



## Summary of Studies Supporting USDA Product Licensure

Establishment Name	Zoetis Inc.
USDA Vet Biologics Establishment Number	190
Product Code	4585.22
True Name	Bovine Rotavirus-Coronavirus Vaccine, Killed Virus, Escherichia Coli Bacterin
Tradename(s) / Distributor or Subsidiary (if different from manufacturer)	Scourguard 4K - No distributor specified Scourguard 4K - Zoetis Hayvan Sagligi Ltd Scourguard 4K - Zoetis Korea Scourguard 4K - Zoetis New Zealand Ltd Ultravac Scourshield - Zoetis Australia Pty Ltd
Date of Compilation Summary	February 25, 2023

**Disclaimer: Do not use the following studies to compare one product to another. Slight differences in study design and execution can render the comparisons meaningless.**

<b>Study Type</b>	Efficacy
<b>Pertaining to</b>	Bovine Coronavirus (BCV)
<b>Study Purpose</b>	Demonstrate passive immunity against diarrhea caused by BCV in calves
<b>Product Administration</b>	2 doses of vaccine administered intramuscularly (IM) approximately 6 and 3 weeks prior to calving.
<b>Study Animals</b>	Thirty-eight (38) neonatal calves (0 to 6 hours of age) were removed from their dams prior to first nursing and were fed colostrum/milk from pre-assigned heifers that had been vaccinated previously with the vaccine (n = 18) or with a placebo (n = 20).
<b>Challenge Description</b>	BCV administered at 8 to 12 hours of age to calves
<b>Interval observed after challenge</b>	Calves were observed up to 10 days post-challenge for clinical signs and mortality.
<b>Results</b>	<p>Mortality rate and clinical scores for fecal consistency, attitude, appetite, and dehydration for BCV disease were calculated. Fecal scores <math>\geq 1</math>, attitude score <math>\geq 1</math>, appetite score <math>\geq 1</math> and dehydration score <math>\geq 1</math> were considered abnormal.</p> <p><u>Mortality:</u>  Calves fed colostrum/milk from pre-assigned heifers that had been vaccinated previously with a placebo:  13/20 (65.0%)</p> <p>Calves fed colostrum/milk from pre-assigned heifers that had been vaccinated previously with the vaccine:  2/18 (11.1%)</p> <p>See the following tables for individual raw data.</p>
<b>USDA Approval Date</b>	08/27/2003

### Fecal Consistency Scoring:

Treatment Group	Animal ID	Days of observation post-challenge*									
		0 AM/PM #	1 AM/PM #	2 AM/PM #	3 AM/PM #	4 AM/PM #	5 AM/PM #	6 AM/PM #	7 AM/PM #	8 AM/PM #	9 AM/PM #
Calves Fed Colostrum from Control Dams	02	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 1	0 / 0	2 / 2	2 / 2	1 / 1
	04	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	-	-	-	-
	05	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	2 / 2	2 / 2	2 / 2	1 / 1	0 / 0
	07	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 1	2 / 2	2 / 2	1 / 1
	09	0 / 0	1 / 1	0 / 0	0 / 0	1 / 1	0 / 0	2 / 2	2 / 2	0 / 0	0 / 0
	11	0 / 0	0 / 0	1 / 1	0 / 0	1 / 1	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2
	13	0 / 0	1 / 1	0 / 0	0 / 0	2 / 2	1 / 1	2 / 2	2 / 2	1 / 1	1 / 1
	16	0 / 0	1 / 1	0 / 0	-	-	-	-	-	-	-
	17	0 / 0	1 / 1	0 / 0	1 / 1	2 / 2	2 / 2	-	-	-	-
	20	0 / 0	0 / 0	-	-	-	-	-	-	-	-
	22	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	2 / 2	2 / 2	-	-
	23	0 / 0	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2	-	-	-	-
	25	0 / 0	2 / 2	0 / 0	0 / 0	0 / 0	2 / 2	2 / 2	2 / -	-	-
	28	0 / 0	2 / 2	1 / 1	1 / 1	0 / 0	0 / 0	0 / 0	1 / 1	2 / 2	-
	29	0 / 0	0 / 0	2 / 2	2 / 2	2 / 2	-	-	-	-	-
	32	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / -	-	-	-
	33	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2
	36	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	2 / 2	1 / 1	-	-	-
	38	0 / 0	2 / 2	1 / 1	1 / 1	2 / 2	2 / 2	2 / -	-	-	-
	39	0 / 0	2 / 2	2 / 2	1 / 1	2 / 2	2 / 2	2 / 2	-	-	-
Calves Fed Colostrum from Vaccinated Dams	01	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	2 / 2	1 / 1	1 / 1	0 / 0
	03	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	1 / 1	1 / 1	0 / 0
	06	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0
	08	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	10	0 / 0	2 / 2	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	2 / 2	2 / 2
	12	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	2 / 2	2 / 2	2 / 2	-	-
	14	0 / 0	2 / 2	0 / 0	0 / 0	0 / 0	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2
	15	0 / 0	2 / 2	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	1 / 1	-	-
	18	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	1 / 1	1 / 1
	19	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	1 / 1	2 / 2	1 / 1	1 / 1	1 / 1
	21	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	1 / 1	0 / 0	0 / 0
	24	0 / 0	2 / 2	0 / 0	0 / 0	0 / 0	2 / 2	2 / 2	2 / 2	1 / 1	1 / 1
	26	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	2 / 2	2 / 2	2 / 2
	27	0 / 0	2 / 2	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	2 / 2	2 / 2	2 / 2
	31	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	2 / 2	2 / 2	1 / 1
	35	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	37	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	2 / 2	2 / 2	1 / 1	1 / 1	2 / 2
	40	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 1

