Season Nitrogen Ratio:		0.53	Lbs Per Acre:						101	0	0	780	191



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Cactus Ranch 2023
Nutrient Applications (Attachment B)

Field Name: MR4

Wheat, 112 Acres Planted on 11/04/2022

Date	Event/Source	Amount Applied/Yield (per Acre)	Units	Lab Sample Data				Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)
10/14/2022	Fertilize - UN32	15.00	Gallons	32.00	0.00	0.00	%			4,478	0	0	0	
10/14/2022	Ground Water: Well Avg	5.00	Acre Inches	0.23			mg/L			29	0	0	38,000	
01/01/2023	Atmospheric Deposit	14.00	Pounds	100.00			%			1,568				
04/09/2023	Surface Water: Lakeside	6.10	Acre Inches	0.90			mg/L			139	0	0	13,908	
05/06/2023	Harvest	17.20	Tons	67.80	1.60	0.39	1.51	%						19,850
Acre Inches Applied:		11.10		Totals:						6,214	0	0	51,909	19,850
Season Nitrogen Ratio:		0.31		Lbs Per Acre:						55	0	0	463	177

Field Name: MR4

Corn, 112 Acres Planted on 06/16/2023

Date	Event/Source	Amount Applied/Yield (per Acre)	Units	Lab Sample Data				Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)
05/31/2023	Surface Water: Lakeside	5.30	Acre Inches	0.90			mg/L			121	0	0	12,085	
07/08/2023	Fertilize - UN32	35.00	Gallons	32.00	0.00	0.00	%			10,450	0	0	0	
07/08/2023	Surface Water: Lakeside	6.00	Acre Inches	0.90			mg/L			137	0	0	13,681	
07/25/2023	Surface Water: Lakeside	6.00	Acre Inches	0.90			mg/L			137	0	0	13,681	
08/14/2023	Surface Water: Lakeside	5.50	Acre Inches	0.90			mg/L			125	0	0	12,541	
09/07/2023	Surface Water: Lakeside	5.40	Acre Inches	0.90			mg/L			123	0	0	12,312	
09/23/2023	Surface Water: Lakeside	5.00	Acre Inches	0.90			mg/L			114	0	0	11,400	
10/08/2023	Surface Water: Lakeside	4.50	Acre Inches	0.90			mg/L			103	0	0	10,260	
10/23/2023	Harvest	23.90	Tons	62.70	1.03	0.20	0.97	%						20,568
Acre Inches Applied:		37.70		Totals:						11,310	0	0	85,960	20,568
Season Nitrogen Ratio:		0.55		Lbs Per Acre:						101	0	0	768	184



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Cactus Ranch 2023
Nutrient Applications (Attachment B)

Field Name: MR5

Wheat, 7 Acres Planted on 11/06/2022

Date	Event/Source	Amount Applied/Yield (per Acre)	Units	Lab Sample Data				Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)
				%	Moist.	Nitrogen	Phos.							
10/12/2022	Fertilize - UN32	20.00	Gallons	32.00	0.00	0.00	%			373	0	0	0	
10/12/2022	Ground Water: Well Avg	4.80	Acre Inches	0.23			mg/L			2	0	0	2,280	
01/01/2023	Atmospheric Deposit	14.00	Pounds	100.00			%			98				
04/10/2023	Surface Water: Lakeside	5.90	Acre Inches	0.90			mg/L			8	0	0	841	
05/14/2023	Harvest	17.00	Tons	63.20	1.60	0.37	2.38	%						1,401
Acre Inches Applied:		10.70		Totals:						481	0	0	3,121	1,401
Season Nitrogen Ratio:		0.34		Lbs Per Acre:						69	0	0	446	200



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Nutrient Applications (Attachment B)

Field Name: MR6

Wheat, 17 Acres Planted on 11/06/2022

Date	Event/Source	Amount Applied/Yield (per Acre)	Units	Lab Sample Data				Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)
				% Moist.	Nitrogen	Phos.	Potass.							
10/15/2022	Fertilize - UN32	15.00	Gallons		32.00	0.00	0.00	%		680	0	0	0	0
10/15/2022	Ground Water: Well Avg	4.60	Acre Inches		0.23			mg/L			4	0	0	5,307
01/01/2023	Atmospheric Deposit	14.00	Pounds		100.00			%			238			
03/28/2023	Surface Water: Lakeside	5.80	Acre Inches		0.90			mg/L			20	0	0	2,007
05/14/2023	Harvest	17.40	Tons		62.30	1.63	0.36	2.51	%					3,635
Acre Inches Applied:		10.40		Totals:						942	0	0	7,314	3,635
Season Nitrogen Ratio:		0.26		Lbs Per Acre:						55	0	0	430	214

Cactus Ranch 2023
Nutrient Applications (Attachment B)

Field Name: MR7

Wheat, 7 Acres Planted on 11/03/2022

Date	Event/Source	Amount Applied/Yield (per Acre)	Units	Lab Sample Data				Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)
				%	Moist.	Nitrogen	Phos.							
10/16/2022	Fertilize - UN32	15.00	Gallons		32.00	0.00	0.00	%		280	0	0	0	
10/16/2022	Ground Water: Well Avg	5.00	Acre Inches		0.23			mg/L			2	0	0	2,375
01/01/2023	Atmospheric Deposit	14.00	Pounds		100.00			%			98			
03/28/2023	Surface Water: Lakeside	6.00	Acre Inches		0.90			mg/L			9	0	0	855
05/14/2023	Harvest	17.20	Tons		61.30	1.56	0.35	2.14	%					1,454
Acre Inches Applied:		11.00		Totals:						388	0	0	3,230	1,454
Season Nitrogen Ratio:		0.27		Lbs Per Acre:						55	0	0	461	208

Cactus Ranch 2023
Nutrient Applications (Attachment B)

Field Name: MR8

Wheat, 21 Acres Planted on 11/07/2022

Date	Event/Source	Amount Applied/Yield (per Acre)	Units	Lab Sample Data				Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)
				% Moist.	Nitrogen	Phos.	Potass.							
10/16/2022	Fertilize - UN32	15.00	Gallons		32.00	0.00	0.00	%		840	0	0	0	0
10/16/2022	Ground Water: Well Avg	5.20	Acre Inches		0.23			mg/L		6	0	0	7,410	
01/01/2023	Atmospheric Deposit	14.00	Pounds		100.00			%		294				
03/27/2023	Surface Water: Lakeside	6.00	Acre Inches		0.90			mg/L		26	0	0	2,565	
05/14/2023	Harvest	17.00	Tons		61.80	1.48	0.36	2.25	%					4,037
Acre Inches Applied:		11.20		Totals:						1,165	0	0	9,975	4,037
Season Nitrogen Ratio:		0.29		Lbs Per Acre:						55	0	0	475	192

Cactus Ranch 2023
Nutrient Applications (Attachment B)

Field Name: MR9

Corn, 50 Acres Planted on 04/20/2023

Date	Event/Source	Amount Applied/Yield (per Acre)	Units	Lab Sample Data				Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)	
				% Moist.	Nitrogen	Phos.	Potass.								
01/01/2023	Atmospheric Deposit	14.00	Pounds		100.00		%			700					
03/24/2023	Corral Solids: Main Corral	10.00	Tons	1.78	0.94	0.37	0.79	%	500		9,232	3,624	7,798	0	
05/10/2023	Surface Water: Lakeside	5.50	Acre Inches		0.90			mg/L			56	0	0	5,598	
05/21/2023	Surface Water: Lakeside	6.00	Acre Inches		0.90			mg/L			61	0	0	6,108	
06/11/2023	Fertilize - UN32	35.00	Gallons		32.00	0.00	0.00	%			4,665	0	0	0	
06/11/2023	Surface Water: Lakeside	6.00	Acre Inches		0.90			mg/L			61	0	0	6,108	
06/22/2023	Surface Water: Lakeside	5.50	Acre Inches		0.90			mg/L			56	0	0	5,598	
07/09/2023	Surface Water: Lakeside	5.50	Acre Inches		0.90			mg/L			56	0	0	5,598	
07/22/2023	Surface Water: Lakeside	5.50	Acre Inches		0.90			mg/L			56	0	0	5,598	
08/02/2023	Harvest	26.80	Tons	62.70	1.31	0.26	0.64	%						13,096	
Acre Inches Applied:		34.00						Totals:	500		14,944	3,624	7,798	34,609	13,096
Season Nitrogen Ratio:		1.14						Lbs Per Acre:			299	72	156	692	262

Cactus Ranch 2023
Nutrient Applications (Attachment B)

Field Name: MR10

Corn, 60 Acres Planted on 04/20/2023

Date	Event/Source	Amount Applied/Yield (per Acre)	Units	Lab Sample Data				Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)	
01/01/2023	Atmospheric Deposit	14.00	Pounds	100.00		%			840						
03/24/2023	Corral Solids: Main Corral	10.00	Tons	1.78	0.94	0.37	0.79	%	600	11,079	4,349	9,358	0		
05/11/2023	Surface Water: Lakeside	5.50	Acre Inches		0.90			mg/L		67	0	0	6,718		
05/22/2023	Surface Water: Lakeside	6.00	Acre Inches		0.90			mg/L		73	0	0	7,329		
06/12/2023	Fertilize - UN32	35.00	Gallons		32.00	0.00	0.00	%		5,598	0	0	0		
06/12/2023	Surface Water: Lakeside	6.00	Acre Inches		0.90			mg/L		73	0	0	7,329		
06/23/2023	Surface Water: Lakeside	5.50	Acre Inches		0.90			mg/L		67	0	0	6,718		
07/10/2023	Surface Water: Lakeside	5.50	Acre Inches		0.90			mg/L		67	0	0	6,718		
07/22/2023	Surface Water: Lakeside	5.00	Acre Inches		0.90			mg/L		61	0	0	6,107		
08/02/2023	Harvest	25.00	Tons	63.10	1.23	0.24	1.16	%							13,616
Acre Inches Applied:		33.50		Totals:				600	17,926	4,349	9,358	40,920	13,616		
Season Nitrogen Ratio:		1.32		Lbs Per Acre:					299	72	156	682		227	

Cactus Ranch 2023
Nutrient Applications (Attachment B)

Field Name: MR11

Date	Event/Source	Amount Applied/Yield (per Acre)	Units	Lab Sample Data			Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)
				% Moist.	Nitrogen	Phos.							
01/01/2023	Atmospheric Deposit	14.00	Pounds		100.00				70				
	Acre Inches Applied:	0.00					Totals:			70			
Season Nitrogen Ratio:							Lbs Per Acre:			14			

Season Notes: Fallow.

Cactus Ranch 2023
Nutrient Applications (Attachment B)

Field Name: MR12

Wheat, 20 Acres Planted on 11/01/2022

Date	Event/Source	Amount Applied/Yield (per Acre)	Units	Lab Sample Data				Manure Applied (Tons)	Wastewater Applied (Gallons)	Nitrogen Applied (Lbs)	Phosphorus Applied (Lbs)	Potassium Applied (Lbs)	Salt Applied (Lbs)	Nitrogen Extracted (Lbs)
				% Moist.	Nitrogen	Phos.	Potass.							
10/15/2022	Fertilize - UN32	15.00	Gallons	32.00	0.00	0.00	%			800	0	0	0	
10/15/2022	Ground Water: Well Avg	4.80	Acre Inches	0.23			mg/L			5	0	0	6,514	
01/01/2023	Atmospheric Deposit	14.00	Pounds	100.00			%			280				
04/07/2023	Surface Water: Lakeside	6.00	Acre Inches	0.90			mg/L			24	0	0	2,443	
05/06/2023	Harvest	17.60	Tons	70.30	1.26	0.31	1.08	%						2,635
Acre Inches Applied:		10.80		Totals:						1,109	0	0	8,957	2,635
Season Nitrogen Ratio:		0.42		Lbs Per Acre:						55	0	0	448	132