\*Day 0 = day of challenge

# Animals were scored in the AM and PM (Score recorded as AM / PM)

- = Animal no longer on study

Fecal Scores: 0 = Normal; 1, 2 = Abnormal

### **Appetite Scoring:**

Treatment Group	Animal ID	Days of observation post-challenge*									
		0 AM/P M#	1 AM/PM #	2 AM/PM #	3 AM/PM #	4 AM/PM #	5 AM/PM #	6 AM/PM #	7 AM/PM #	8 AM/PM #	9 AM/PM #
Calves Fed Colostrum from Control Dams	02	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	04	0 / 1	2 / 2	1 / 2	1 / 2	1 / 2	1 / 1	-	-	-	-
	05	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	07	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	09	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	11	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 0	0 / 0	0 / 0	1 / 2
	13	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	16	0 / 0	1 / 0	0 / 0	-	-	-	-	-	-	-
	17	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	-	-	-	-
	20	0 / 2	2 / 2	-	-	-	-	-	-	-	-
	22	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	-	-
	23	0 / 2	1 / 1	0 / 0	0 / 0	0 / 0	0 / 2	-	-	-	-
	25	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / -	-	-
	28	0 / 0	0 / 1	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	2 / 2	-
	29	0 / 0	0 / 0	0 / 0	0 / 0	0 / 2	-	-	-	-	-
	32	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / -	-	-	-
	33	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2
	36	0 / 0	1 / 0	1 / 1	1 / 1	0 / 0	0 / 0	0 / 2	-	-	-
	38	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	2 / -	-	-	-
	39	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	2 / 2	-	-	-
Calves Fed Colostrum from Vaccinated Dams	01	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	03	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	06	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	08	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	10	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	12	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	-	-
	14	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 2
	15	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	-	-
	18	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	19	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	21	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	24	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	26	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	27	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	31	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	35	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	37	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 0	0 / 0	0 / 0	0 / 0
	40	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0

\*Day 0 = day of challenge

# Animals were scored in the AM and PM (Score recorded as AM / PM)

- = Animal no longer on study

Appetite Scores: 0 = Normal; 1, 2 = Abnormal

## Attitude Scoring:

Treatment Group	Animal ID	Days of observation post-challenge*									
		0 AM/PM #	1 AM/PM #	2 AM/PM #	3 AM/PM #	4 AM/PM #	5 AM/PM #	6 AM/PM #	7 AM/PM #	8 AM/PM #	9 AM/PM #
Calves Fed Colostrum from Control Dams	02	0 / 0	0 / **	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	1 / 2	1 / 1	0 / 1
	04	0 / 1	2 / 0	2 / 2	2 / 2	1 / 2	2 / 2	3 / -	-	-	-
	05	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 1	1 / 2	1 / 2	1 / 1	0 / 1
	07	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	0 / 1	1 / 2	1 / 2	0 / 1
	09	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	1 / 2	0 / 0	0 / 0
	11	0 / 0	0 / 1	0 / 1	0 / 0	0 / 1	1 / 2	2 / 2	1 / 2	2 / 2	2 / 2
	13	0 / 0	0 / 0	0 / 1	0 / 1	1 / 2	0 / 1	1 / 1	1 / 2	1 / 1	2 / 2
	16	0 / 0	1 / 1	0 / 1	-	-	-	-	-	-	-
	17	0 / 0	1 / 1	0 / 1	2 / 2	2 / 2	2 / 3	-	-	-	-
	20	0 / 1	2 / 3	-	-	-	-	-	-	-	-
	22	0 / 0	0 / 1	0 / 0	0 / 0	0 / 1	0 / 1	0 / 1	1 / 2	-	-
	23	0 / 0	1 / 2	0 / 1	1 / 1	1 / 2	2 / 2	-	-	-	-
	25	0 / 0	0 / 1	0 / 1	0 / 0	0 / 1	1 / 2	1 / 2	3 / -	-	-
	28	0 / 1	1 / 2	1 / 2	1 / 2	0 / 1	0 / 0	1 / 1	1 / 1	2 / 3	-
	29	0 / 0	0 / 0	1 / 1	1 / 2	2 / 2	-	-	-	-	-
	32	0 / 0	0 / 1	0 / 0	0 / 1	0 / 0	0 / 0	2 / -	-	-	-
	33	0 / 0	1 / 2	0 / 0	0 / 0	0 / 0	0 / 1	1 / 1	2 / 2	2 / 2	2 / 3
	36	0 / 0	1 / 1	1 / 2	0 / 1	0 / 1	1 / 1	2 / 3	-	-	-
	38	0 / 0	1 / 2	1 / 1	0 / 1	1 / 1	1 / 2	3 / -	-	-	-
	39	0 / 0	0 / 1	2 / 2	1 / 1	1 / 1	2 / 2	2 / 3	-	-	-
Calves Fed Colostrum from Vaccinated Dams	01	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0
	03	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	0 / 1	1 / 1	0 / 0
	06	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	08	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	
	10	0 / 0	1 / 2	0 / 1	0 / 1	0 / 0	0 / 0	0 / 0	1 / 2	0 / 1	1 / 1
	12	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 1	1 / 2	2 / 3	-	-
	14	0 / 0	1 / 2	0 / 1	0 / 0	0 / 0	1 / 1	1 / 2	0 / 1	2 / 2	2 / 2
	15	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	0 / 1	-	-
	18	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 2	0 / 0	0 / 0
	19	0 / 0	0 / 1	0 / 0	0 / 0	0 / 1	1 / 1	1 / 2	0 / 0	1 / 1	1 / 1
	21	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	0 / 0	1 / 2	0 / 1
	24	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	1 / 1	2 / 2	2 / 2	1 / 1	1 / 1
	26	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	1 / 1	1 / 2
	27	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 2	1 / 1	1 / 1
	31	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 2	1 / 1	0 / 0
	35	0 / 0	0 / 1	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	37	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	1 / 2	2 / 2	1 / 1	1 / 1	2 / 2
	40	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1

\*Day 0 = day of challenge

# Animals were scored in the AM and PM (Score recorded as AM / PM)

\*\* = Datapoint not available

- = Animal no longer on study

Attitude Scores: 0 = Normal; 1, 2, 3 = Abnormal

### Dehydration Scoring:

Treatment Group	Animal ID	Days of observation post-challenge*									
		0 AM/PM #	1 AM/PM #	2 AM/PM #	3 AM/PM #	4 AM/PM #	5 AM/PM #	6 AM/PM #	7 AM/PM #	8 AM/PM #	9 AM/PM #
Calves Fed Colostrum from Control Dams	02	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	1 / 2	1 / 1	0 / 1
	04	0 / 0	2 / 2	1 / 2	2 / 2	1 / 2	2 / 2	-	-	-	-
	05	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 1	1 / 2	1 / 2	1 / 1	0 / 1
	07	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 2	1 / 2	0 / 1
	09	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	1 / 2	0 / 0	0 / 0
	11	0 / 0	0 / 0	0 / 1	0 / 0	0 / 1	1 / 2	2 / 2	1 / 2	2 / 2	2 / 2
	13	0 / 0	0 / 0	0 / 1	0 / 1	1 / 2	0 / 1	1 / 1	1 / 2	1 / 1	2 / 2
	16	0 / 0	1 / 1	0 / 1	-	-	-	-	-	-	-
	17	0 / 0	1 / 1	0 / 1	2 / 2	2 / 2	2 / 3	-	-	-	-
	20	0 / 0	2 / 3	-	-	-	-	-	-	-	-
	22	0 / 0	0 / 1	0 / 0	0 / 0	0 / 1	0 / 1	0 / 1	1 / 2	-	-
	23	0 / 0	1 / 2	0 / 1	1 / 1	1 / 2	2 / 2	-	-	-	-
	25	0 / 0	0 / 1	0 / 1	0 / 0	0 / 1	1 / 2	1 / 2	3 / -	-	-
	28	0 / 0	1 / 2	1 / 2	1 / 2	0 / 1	0 / 0	1 / 1	1 / 1	2 / 3	-
	29	0 / 0	0 / 0	1 / 1	1 / 2	2 / 2	-	-	-	-	-
	32	0 / 0	0 / 1	0 / 0	0 / 1	0 / 0	0 / 0	2 / -	-	-	-
	33	0 / 0	1 / 2	0 / 0	0 / 0	0 / 0	0 / 1	1 / 1	2 / 2	2 / 2	2 / 3
	36	0 / 0	1 / 1	1 / 2	0 / 1	0 / 1	1 / 2	2 / 3	-	-	-
	38	0 / 0	1 / 2	1 / 1	0 / 1	1 / 1	1 / 2	3 / -	-	-	-
	39	0 / 0	0 / 1	2 / 2	1 / 1	1 / 1	2 / 2	2 / 3	-	-	-
Calves Fed Colostrum from Vaccinated Dams	01	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0
	03	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	0 / 1	1 / 1	0 / 0
	06	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	08	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	10	0 / 0	1 / 1	0 / 1	0 / 1	0 / 0	0 / 0	0 / 0	1 / 2	0 / 1	1 / 1
	12	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 1	1 / 2	2 / 3	-	-
	14	0 / 0	1 / 1	0 / 1	0 / 0	0 / 0	1 / 1	1 / 2	0 / 1	2 / 2	2 / 2
	15	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	0 / 1	-	-
	18	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 2	0 / 0	0 / 0
	19	0 / 0	0 / 1	0 / 0	0 / 0	0 / 1	1 / 1	1 / 2	0 / 0	1 / 1	1 / 1
	21	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	0 / 0	1 / 1	0 / 1
	24	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	1 / 1	2 / 2	2 / 2	1 / 1	1 / 1
	26	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	1 / 1	1 / 2
	27	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 2	1 / 1	1 / 1
	31	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 2	1 / 1	1 / 1
	35	0 / 0	0 / 1	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	37	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	1 / 2	2 / 2	1 / 1	1 / 1	2 / 2
	40	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1

\*Day 0 = day of challenge

# Animals were scored in the AM and PM (Score recorded as AM / PM)

- = Animal no longer on study

Dehydration Scores: 0 = Normal; 1, 2, 3 = Abnormal

## Mortality (Yes / No)

Treatment Group	Animal ID	Mortality (Yes/No)	
		Yes	No
Calves Fed Colostrum from Control Dams	02		X
	04	X	
	05		X
	07		X
	09		X
	11		X
	13		X
	16	X	
	17	X	
	20	X	
	22	X	
	23	X	
	25	X	
	28	X	
	29	X	
	32	X	
	33		X
	36	X	
	38	X	
	39	X	
Calves Fed Colostrum from Vaccinated Dams	01		X
	03		X
	06		X
	08		X
	10		X
	12	X	
	14		X
	15	X	
	18		X
	19		X
	21		X
	24		X
	26		X
	27		X
	31		X
	35		X
	37		X
	40		X

<b>Study Type</b>	Efficacy
<b>Pertaining to</b>	<i>Escherichia coli</i> K99 ( <i>E. coli</i> K99)
<b>Study Purpose</b>	Demonstrate passive immunity against diarrhea caused by <i>E. coli</i> K99 in neonatal calves
<b>Product Administration</b>	2 doses of vaccine administered intramuscularly (IM) approximately 6 and 3 weeks to heifers prior to calving.
<b>Study Animals</b>	Twenty-eight (28) neonatal calves were removed from their dams prior to first nursing: 20 calves were fed colostrum/milk from pre-assigned heifers (one calf to one heifer) that had been vaccinated previously with the vaccine; 8 calves were fed colostrum/milk from pre-assigned heifers (one calf to one heifer) that had been vaccinated previously with a placebo (controls). Calves were negative for pre-colostral <i>E coli</i> antibody titer ( $\leq 128$ ).
<b>Challenge Description</b>	<i>E coli</i> administered orally at 8 to 12 hours of age to calves
<b>Interval observed after challenge</b>	Calves were observed up to 6 days post-challenge for mortality
<b>Results</b>	<p>Mortality rate was calculated for each treatment group.</p> <p><u>Mortality:</u>  Calves fed colostrum/milk from pre-assigned heifers that had been vaccinated previously with a placebo (controls):  8/8 (100.0%)</p> <p>Calves fed colostrum/milk from pre-assigned heifers that had been vaccinated previously with the vaccine:  1/20 (5.0 %)</p> <p>See tables for individual data.</p>
<b>USDA Approval Date</b>	03/28/2005