Cactus Ranch 2023
Nutrient Applications (Attachment B)

Summary of Nutrient Applications, Removal, and Balance

	<u>Total N (Lbs)</u>	<u>Total P (Lbs)</u>	<u>Total K (Lbs)</u>	<u>Total Salts (Lbs)</u>	<u>Total Manure Applied</u>	
<i>Solid Manure</i>	20,311.50	7,973.90	17,156.70	0.00	1,100.00	tons
<i>Process Wastewater</i>	1,021.36	658.24	6,829.92	26,517.28	738,596.96	gallons
<i>Irrigation Water</i>	2,954.22					
<i>Fertilizer / Total Imports</i>	45,021.85					
<i>Atmospheric Deposition</i>	6,692.00					
<i>Total Nitrogen Applied</i>	76,000.93					
<i>Crop Nitrogen Removal</i>	139,358.30					
<i>Nitrogen Balance</i>	(63,357.37)					
<i>Nitrogen Ratio</i>	0.55					

- Nutrient applications shown in Attachment B are on a crop year basis.
- Lab sample data results for applications are based on the sample taken closest to the application date. Lab sample data results are shown on 100% dry basis for manure applications and harvest events.
- Well Avg: Irrigation source representing the average nutrient values of all irrigation wells sampled for the facility during the reporting year.

** Book Value: No sample data results were available. For manure applications and plant tissue harvests, the calculations were based off book values.

Cactus Ranch 2023 Nutrient Applications (Attachment B)

FIELD NITROGEN RATIO Calculation:

"Field Nitrogen Ratio" = "Total Nitrogen Applied to Field" / "Total Nitrogen Extracted from Field at Harvest"

ATMOSHERIC DEPOSITION Applied (Lbs) Calculation:

"Nitrogen Applied (Lbs)" = "14 Lbs (per year) * "Acres Planted"

HARVEST Nitrogen Extraction (Lbs) Calculation:

"Nitrogen Extracted (Lbs)" = ("Yield" (tons per acre) * 2000) * ((100 - "% Moisture") / 100 * "Lab Sample Data Nitrogen Value" / 100) * "Acres Planted"

IRRIGATION Nitrogen and Salts Applied (Lbs) Calculations:

"Nitrogen Applied (Lbs)" = "Lbs Applied per Acre" (see below) * ("Lab Sample Data Nitrogen Value" * 0.000001) * "Acres Planted"

"Salts Applied (Lbs)" = "Lbs Applied per Acre" (see below) * ("Lab Sample Data TDS Value" * 0.000001) * "Acres Planted"

PROCESS WASTEWATER Nitrogen, Phosphorus, Potassium and Salts Applied (Lbs) Calculations:

"Nitrogen Applied (Lbs)" = "Lbs Applied per Acre" (see below) * ("Lab Sample Data Nitrogen Value" * 0.000001) * "Acres Planted"

"Phosphorus Applied (Lbs)" = "Lbs Applied per Acre" (see below) * ("Lab Sample Data Phosphorus Value" * 0.000001) * "Acres Planted"

"Potassium Applied (Lbs)" = "Lbs Applied per Acre" (see below) * ("Lab Sample Data Potassium Value" * 0.000001) * "Acres Planted"

"Salt Applied (Lbs)" = "Lbs Applied per Acre" (see below) * ("Lab Sample Data TDS Value" * 0.000001) * "Acres Planted"

SOLID MANURE (Corral, Separator, or Compost) Nitrogen, Phosphorus, Potassium and Salts Applied (Lbs) Calculations:

"Nitrogen Applied (Lbs)" = "Lbs Applied per Acre" (see below) * ((100 - "% Moisture")/100 * "Lab Sample Data Nitrogen Value"/100) * "Acres Planted"

"Phosphorus Applied (Lbs)" = "Lbs Applied per Acre" (see below) * ((100 - "% Moisture")/100 * "Lab Sample Data Phosphorus Value"/100) * "Acres Planted"

"Potassium Applied (Lbs)" = "Lbs Applied per Acre" (see below) * ((100 - "% Moisture")/100 * "Lab Sample Data Potassium Value"/100) * "Acres Planted"

"Salt Applied (Lbs)" = "Lbs Applied per Acre" (see below) * ((100 - "% Moisture")/100 * "Lab Sample Data Ash Value"/100) * "Acres Planted"

"Lbs Applied per Acre" Calculations:

If "Application Units" = Tons, Then "Lbs Applied per Acre" = "Application Amount" (per Acre) * 2000

If "Application Units" = Acres Inches, Then "Lbs Applied per Acre" = "Application Amount" (per Acre) * 8.33 *27,154.3

If "Application Units" = Acre Feet, Then Lbs Applied per Acre" = "Application Amount" (per Acre) * 8.33 * 325,851

If "Application Units" = Gallons, Then "Lbs Applied per Acre" = "Application Amount" (per Acre) * 8.33



INNOVATIVE AG SERVICES

Cactus Ranch 2023

Estimated Manure and Process Wastewater/Nutrients Transferred Off-Site (Attachment C)**A. ESTIMATED TOTAL MANURE TRANSFERRED OFFSITE**

Total Manure Exported (tons)*	Total Nitrogen Exported (lbs)**	Total Phosphorus Exported (lbs)**	Total Potassium Exported (lbs)**	Total Salts Exported (lbs)**
-------------------------------	---------------------------------	-----------------------------------	----------------------------------	------------------------------

* The Total Manure (tons) should be calculated as the sum of all manure transferred offsite as reported in all the Manure/Process Wastewater Tracking Manifests for the reporting period.

** Total (N, P, K, Salts) (lbs) = Sum of (N, P, K, Salts) for each manure export event based on (Manure(tons) x 2000lb/ton) x ((100-moisture%)/100) x (N, P, K, and Ash) Concentration (%, dry weight) / 100 using the samples closest in date to the export event.