**Mortality Results:**

Treatment Group	Animal ID	Mortality Yes / No	
		YES	NO
Calves Fed Colostrum from Control Dams	03	X	
	07	X	
	13	X	
	17	X	
	24	X	
	26	X	
	30	X	
	37	X	
Calves Fed Colostrum from Vaccinated Dams	01		X
	02		X
	06		X
	09		X
	10		X
	12		X
	14		X
	15		X
	18		X
	19		X
	20		X
	21		X
	22	X	
	25		X
	28		X
	31		X
	32		X
	34		X
	36		X
	38		X

<b>Study Type</b>	Efficacy
<b>Pertaining to</b>	Bovine Rotavirus serotype G10 (BRV G10)
<b>Study Purpose</b>	Demonstrate passive immunity against diarrhea caused by BRV G10 in calves
<b>Product Administration</b>	2 doses of vaccine administered intra muscularly (IM) approximately 6 and 3 weeks to pregnant heifers prior to calving.
<b>Study Animals</b>	Thirty-eight (38) neonatal calves were removed from their dams prior to first nursing; 20 calves were fed colostrum/milk from pre-assigned heifers (one calf to one heifer) that had been vaccinated previously with the vaccine; 18 calves were fed colostrum/milk from pre-assigned heifers (one calf to one heifer) that had been vaccinated previously with a placebo. Calves were negative for Pre-colostral virus neutralizing (VN) BRV antibody titer.
<b>Challenge Description</b>	BRV-2292B strain administered orally at 6 to 12 hours of age to calves
<b>Interval observed after challenge</b>	Calves were observed up to 9 days post-challenge for clinical signs and mortality.
<b>Results</b>	Calves were observed for fecal consistency, appetite, attitude, dehydration, and mortality.  See tables for individual data
<b>USDA Approval Date</b>	07/29/2004

### Fecal Consistency Scoring:

Treatment Group	Animal ID	Days of observation post-challenge*									
		0 AM/PM #	1 AM/PM #	2 AM/PM #	3 AM/PM #	4 AM/PM #	5 AM/PM #	6 AM/PM #	7 AM/PM #	8 AM/PM #	9 AM/PM #
Calves fed colostrum from Control Dams	02	0 / 0	1 / 1	1 / 1	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2	1 / 1
	04	0 / 0	0 / 0	1 / 1	1 / 1	1 / 1	1 / 1	-	-	-	-
	08	0 / 0	1 / 1	0 / 0	1 / 1	0 / 0	0 / 0	1 / 1	1 / 1	0 / -	-
	09	0 / 0	0 / 0	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2	0 / 1	1 / 1
	12	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
	13	0 / 0	0 / 0	2 / 2	1 / 1	0 / 0	1 / 1	0 / 0	2 / 2	1 / 1	1 / 1
	15	0 / 0	0 / 0	0 / 0	1 / 1	1 / 1	2 / 2	2 / 2	1 / 1	0 / 0	0 / 0
	18	0 / 0	0 / 0	2 / 2	0 / 0	0 / 0	1 / 1	1 / 1	0 / 0	1 / 1	0 / 0
	19	0 / 0	0 / 0	1 / 1	2 / 2	1 / 1	1 / 1	1 / 1	-	-	-
	22	0 / 0	0 / 0	1 / 1	1 / 1	0 / 0	1 / 1	1 / 1	1 / 1	1 / 1	2 / 2
	25	0 / 0	0 / 0	2 / 2	2 / 2	2 / 2	2 / 2	-	-	-	-
	27	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	30	0 / 0	2 / 2	1 / 1	1 / 1	0 / 0	2 / 2	1 / 1	0 / 0	2 / 2	2 / 2
	32	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	2 / 2
	33	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 1	1 / 1	1 / 1	0 / 0
	35	0 / 0	2 / 2	2 / 2	2 / 2	2 / 2	1 / 1	2 / 2	-	-	-
	37	0 / 0	0 / 0	1 / 1	1 / 1	1 / 1	2 / 2	2 / 2	1 / 1	1 / 1	1 / 1
	39	0 / 0	0 / 0	2 / 2	2 / 2	1 / 1	0 / 0	0 / 0	2 / 2	2 / 2	1 / 1
Calves Fed Colostrum from Vaccinated Dams	01	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0
	03	0 / 0	0 / 0	1 / 1	2 / 2	2 / 2	2 / 2	0 / 0	2 / 2	1 / 1	0 / 0
	05	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2
	07	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	10	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	11	0 / 0	0 / 0	2 / 2	1 / 1	1 / 1	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0
	14	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	16	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	17	0 / 0	2 / 2	0 / 0	1 / 1	1 / 1	2 / 2	1 / 1	1 / 1	0 / 0	0 / 0
	20	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	21	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	24	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1
	26	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	28	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 1	1 / 1
	29	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	1 / 1	1 / 1	1 / 1	2 / 2
	31	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	34	0 / 0	2 / 2	0 / 0	1 / 1	0 / 0	1 / 1	1 / 1	2 / 2	0 / 0	1 / 1
	36	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	38	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	40	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 1	0 / 0	0 / 1	0 / 0

\*Day 0 = day of challenge

# Animals were scored in the AM and PM (Score recorded as AM / PM)

- = Animal no longer on study

Fecal Scores: 0, 1 = Normal; 2 = Abnormal

## Appetite Scoring:

Treatment Group	Animal ID	Days of observation post-challenge*									
		0 AM/PM #	1 AM/PM #	2 AM/PM #	3 AM/PM #	4 AM/PM #	5 AM/PM #	6 AM/PM #	7 AM/PM #	8 AM/PM #	9 AM/PM #
Calves fed colostrum from Control Dams	02	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 0
	04	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	-	-	-	-
	08	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	1 / 2	0 / 2	2 / -	-
	09	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0
	12	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	13	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	15	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	18	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	19	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	-	-	-
	22	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 2	0 / 0
	25	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	2 / 2	-	-	-	-
	27	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	30	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	32	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	33	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	35	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 2	-	-	-
	37	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	39	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
Calves Fed Colostrum from Vaccinated Dams	01	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	03	0 / 0	0 / 0	0 / 0	0 / 1	0 / 2	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	05	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	07	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	10	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	11	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	14	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	16	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	17	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	20	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	21	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	24	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	26	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	28	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	29	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	31	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	34	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	36	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	38	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	40	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0

\*Day 0 = day of challenge

# Animals were scored in the AM and PM (Score recorded as AM / PM)

- = Animal no longer on study

Appetite Scores: 0 = Normal; 1, 2 = Abnormal

## Attitude Scoring:

Treatment Group	Animal ID	Days of observation post-challenge*									
		0 AM/PM #	1 AM/PM #	2 AM/PM #	3 AM/PM #	4 AM/PM #	5 AM/PM #	6 AM/PM #	7 AM/PM #	8 AM/PM #	9 AM/PM #
Calves fed colostrum from Control Dams	02	0 / 1	1 / 2	1 / 2	2 / 2	1 / 2	1 / 2	2 / 2	2 / 2	2 / 2	2 / 2
	04	0 / 0	0 / 0	1 / 1	0 / 1	0 / 1	1 / 1	-	-	-	-
	08	0 / 1	1 / 2	1 / 2	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2	2 / -	-
	09	0 / 0	0 / 0	0 / 1	0 / 0	1 / 2	1 / 1	2 / 2	2 / 2	2 / 2	1 / 2
	12	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 1	2 / 2	1 / 1	1 / 1	1 / 1
	13	0 / 0	0 / 0	1 / 2	0 / 1	0 / 0	0 / 0	0 / 0	1 / 2	1 / 1	0 / 1
	15	0 / 0	0 / 0	0 / 0	1 / 1	0 / 1	1 / 2	1 / 2	1 / 1	0 / 0	0 / 0
	18	0 / 0	0 / 1	1 / 2	1 / 1	1 / 1	0 / 1	1 / 1	0 / 0	0 / 1	0 / 1
	19	0 / 0	0 / 0	1 / 1	1 / 2	1 / 1	2 / 2	2 / 2	-	-	-
	22	0 / 0	0 / 0	0 / 1	0 / 1	0 / 0	0 / 1	1 / 1	0 / 0	0 / 1	2 / 2
	25	0 / 0	0 / 1	1 / 2	1 / 1	1 / 2	2 / 2	-	-	-	-
	27	0 / 0	0 / 0	2 / 2	1 / 2	0 / 1	1 / 1	1 / 1	0 / 0	0 / 0	0 / 0
	30	0 / 0	1 / 2	0 / 0	1 / 2	0 / 0	2 / 2	0 / 1	0 / 0	0 / 1	1 / 2
	32	0 / 0	0 / 0	1 / 1	0 / 1	1 / 1	0 / 0	0 / 0	0 / 0	0 / 1	1 / 2
	33	0 / 0	0 / 0	0 / 0	0 / 1	0 / 0	0 / 1	0 / 0	0 / 1	0 / 0	0 / 0
	35	0 / 0	1 / 1	1 / 2	2 / 2	2 / 2	1 / 2	2 / 2	-	-	-
	37	0 / 0	0 / 1	1 / 1	1 / 1	0 / 0	0 / 1	1 / 2	1 / 2	1 / 0	0 / 0
	39	0 / 0	0 / 1	1 / 2	1 / 1	0 / 0	0 / 0	1 / 1	1 / 2	2 / 1	1 / 1
Calves Fed Colostrum from Vaccinated Dams	01	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	03	0 / 1	0 / 0	0 / 0	0 / 1	0 / 1	2 / 2	0 / 0	1 / 2	1 / 1	1 / 1
	05	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1
	07	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	10	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	11	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	1 / 1	1 / 1	0 / 0	0 / 0	0 / 0
	14	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	16	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	17	0 / 0	0 / 1	0 / 0	0 / 1	0 / 0	0 / 1	1 / 1	0 / 1	0 / 0	0 / 0
	20	0 / 0	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	21	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	24	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1
	26	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	28	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	0 / 1	1 / 1	0 / 1
	29	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 2
	31	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	34	0 / 0	1 / 2	0 / 0	0 / 1	0 / 0	0 / 0	0 / 1	1 / 2	0 / 1	1 / 0
	36	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	38	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	40	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	0 / 1	0 / 0	0 / 0	0 / 0

\*Day 0 = day of challenge

# Animals were scored in the AM and PM (Score recorded as AM / PM)

- = Animal no longer on study

Attitude Scores: 0 = Normal; 1, 2, 3 = Abnormal

## Dehydration Scoring:

Treatment Group	Animal ID	Days of observation post-challenge*									
		0 AM/PM #	1 AM/PM #	2 AM/PM #	3 AM/PM #	4 AM/PM #	5 AM/PM #	6 AM/PM #	7 AM/PM #	8 AM/PM #	9 AM/PM #
Calves fed colostrum from Control Dams	02	0 / 0	1 / 2	1 / 2	2 / 2	1 / 2	1 / 2	2 / 2	2 / 2	2 / 2	2 / 2
	04	0 / 0	0 / 0	1 / 1	0 / 1	0 / 1	1 / 1	-	-	-	-
	08	0 / 1	1 / 2	1 / 2	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2	3 / -	-
	09	0 / 0	0 / 0	0 / 1	0 / 0	1 / 2	1 / 1	2 / 2	2 / 2	2 / 2	1 / 2
	12	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	1 / 1	2 / 2	1 / 1	1 / 1	1 / 1
	13	0 / 0	0 / 0	1 / 2	0 / 1	0 / 0	0 / 0	0 / 0	1 / 2	1 / 1	0 / 1
	15	0 / 0	0 / 0	0 / 0	1 / 1	0 / 1	1 / 2	1 / 2	1 / 1	0 / 0	0 / 0
	18	0 / 0	0 / 1	1 / 2	1 / 1	1 / 1	0 / 1	1 / 1	0 / 0	0 / 1	0 / 1
	19	0 / 0	0 / 0	1 / 1	1 / 2	1 / 1	2 / 2	2 / 3	-	-	-
	22	0 / 0	0 / 0	0 / 1	0 / 1	0 / 0	0 / 1	1 / 1	0 / 0	0 / 1	2 / 2
	25	0 / 0	0 / 1	1 / 2	1 / 1	1 / 2	2 / 3	-	-	-	-
	27	0 / 0	0 / 0	2 / 2	1 / 2	0 / 1	1 / 1	1 / 1	0 / 0	0 / 0	0 / 0
	30	0 / 0	1 / 2	0 / 0	1 / 2	0 / 0	2 / 2	0 / 1	0 / 0	0 / 1	1 / 2
	32	0 / 0	0 / 0	1 / 1	0 / 1	1 / 1	0 / 0	0 / 0	0 / 0	0 / 1	1 / 2
	33	0 / 0	0 / 0	0 / 0	0 / 1	0 / 0	0 / 1	0 / 0	0 / 1	0 / 0	0 / 0
	35	0 / 0	1 / 1	1 / 2	2 / 2	2 / 2	1 / 2	2 / 3	-	-	-
	37	0 / 0	0 / 1	1 / 1	1 / 1	0 / 0	0 / 1	1 / 2	1 / 2	1 / 0	0 / 0
	39	0 / 0	0 / 1	1 / 2	1 / 1	0 / 0	0 / 0	1 / 1	1 / 2	2 / 1	1 / 1
Calves Fed Colostrum from Vaccinated Dams	01	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	03	0 / 0	0 / 0	0 / 0	0 / 1	0 / 1	2 / 3	0 / 0	1 / 2	1 / 1	1 / 1
	05	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1
	07	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	10	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	11	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	1 / 1	1 / 1	0 / 0	0 / 0	0 / 0
	14	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	16	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	17	0 / 0	0 / 1	0 / 0	0 / 1	0 / 1	0 / 1	1 / 1	0 / 1	0 / 0	0 / 0
	20	0 / 0	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	21	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	24	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1
	26	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	28	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	0 / 1	1 / 1	0 / 1
	29	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 2
	31	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	34	0 / 0	1 / 2	0 / 0	0 / 1	0 / 0	0 / 0	0 / 1	1 / 2	0 / 1	1 / 1
	36	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	38	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	40	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	0 / 1	0 / 0	0 / 0	0 / 0