B. ESTIMATED TOTAL PROCESS WASTEWATER TRANSFERRED OFFSITE

Total Process Wastewater Exported (gal)*	Total Nitrogen Exported (lbs)**	Total Phosphorus Exported (lbs)**	Total Potassium Exported (lbs)**	Total TDS Exported (lbs)**
--	---------------------------------	-----------------------------------	----------------------------------	----------------------------

* The Total Manure (gals) should be calculated as the sum of all manure transferred offsite as reported in all the Manure/Process Wastewater Tracking Manifests for the reporting period.

** Total (Nitrogen, Phosphorus, Potassium, TDS) (lbs) = Sum of (Nitrogen, Phosphorus, Potassium, TDS) for each wastewater export event based on (Process Wastewater(gals) x 8.33lb/gal) x (N03-N or TKN, P, K, TDS) x 10-6 using the samples closest in date to the export event.

Cactus Ranch 2023
Land Application Area Description Technical Report (Attachment D)

Field Name	Assessor Parcel Number(s)	Acres	Type of Waste Applied
MR1	x028 x205 x017 x000	61	Process Wastewater
MR2	x028 x205 x017 x000	75	Process Wastewater
MR3	x028 x205 x003 x000	43	None
MR4	x028 x205 x003 x000	112	None
MR5	x028 x205 x019 x000	7	None
MR6	x028 x205 x012 x000, x028 x205 x019 x000	17	None
MR7	x028 x205 x015 x000	7	None
MR8	x028 x205 x015 x000	21	None
MR9	x028 x205 x020 x000	50	Manure
MR10	x028 x205 x020 x000	60	Manure
MR11	x028 x205 x014 x000	5	None
MR12	x028 x205 x014 x000	20	None
			478

Production Area APN(s): x028 x205 x014 x000

Cactus Ranch 2023
Lab Results Summary (Attachment E)

Process Wastewater

(mg/l/ppm unless noted otherwise)

Sample Date:	TKN	TP	TK	EC (umhos/cm)	NH4N	NO3N	TDS	pH (units)	General Minerals						
									CA	MG	NA	HCO3	CO3	SO4	CL
02/16/2023	288.00	111.00	1,230.00	6,670	72.00		4,430.00								
04/25/2023	166.00	107.00	1,110.00	6,490	78.30	0.00	4,310.00	7.79							
07/13/2023	352.00	37.00	656.00	7,560	281.00		5,020.00								
11/07/2023	501.00	29.30	770.00	7,620	496.00		5,060.00								
Averages:	326.75	71.08	941.50	7,085	231.82	0.00	4,705.00	7.79							

Manure - Corral Solids

(Dry Weight Basis)

Sample Date:	TN	TP	TK	Moisture	Ash	CA	MG	NA	S	CL
06/02/2023	0.94	0.37	0.79	1.78						%
11/07/2023	1.59	0.62	1.91	36.50						%
Averages:	1.26	0.50	1.35	19.14						

Plant Tissue

(Dry Weight Basis)

Field:	Crop #:	Crop	Sample Date:	TN (lbs/ton)	TP (lbs/ton)	TK (lbs/ton)	Moisture (%)	Ash (%)
MR1	1	Wheat	05/14/2023	32.80	6.94	45.60	62.40	9.25
MR1	2	Corn	11/02/2023	22.80	4.26	18.06	66.70	5.04



INNOVATIVE AG SERVICES

Cactus Ranch 2023
Lab Results Summary (Attachment E)

Plant Tissue*(Dry Weight Basis)*

Field:	Crop #:	Crop	Sample Date:	TN (lbs/ton)	TP (lbs/ton)	TK (lbs/ton)	Moisture (%)	Ash (%)
MR2	1	Wheat	05/14/2023	32.20	7.24	48.20	63.00	9.85
MR3	1	Wheat	05/14/2023	32.40	7.08	50.40	62.90	9.67
MR3	2	Corn	10/23/2023	21.60	4.56	19.82	62.30	5.43
MR4	1	Wheat	05/06/2023	32.00	7.76	30.20	67.80	8.24
MR4	2	Corn	10/23/2023	20.60	4.00	19.46	62.70	4.84
MR5	1	Wheat	05/14/2023	32.00	7.44	47.60	63.20	10.10
MR6	1	Wheat	05/14/2023	32.60	7.16	50.20	62.30	9.64
MR7	1	Wheat	05/14/2023	31.20	7.06	42.80	61.30	8.98
MR8	1	Wheat	05/14/2023	29.60	7.20	45.00	61.80	9.05
MR9	1	Corn	08/02/2023	26.20	5.12	12.78	62.70	5.56
MR10	1	Corn	08/02/2023	24.60	4.70	23.20	63.10	7.35
MR11	1	FALLOW						
MR12	1	Wheat	05/06/2023	25.20	6.14	21.60	70.30	8.02

Well / Irrigation Water*(mg/l/ppm unless noted otherwise)*

Sample Date:	NO3N	TP	EC (umhos/cm)	NH4N *	TDS	TN	General Minerals					
							CA	MG	NA	HCO3	CO3	SO4



INNOVATIVE AG SERVICES

Cactus Ranch 2023
Lab Results Summary (Attachment E)

Well / Irrigation Water

(mg/l/ppm unless noted otherwise)

	Sample Date:	NO3N	TP	EC (umhos/cm)	NH4N *	TDS	TN	CA	MG	NA	HCO3	CO3	SO4	CL	General Minerals
Domestic															
D1															Out of service.
D2	01/25/2023	0.00		378											
	Averages:	0.00		378											
Irrigation															
2		Out of Service													Out of service.
3		Out of Service													Out of service.
4															Did not run.
7	12/01/2023	0.00		332		340.00	0.00								
8	12/01/2023	0.00		381		380.00	0.00								
9															Did not run.
	Averages:	0.00		356		360.00	0.00								
Surface Water															
Lakeside (General)	06/28/2023	0.90		158		90.00	0.90								
	Averages:	0.90		158		90.00	0.90								

* NH4N was non-detectable unless a value is shown

**Cactus Ranch 2023
Lab Results Summary (Attachment E)**

Soils

Field	Sample Date:	PO4P (ppm)
MR3	11/03/2023	68.00
MR4	11/03/2023	71.00

Cactus Ranch 2023
Planting and Harvest Information (Attachment F)

	Crop #	Crop	Acres Planted	Plant Date	Harvest Date	Estimated Yield (tons)	Tons Harvested	Actual Yield
Field:	MR1							
	1	Wheat	61	11/03/2022	05/14/2023	18.0	1146.8	18.8
	2	Corn	61	06/16/2023	11/02/2023	22.6	1445.7	23.7
Field:	MR2							
	1	Wheat	75	11/03/2022	05/14/2023	17.1	1320.0	17.6
Field:	MR3							
	1	Wheat	43	11/04/2022	05/14/2023	19.6	834.2	19.4
	2	Corn	43	06/16/2023	10/23/2023	21.9	1006.2	23.4
Field:	MR4							
	1	Wheat	112	11/04/2022	05/06/2023	16.1	1926.4	17.2
	2	Corn	112	06/16/2023	10/23/2023	22.0	2676.8	23.9
Field:	MR5							
	1	Wheat	7	11/06/2022	05/14/2023	15.4	119.0	17.0
Field:	MR6							
	1	Wheat	17	11/06/2022	05/14/2023	16.7	295.8	17.4
Field:	MR7							
	1	Wheat	7	11/03/2022	05/14/2023	18.0	120.4	17.2
Field:	MR8							
	1	Wheat	21	11/07/2022	05/14/2023	18.0	357.0	17.0
Field:	MR9							
	1	Corn	50	04/20/2023	08/02/2023	30.0	1340.0	26.8
Field:	MR10							
	1	Corn	60	04/20/2023	08/02/2023	30.0	1500.0	25.0
Field:	MR12							
	1	Wheat	20	11/01/2022	05/06/2023	16.5	352.0	17.6



INNOVATIVE AG SERVICES

Cactus Ranch 2023
Weather Data (Attachment G)

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	Light	None	Light	None	None	None	None	None	None	None	None	None
2	Light	None	None	None	None	None	None	None	None	None	None	None
3	None	None	None	None	None	None	None	None	None	None	None	None
4	Light	None	None	None	Light	None	None	None	None	None	None	None
5	Heavy	Light	Light	None	None	None	None	None	None	None	None	None
6	None	None	None	None	None	None	None	None	None	None	None	None
7	None	None	None	None	None	SWP	None	None	None	None	None	None
8	None	None	None	None	None	None	None	None	None	None	None	None
9	SWP	None	Light	None	None	None	None	None	None	None	None	None
10	Light	None	SWP	None	None	None	None	None	None	None	None	None
11	None	None	None	None	None	None	None	None	None	None	None	None
12	None	None	None	None	None	None	None	None	None	None	None	None
13	None	None	None	None	None	None	None	None	None	None	None	None
14	Heavy	None	SWP	None	None	None	None	None	None	None	None	None
15	Light	None	Heavy	None	None	None	None	None	None	None	None	None
16	Heavy	None	None	None	None	None	None	None	None	None	None	None
17	None	None	None	None	None	None	None	None	None	None	None	None
18	None	None	None	None	None	None	None	None	None	None	None	None
19	None	None	Light	None	None	None	None	Light	None	None	None	None
20	None	None	None	None	None	None	None	SWP	None	None	None	None
21	None	None	SWP	None	None	None	None	None	None	None	None	None
22	None	Light	Light	None	None	None	None	None	None	None	None	None
23	None	None	None	None	None	None	None	None	None	Heavy	None	None
24	None	SWP	None	None	None	None	None	None	None	None	None	None
25	None	SWP	None	None	None	None	None	None	None	None	None	None
26	None	None	None	None	None	None	None	None	None	None	None	None
27	None	Light	None	None	None	None	None	None	None	None	None	None
28	None	Heavy	Light	None	None	None	None	None	None	None	None	None
29	Light		Heavy	None	None	None	None	None	None	None	None	None
30	None		Light	None	None	None	None	None	None	None	None	Light
31	None		None		None		None	None		None		None

*Note: SWP = Standing Water Present



February 2, 2023

Lab No. : VI 2340469**Customer No.** : 4018573**Reference** : 40145

Innovative Ag Services, LLC
 1201 Delta View Road Suite 5
 Hanford, CA 93230

Laboratory Report

Introduction: This report package contains a total of 3 pages divided into 3 sections:

- | | | |
|-----------------|----------|---|
| Case Narrative | (1 page) | : An overview of the work performed at FGL. |
| Sample Results | (1 page) | : Results for each sample submitted. |
| Quality Control | (1 page) | : Supporting Quality Control (QC) results. |

Case Narrative

This Case Narrative pertains to the following samples:

Sample Description	Date Sampled	Date Received	FGL Lab No.	Matrix
D2	01/25/2023	01/25/2023	VI 2340469-001	AGW

Sampling and Receipt Information:

The Sample was received in acceptable condition and within temperature requirements, unless noted on the Condition Upon Receipt (CUR) form. The Sample was received, prepared and analyzed within the method specified holding times. All samples arrived on ice. All samples were checked for pH if acid or base preservation is required (except for VOAs). For details of sample receipt information, please see the associated Chain of Custody and Condition Upon Receipt Form.

Quality Control: All samples were prepared and analyzed according to established quality control criteria. Any exceptions are noted in the Quality Control Section of this report.

Test Summary

Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
SM 4500-NO3 F Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)

Certification: I certify that this data package is in compliance with ELAP standards, both technically and for completeness, except for any conditions listed above and in the QC Section. Release of the data contained in this data package is authorized by the Laboratory Director or his designee, as verified by the following electronic signature. This report shall not be reproduced except in full, without the written approval of the laboratory.