\*Day 0 = day of challenge

# Animals were scored in the AM and PM (Score recorded as AM / PM)

- = Animal no longer on study

Fecal Scores: 0 = Normal; 1, 2, 3 = Abnormal

# Mortality (Yes / No)

Treatment Group	Animal ID	Mortality (Yes/No)	
		Yes	No
Calves fed colostrum from Control Dams	02		X
	04	X	
	08	X	
	09		X
	12		X
	13		X
	15		X
	18		X
	19	X	
	22		X
	25	X	
	27		X
	30		X
	32		X
	33		X
	35	X	
	37		X
	39		X
Calves Fed Colostrum from Vaccinated Dams	01		X
	03		X
	05		X
	07		X
	10		X
	11		X
	14		X
	16		X
	17		X
	20		X
	21		X
	24		X
	26		X
	28		X
	29		X
	31		X
	34		X
	36		X
	38		X
	40		X

<b>Study Type</b>	Efficacy
<b>Pertaining to</b>	Bovine Rotavirus serotype G6 (BRV G6)
<b>Study Purpose</b>	Demonstrate passive immunity against diarrhea caused by BRV G6 in calves
<b>Product Administration</b>	2 doses of vaccine administered intra muscularly (IM) approximately 6 and 3 weeks to pregnant heifers prior to calving.
<b>Study Animals</b>	Thirty-nine (39) neonatal calves were removed from their dams prior to first nursing; 19 calves were fed colostrum/milk from pre-assigned heifers (one calf to one heifer) that had been vaccinated previously with the vaccine; 20 calves were fed colostrum/milk from pre-assigned heifers (one calf to one heifer) that had been vaccinated previously with a placebo. Calves were negative for pre-colostral virus neutralizing (VN) BRV antibody titer.
<b>Challenge Description</b>	BRV, virulent Lincoln strain, administered orally at 8 to 12 hours of age
<b>Interval observed after challenge</b>	Calves were observed up to 9 days post-challenge for clinical signs.
<b>Results</b>	Calves were observed for fecal consistency, appetite, attitude, and dehydration.,  See the following tables for individual raw data.
<b>USDA Approval Date</b>	10/25/2004



### Fecal Consistency Scoring:

Treatment Group	Animal ID	Days of observation post-challenge*									
		0 AM/PM #	1 AM/PM #	2 AM/PM #	3 AM/PM #	4 AM/PM #	5 AM/PM #	6 AM/PM #	7 AM/PM #	8 AM/PM #	9 AM/PM #
Calves Fed Colostrum from Control Dams	02	0 / 0	0 / 0	2 / 2	2 / 2	2 / 3	2 / 2	3 / 3	2 / 2	3 / 3	2 / -
	03	0 / 0	1 / 1	3 / 3	2 / 2	3 / 3	-	-	-	-	-
	05	0 / 0	0 / 0	3 / 3	1 / 1	1 / 1	2 / 2	2 / 2	2 / 2	3 / 3	3 / 3
	07	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	3 / 3	2 / 2	2 / 2
	10	0 / 0	0 / 0	3 / 3	1 / 1	3 / 3	3 / 3	3 / 3	2 / 2	3 / 3	-
	12	1 / 1	2 / 2	3 / 3	3 / 3	3 / 3	2 / 2	-	-	-	-
	14	0 / 0	2 / 2	2 / 2	1 / 1	2 / 2	2 / 2	3 / 3	3 / 3	-	-
	15	0 / 0	2 / 2	2 / 2	3 / 3	-	-	-	-	-	-
	17	0 / 0	0 / 0	3 / 3	3 / 3	2 / 2	2 / 2	1 / 1	3 / 3	2 / 2	2 / 2
	20	0 / 0	2 / 3	1 / 1	2 / 2	1 / 1	1 / 1	0 / 0	0 / 0	3 / 3	3 / 3
	22	0 / 0	3 / 3	3 / 3	3 / 3	3 / 3	2 / 2	0 / 0	2 / 2	0 / 0	0 / 0
	23	0 / 0	2 / 2	2 / 2	1 / 1	0 / 0	0 / 0	3 / 3	2 / 2	1 / 1	1 / 1
	26	0 / 0	3 / 3	3 / 3	2 / 2	0 / 0	3 / 3	0 / 0	0 / 0	2 / 2	1 / 1
	28	0 / 0	3 / 3	3 / 3	-	-	-	-	-	-	-
	30	0 / 0	3 / 3	2 / 2	1 / 1	2 / 2	0 / 0	0 / 0	2 / 2	2 / 2	2 / 2
	32	0 / 0	2 / 2	2 / 2	3 / 3	2 / 2	0 / 0	0 / 0	0 / 0	2 / 2	2 / 2
	34	0 / 0	0 / 0	3 / 3	2 / 2	2 / 2	1 / 1	2 / 2	2 / 2	2 / 2	2 / 2
	35	0 / 0	0 / 0	3 / 3	2 / 2	3 / 3	3 / 3	3 / 3	3 / 3	3 / 3	-
	38	0 / 0	3 / 3	2 / 2	1 / 1	1 / 1	3 / 3	3 / 3	3 / 3	2 / 2	2 / 2
	39	0 / 0	2 / 2	3 / 3	3 / 3	3 / 3	2 / 2	3 / 3	3 / 3	-	-
Calves Fed Colostrum from Vaccinated Dams	01	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	1 / 1	0 / 0	3 / 3
	04	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 1	3 / 3	3 / 3
	06	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	1 / 1	1 / 1
	09	0 / 0	2 / 2	1 / 1	0 / 0	3 / 3	3 / 3	3 / 3	3 / 3	2 / -	-
	11	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	3 / 3	1 / 1	1 / 1	1 / 1
	13	0 / 0	1 / 1	0 / 0	1 / 1	2 / 2	3 / 3	2 / 2	2 / 2	3 / 3	2 / 2
	16	0 / 0	2 / 2	0 / 0	2 / 2	3 / 3	3 / 3	2 / -	-	-	-
	18	0 / 0	0 / 0	1 / 1	0 / 0	1 / 1	1 / 1	3 / 3	3 / 3	3 / 3	3 / 3
	19	0 / 0	0 / 0	2 / 2	2 / 2	0 / 0	1 / 1	0 / 0	3 / 3	3 / 3	3 / 3
	21	0 / 0	1 / 1	0 / 0	2 / 2	1 / 1	2 / 2	2 / 2	3 / 3	1 / 1	0 / 0
	24	0 / 0	2 / 2	2 / 2	1 / 1	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0
	25	0 / 0	2 / 2	0 / 0	0 / 0	2 / 2	0 / 0	1 / 1	1 / 1	2 / 2	3 / 3
	27	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	2 / 2	1 / 1	3 / 3	1 / 1
	29	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	1 / 1	2 / 2	2 / 2	2 / 2	0 / 0
	31	0 / 0	0 / 0	1 / 1	0 / 0	3 / 3	2 / 2	3 / 3	3 / 3	1 / 1	1 / 1
	33	0 / 0	0 / 0	3 / 3	1 / 1	0 / 0	3 / 3	3 / -	-	-	-
	36	0 / 0	0 / 0	1 / 1	1 / 1	2 / 2	3 / 3	2 / 2	2 / 2	2 / 2	1 / 1
	37	0 / 0	0 / 0	1 / 1	0 / 0	3 / 3	3 / 3	3 / 3	2 / 2	-	-
	40	0 / 0	2 / 2	2 / 2	2 / 2	1 / 1	0 / 0	1 / 1	2 / 2	2 / 2	1 / 1

\*Day 0 = day of challenge

# Animals were scored in the AM and PM (Score recorded as AM / PM)

- = Animal no longer on study

Fecal Scores: 0, 1 = Normal; 2, 3 = Abnormal

## Appetite Scoring:

Treatment Group	Animal ID	Days of observation post-challenge*									
		0 AM/PM #	1 AM/PM #	2 AM/PM #	3 AM/PM #	4 AM/PM #	5 AM/PM #	6 AM/PM #	7 AM/PM # <sub>0</sub>	8 AM/PM #	9 AM/PM #
Calves Fed Colostrum from Control Dams	02	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	2 / -
	03	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	-	-	-	-	-
	05	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	07	0 / 0	0 / 1	1 / 2	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	10	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 2	-
	12	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	-	-	-	-
	14	0 / 0	1 / 2	0 / 0	0 / 1	0 / 1	0 / 0	0 / 1	0 / 2	-	-
	15	0 / 0	1 / 0	0 / 1	1 / 1	-	-	-	-	-	-
	17	0 / 0	0 / 1	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	0 / 0
	20	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	22	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	23	0 / 0	1 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	26	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 0	0 / 0
	28	0 / 0	0 / 0	0 / 0	1 / -	-	-	-	-	-	-
	30	0 / 0	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	32	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	34	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	35	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / 2	-
	38	0 / 0	2 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	39	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	0 / 1	2 / 2	-	-
Calves Fed Colostrum from Vaccinated Dams	01	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	04	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	06	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	09	0 / 0	1 / 0	0 / 0	0 / 0	0 / 1	0 / 1	0 / 0	0 / 1	2 / -	-
	11	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	13	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	16	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	2 / -	-	-	-
	18	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	19	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	0 / 0
	21	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	24	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	25	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	27	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	29	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	31	0 / 1	1 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	33	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	2 / -	-	-	-
	36	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	37	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	-	-
	40	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0