KD: JRD

Approved By **Kelly A. Dunnahoo, B.S.**  Digitally signed by Kelly A. Dunnahoo, B.S.
 Title: Laboratory Director
 Date: 2023-02-03



February 2, 2023

Innovative Ag Services, LLC
 1201 Delta View Road Suite 5
 Hanford, CA 93230

Description : D2
 Project : 0164 Cactus Ranch

Lab No. : VI 2340469-001
 Customer No. : 4018573
 Reference : 40145
 Sampled On : January 25, 2023 at 12:15
 Sampled By : Sean
 Received On : January 25, 2023 at 16:14
 Matrix : Ag Water

Sample Results - Inorganic

Constituent	Result	RL	Units	Note	Dil.	DQF	Sample Preparation			Sample Analysis			
							Date	Time	Who	Method	Date	Time	Who
Dairy Analysis													
Nitrate Nitrogen	ND	0.4	mg/L		1	U	01/26/2023	12:30	Ifs	SM 4500-NO3 F	01/26/2023	15:44	Ifs
Conductivity	378	1	umhos/cm		1		01/27/2023	12:47	sta		01/27/2023	12:47	sta

DQF Flags Definition:

U Constituent results were non-detect.

ND=Non-Detected, RL=Reporting Level, Dil.=Dilution



February 2, 2023

Innovative Ag Services, LLC
 Lab No. : VI 2340469
 Customer No. : 4018573
Quality Control - Wet Chem

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Wet Chem								
E. C.	2510B	01/27/2023:200907STA (VI 2340470-002)	Blank Dup	umhos/cm umhos/cm		ND 1.14%	<1 5	
Nitrate Nitrogen	4500NO3F	01/26/2023:200896LFS (SP 2301160-001)	Blank LCS MS MSD MSRPD	mg/L mg/L mg/L mg/L mg/L	11.22 5.609 5.609 5.609	93.7% 94.0% 91.7% 1.0%	<0.4 80-120 66-125 66-125 ≤30.4	

Definition

- Blank : Method Blank - Prepared to verify that the preparation process is not contributing contamination to the samples.
- DQO : Data Quality Objective - This is the criteria against which the quality control data is compared.
- Dup : Duplicate Sample - A random sample with each batch is prepared and analyzed in duplicate. The relative percent difference is an indication of precision for the preparation and analysis.
- LCS : Laboratory Control Standard/Sample - Prepared to verify that the preparation process is not affecting analyte recovery.
- MS : Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
- MSD : Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
- MSRPD : MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.
- ND : Non-detect - Result was below the DQO listed for the analyte.



Laboratory Analysis Work Order

Nº 40145

ID: # 0164SITE NAME: CACTUS RANCHBilling: TAS

ANALYSIS TO BE COMPLETED:

Irrigation/Ground Water (ELAP Standards)

W1 EC, NO₃N (Dom)W2 EC, NO₃N, TDS, TN (Irr)W3 NH₄-N (Ammonium)W4 EC, NO₃N, Ca, Mg, Na, K, HCO₃, CO₃, SO₄S, Cl, TDS (Dom, GM)W5 EC, NO₃N, TDS, TN, Ca, Mg, Na, HCO₃, CO₃, SO₄S, Cl (Irr, GM)W6 NO₃N, NO₂ (Dom ILRP, Annually)W7 Ca, Mg, Na, K, HCO₃, CO₃, SO₄, Cl + Lab Filtering (GWM)

W8 Other: _____

Plant Tissue

P1 TN, NO₃N, PO₄P, K (Mid Season - Wheat)

P2 TN, P, K (Mid-season - Corn)

P3 TN, TP, TK, Ash, %M (At Harvest)

P4 TN, %M

P5 % Moisture

P6 NIR

P7 Other: _____

2340469

14.8 P1

Sample ID	Description	Analysis	Date/Time	Sampled by	IAS USE ONLY: FIELD TESTS		
					NH ₃ N*	pH	Temp
1	D2	Dom	1/25/23 12:15	SEAN	0		
2							
3							
4							
5							
6							
7							
8							

* Field Test of ammonium nitrogen may only be made by a trained technician. Positive test to be analyzed for ammonium nitrogen by the laboratory.

All samples are to follow the procedures noted in the Sampling & Analysis Plan of the NMP and the RWQCB specifications. Any samples taken outside of these procedures shall provide the procedures on the notes below. Additionally, if any preservatives are used in the collections or processing of samples, please note below.

NOTES: _____

CHAIN OF CUSTODY RECORDING

	Signature	Company	Received Date & Time	Relinquished Date & Time
1 st	John S...	TAS		1/25/23 16:30
2 nd	EMA	FGL	1/25/23 16:00	
3 rd	EMA	FGL		1/25/23 16:14
4 th	John S...	FGL	1/25/23 16:14	

LABORATORY USE ONLY John S... 1-25-23 1730Logged In By: GLS 1/25/23 1730 Total Samples: _____

Laboratory #: _____



December 21, 2023

Innovative Ag Services, LLC
 1201 Delta View Road
 Suite 5
 Hanford, CA 93230

Lab No. : VI 2348057
Customer No. : 4018573
Reference : 42119

Laboratory Report

Introduction: This report package contains a total of 4 pages divided into 3 sections:

- | | | |
|-----------------|-----------|---|
| Case Narrative | (1 page) | : An overview of the work performed at FGL. |
| Sample Results | (2 pages) | : Results for each sample submitted. |
| Quality Control | (1 page) | : Supporting Quality Control (QC) results. |

Case Narrative

This Case Narrative pertains to the following samples:

Sample Description	Date Sampled	Date Received	FGL Lab No.	Matrix
7	12/01/2023	12/01/2023	VI 2348057-001	AGW
8	12/01/2023	12/01/2023	VI 2348057-002	AGW

Sampling and Receipt Information:

All samples were received in acceptable condition and within temperature requirements, unless noted on the Condition Upon Receipt (CUR) form. All samples were received, prepared and analyzed within the method specified holding times. All samples arrived on ice. All samples were checked for pH if acid or base preservation is required (except for VOAs). For details of sample receipt information, please see the associated Chain of Custody and Condition Upon Receipt Form.

Quality Control: All samples were prepared and analyzed according to established quality control criteria. Any exceptions are noted in the Quality Control Section of this report.

Test Summary

EPA 351.2	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
SM 2540 C	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
SM 4500-H+B	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)
SM 4500-NO3 F	Preparation and analysis performed by FGL-Santa Paula (FGL-SP ELAP# 1573)

Certification: I certify that this data package is in compliance with ELAP standards, both technically and for completeness, except for any conditions listed above and in the QC Section. Release of the data contained in this data package is authorized by the Laboratory Director or his designee, as verified by the following electronic signature. This report shall not be reproduced except in full, without the written approval of the laboratory.

KD: JRD

Approved By **Kelly A. Dunnahoo, B.S.**  Digitally signed by Kelly A. Dunnahoo, B.S.
 Title: Laboratory Director
 Date: 2023-12-22

Section: Case Narrative

Page 1 of 4

Page 1 of 4

Corporate Offices & Laboratory 853 Corporation Street Santa Paula, CA 93060 TEL: (805)392-2000 Env FAX: (805)525-4172 / Ag FAX: (805)392-2063 CA ELAP Certification No. 1573	Office & Laboratory 2500 Stagecoach Road Stockton, CA 95215 TEL: (209)942-0182 FAX: (209)942-0423	Office & Laboratory 563 E. Lindo Avenue Chico, CA 95926 TEL: (530)343-5818 FAX: (530)343-3807	Office & Laboratory 3442 Empresa Drive, Suite D San Luis Obispo, CA 93401 TEL: (805)783-2940 FAX: (805)783-2912	Office & Laboratory 9415 W. Goshen Avenue Visalia, CA 93291 TEL: (559)734-9473 FAX: (559)734-8435
				CA ELAP Certification No. 2775



December 21, 2023

Innovative Ag Services, LLC
 1201 Delta View Road
 Suite 5
 Hanford, CA 93230

Description : 7
 Project : 0164 Cactus Ranch

Lab No. : VI 2348057-001
 Customer No.: 4018573
 Reference : 42119
 Sampled On : December 1, 2023 at 13:30
 Sampled By : Zeke
 Received On : December 1, 2023 at 15:50
 Matrix : Ag Water

Sample Results - Inorganic

Constituent	Result	RL	Units	Note	Dil.	DQF	Sample Preparation			Sample Analysis			
							Date	Time	Who	Method	Date	Time	Who
Dairy Analysis													
Nitrogen, Total Kjeldahl	ND	0.5	mg/L		1	U	12/12/2023	08:00	sta	EPA 351.2	12/13/2023	14:20	lcr
Nitrate Nitrogen	ND	0.4	mg/L		1	U	12/07/2023	09:00	lfs	SM 4500-NO3 F	12/07/2023	12:31	lfs
Nitrogen, Total as Nitrogen	ND	0.5	mg/L		1	U	12/12/2023	08:00	sta	Calc.	12/13/2023	14:20	lcr
Nitrate + Nitrite as N	ND	0.4	mg/L		1	U	12/07/2023	09:00	lfs	SM 4500-NO3 F	12/07/2023	12:31	lfs
Kjeldahl Nitrogen	ND	0.5	mg/L		1	U	12/12/2023	08:00	sta	EPA 351.2	12/13/2023	14:20	lcr
Conductivity	332	1	umhos/cm		1		12/07/2023	07:47	krh	SM 4500-H+B	12/07/2023	11:48	krh
Solids, Total Dissolved (TDS)	340	20	mg/L		1		12/04/2023	14:45	ctl	SM 2540 C	12/05/2023	11:00	ctl

DQF Flags Definition:

U Constituent results were non-detect.

ND=Non-Detected, RL=Reporting Level , Dil.=Dilution



December 21, 2023

Innovative Ag Services, LLC
 1201 Delta View Road
 Suite 5
 Hanford, CA 93230

Description : 8
 Project : 0164 Cactus Ranch

Lab No. : VI 2348057-002

Customer No.: 4018573

Reference : 42119

Sampled On : December 1, 2023 at 13:40

Sampled By : Zeke

Received On : December 1, 2023 at 15:50

Matrix : Ag Water

Sample Results - Inorganic

Constituent	Result	RL	Units	Note	Dil.	DQF	Sample Preparation			Sample Analysis			
							Date	Time	Who	Method	Date	Time	Who
Dairy Analysis													
Nitrogen, Total Kjeldahl	ND	0.5	mg/L		1	U	12/12/2023	08:00	sta	EPA 351.2	12/13/2023	14:22	lcr
Nitrate Nitrogen	ND	0.4	mg/L		1	U	12/07/2023	09:00	lfs	SM 4500-NO3 F	12/07/2023	12:33	lfs
Nitrogen, Total as Nitrogen	ND	0.5	mg/L		1	U	12/12/2023	08:00	sta	Calc.	12/13/2023	14:22	lcr
Nitrate + Nitrite as N	ND	0.4	mg/L		1	U	12/07/2023	09:00	lfs	SM 4500-NO3 F	12/07/2023	12:33	lfs
Kjeldahl Nitrogen	ND	0.5	mg/L		1	U	12/12/2023	08:00	sta	EPA 351.2	12/13/2023	14:22	lcr
Conductivity	381	1	umhos/cm		1		12/07/2023	07:47	krh	SM 4500-H+B	12/07/2023	11:51	krh
Solids, Total Dissolved (TDS)	380	20	mg/L		1		12/04/2023	14:45	ctl	SM 2540 C	12/05/2023	11:00	ctl

DQF Flags Definition:

U Constituent results were non-detect.

ND=Non-Detected, RL=Reporting Level , Dil.=Dilution



December 21, 2023

Innovative Ag Services, LLC

Lab No. : VI 2348057

Customer No. : 4018573

Quality Control - Wet Chem

Constituent	Method	Date/ID	Type	Units	Conc.	QC Data	DQO	Note
Wet Chem								
E. C.	2320B	(VI 2348057-001)	Dup	umhos/cm		0.3%	5	
Solids, Total Dissolved	2540CE	12/04/2023:213647CTL (SP 2319835-002) (SP 2319835-002)	Blank LCS Dup Dup	mg/L mg/L mg/L mg/L	991.5	ND 101% 1.66% 1.62%	<20 90-110 5 5	
Nitrogen, Total Kjeldahl	351.2	12/12/2023:213992STA (VI 2348057-001) (VI 2348057-002)	Blank LCS MS MSD MSRPD MS MSD MSRPD	mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L	12.00 12.00 12.00 3.5% 12.00 12.00 4.5%	ND 94.7% 87.5% 90.6% 91.1% 87.2% ≤20	<0.5 73-124 <1/4 90-110 90-110 ≤20	
Nitrate + Nitrite as N	4500NO3F	12/07/2023:213812LFS (SP 2320111-001)	Blank LCS MS MSD MSRPD	mg/L mg/L mg/L mg/L mg/L	11.22 5.609 5.609 5.609	ND 101% 99.0% 99.0% 0.0%	<0.4 80-120 66-125 66-125 ≤30.4	
Nitrate Nitrogen	4500NO3F	12/07/2023:213812LFS (SP 2320111-001)	Blank LCS MS MSD MSRPD	mg/L mg/L mg/L mg/L mg/L	11.22 5.609 5.609 5.609	ND 101% 99.0% 99.0% 0.0%	<0.4 80-120 66-125 66-125 ≤30.4	

Definition

- <1/4 : High Sample Background - Spike concentration was less than one forth of the sample concentration.
- Blank : Method Blank - Prepared to verify that the preparation process is not contributing contamination to the samples.
- DQO : Data Quality Objective - This is the criteria against which the quality control data is compared.
- Dup : Duplicate Sample - A random sample with each batch is prepared and analyzed in duplicate. The relative percent difference is an indication of precision for the preparation and analysis.
- LCS : Laboratory Control Standard/Sample - Prepared to verify that the preparation process is not affecting analyte recovery.
- MS : Matrix Spikes - A random sample is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
- MSD : Matrix Spike Duplicate of MS/MSD pair - A random sample duplicate is spiked with a known amount of analyte. The recoveries are an indication of how that sample matrix affects analyte recovery.
- MSRPD : MS/MSD Relative Percent Difference (RPD) - The MS relative percent difference is an indication of precision for the preparation and analysis.
- ND : Non-detect - Result was below the DQO listed for the analyte.



Laboratory Analysis Work Order

ID: # 0164

10.7°C

ID#
THU07

Nº 42119

2348057

LABORATORY: FGLSITE NAME: Cactus RanchBilling: IAS

ANALYSIS TO BE COMPLETED:

Irrigation/Ground Water (ELAP Standards)

W1 EC, NO₃N (Dom)W2 EC, NO₃N, TDS, TN (Irr)W3 NH₄-N (Ammonium)W4 EC, NO₃N, Ca, Mg, Na, K, HCO₃, CO₃, SO₄S, Cl, TDS (Dom, GM)W5 EC, NO₃N, TDS, TN, Ca, Mg, Na, HCO₃, CO₃, SO₄S, Cl (Irr, GM)W6 NO₃N, NO₂ (Dom ILRP, Annually)W7 Ca, Mg, Na, K, HCO₃, CO₃, SO₄, Cl + Lab Filtering (GWM)

W8 Other: _____

Plant Tissue

P1 TN, NO₃N, PO₄P, K (Mid Season - Wheat)

P2 TN, P, K (Mid-season - Corn)

P3 TN, TP, TK, Ash, %M (At Harvest)

P4 TN, %M

P5 % Moisture

P6 NIR

P7 Other: _____

Process Waste Water (lagoon)

L1 EC, NH₄N, TKN, TP, TK, TDS (Quarterly)L2 EC, NO₃N, NH₄N, TKN, TP, TK, TDS, pH (Annually)L3 L1 + Ca, Mg, Na, HCO₃, CO₃, SO₄S, Cl (Biennially)

L4 Other: _____

Manure

M1 TN, TP, TK, %M (2/year)

M2 TN, TP, K, %M, Ca, Mg, Na, S, Cl, ash (Biennially)

M3 Other: _____

Soil

S1 SP%, pH, EC, Ca, Mg, Na, K, ESP, LP, B, NO₃N, PO₄P, K-AA, Zn, Mn, Fe, Cu, SO₄SS2 S1 + CEC, CaCO₃, OM, C:N, TNS3 NO₃N, NH₄N

S4 Other: _____

Sample ID	Description	Analysis	Date/Time	Sampled by	IAS USE ONLY: FIELD TESTS		
					NH ₃ N *	pH	Temp
1 7	IRR	WR	12-1 1:30	Zk-			
2 8	IRR	WR	12-1 1:40	Zk-			
3							
4							
5							
6							
7							
8							

* Field Test of ammonium nitrogen may only be made by a trained technician. Positive test to be analyzed for ammonium nitrogen by the laboratory.

All samples are to follow the procedures noted in the Sampling & Analysis Plan of the NMP and the RWQCB specifications. Any samples taken outside of these procedures shall provide the procedures on the notes below. Additionally, if any preservatives are used in the collections or processing of samples, please note below.

NOTES: 12/1/23
1515

CHAIN OF CUSTODY RECORDING

Signature	Company	Received Date & Time	Relinquished Date & Time
1 st	IAS		12-1-23 / 2:55
2 nd	FGL	12-1-23 15:05	
3 rd	FGL		12-1-23 15:55
4 th	FGL	12-1-2023 15:50	

LABORATORY USE ONLY
Rece^d G^s
Logged In By: _____

12-1-2023 17:30

Total Samples: _____

Laboratory #: _____