\*Day 0 = day of challenge

# Animals were scored in the AM and PM (Score recorded as AM / PM)

- = Animal no longer on study

Appetite Scores: 0 = Normal; 1, 2 = Abnormal

## Attitude Scoring:

Treatment Group	Animal ID	Days of observation post-challenge*									
		0 AM/PM #	1 AM/PM #	2 AM/PM #	3 AM/PM #	4 AM/PM #	5 AM/PM #	6 AM/PM #	7 AM/PM #	8 AM/PM #	9 AM/PM #
Calves Fed Colostrum from Control Dams	02	0 / 1	0 / 1	1 / 1	1 / 2	1 / 2	2 / 2	2 / 2	2 / 2	2 / 2	3 / -
	03	0 / 0	1 / 2	1 / 2	2 / 2	2 / 2	-	-	-	-	-
	05	0 / 0	0 / 1	2 / 2	1 / 2	1 / 1	2 / 2	1 / 2	1 / 2	2 / 2	2 / 2
	07	0 / 0	0 / 1	1 / 1	0 / 1	0 / 0	0 / 0	0 / 0	2 / 2	1 / 2	1 / 1
	10	0 / 0	0 / 0	1 / 2	1 / 1	0 / 2	2 / 2	2 / 2	1 / 1	2 / 2	-
	12	0 / 1	0 / 1	1 / 2	2 / 2	2 / 2	2 / 2	-	-	-	-
	14	0 / 0	1 / 1	1 / 2	1 / 2	1 / 2	2 / 2	2 / 2	2 / 2	-	-
	15	0 / 0	1 / 2	2 / 2	2 / 2	-	-	-	-	-	-
	17	0 / 0	0 / 1	2 / 2	2 / 2	2 / 2	2 / 2	1 / 1	2 / 2	2 / 2	2 / 2
	20	0 / 0	1 / 2	0 / 0	1 / 2	0 / 0	1 / 1	1 / 0	0 / 0	1 / 2	1 / 2
	22	0 / 0	2 / 2	1 / 2	1 / 2	1 / 2	0 / 1	0 / 0	0 / 1	0 / 0	0 / 0
	23	0 / 0	1 / 2	1 / 1	1 / 1	1 / 1	1 / 1	1 / 2	1 / 1	0 / 1	1 / 1
	26	0 / 0	1 / 2	2 / 2	2 / 2	1 / 0	2 / 2	0 / 0	0 / 0	0 / 1	1 / 1
	28	0 / 0	1 / 2	2 / 2	-	-	-	-	-	-	-
	30	0 / 0	2 / 2	1 / 1	2 / 2	0 / 1	0 / 0	1 / 2	2 / 2	2 / 2	1 / 2
	32	0 / 0	1 / 2	1 / 2	2 / 2	2 / 2	0 / 1	1 / 1	0 / 0	2 / 2	1 / 2
	34	0 / 0	0 / 0	1 / 2	2 / 2	1 / 2	1 / 1	1 / 1	1 / 2	1 / 2	0 / 1
	35	0 / 0	0 / 0	1 / 1	1 / 1	1 / 2	1 / 2	1 / 2	2 / 2	2 / 2	-
	38	0 / 0	1 / 2	2 / 2	1 / 1	0 / 0	1 / 2	1 / 2	1 / 2	1 / 1	1 / 2
	39	0 / 0	1 / 1	1 / 2	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2	-	-
Calves Fed Colostrum from Vaccinated Dams	01	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	04	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 2
	06	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	0 / 1	0 / 0
	09	0 / 0	1 / 1	0 / 1	0 / 0	2 / 2	1 / 2	2 / 2	1 / 2	3 / -	-
	11	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	1 / 2	0 / 1	0 / 0	0 / 0
	13	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	2 / 2	0 / 1	1 / 2	2 / 2	1 / 2
	16	0 / 0	0 / 1	0 / 0	1 / 2	2 / 2	2 / 2	3 / -	-	-	-
	18	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 2	1 / 2	1 / 2
	19	0 / 0	0 / 1	1 / 2	1 / 2	0 / 0	0 / 0	0 / 0	1 / 2	1 / 2	2 / 2
	21	0 / 0	0 / 0	0 / 0	1 / 2	0 / 1	1 / 2	2 / 2	1 / 2	1 / 1	1 / 1
	24	0 / 0	1 / 2	1 / 2	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	25	0 / 0	1 / 2	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	1 / 1	0 / 1	1 / 2
	27	0 / 0	1 / 0	0 / 1	0 / 0	0 / 0	0 / 0	1 / 2	0 / 1	1 / 2	1 / 1
	29	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 1	0 / 1	1 / 1	1 / 0
	31	0 / 1	1 / 1	0 / 0	0 / 0	1 / 2	1 / 1	1 / 2	2 / 2	1 / 0	0 / 0
	33	0 / 0	0 / 0	0 / 2	0 / 0	1 / 1	2 / 2	3 / -	-	-	-
	36	0 / 0	0 / 0	0 / 0	0 / 1	0 / 1	1 / 2	0 / 1	1 / 1	0 / 1	0 / 1
	37	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	1 / 2	2 / 2	1 / 2	-	-
	40	0 / 0	0 / 1	0 / 1	0 / 1	0 / 1	0 / 0	0 / 0	0 / 1	0 / 1	0 / 0

\*Day 0 = day of challenge

# Animals were scored in the AM and PM (Score recorded as AM / PM)

- = Animal no longer on study

Attitude Scores: 0 = Normal; 1, 2, 3 = Abnormal

## Dehydration Scoring:

Treatment Group	Animal ID	Days of observation post-challenge*									
		0 AM/PM #	1 AM/PM #	2 AM/PM #	3 AM/PM #	4 AM/PM #	5 AM/PM #	6 AM/PM #	7 AM/PM #	8 AM/PM #	9 AM/PM #
Calves Fed Colostrum from Control Dams	02	0 / 0	0 / 0	1 / 1	1 / 2	1 / 2	2 / 2	2 / 2	2 / 2	2 / 2	3 / -
	03	0 / 0	1 / 1	1 / 2	2 / 2	2 / 3	-	-	-	-	-
	05	0 / 0	0 / 0	2 / 2	1 / 2	1 / 1	1 / 2	1 / 2	1 / 2	2 / 2	2 / 2
	07	0 / 0	0 / 1	1 / 1	0 / 1	0 / 0	0 / 0	0 / 0	2 / 2	1 / 2	1 / 1
	10	0 / 0	0 / 0	1 / 2	1 / 1	0 / 2	2 / 2	2 / 2	1 / 1	2 / 2	-
	12	0 / 1	0 / 1	0 / 2	2 / 2	2 / 2	2 / 3	-	-	-	-
	14	0 / 0	1 / 1	1 / 2	1 / 2	1 / 2	2 / 2	2 / 2	2 / 2	-	-
	15	0 / 0	1 / 2	2 / 2	2 / 2	-	-	-	-	-	-
	17	0 / 0	0 / 1	2 / 2	2 / 2	2 / 2	2 / 2	1 / 1	2 / 2	2 / 2	2 / 2
	20	0 / 0	1 / 2	0 / 0	1 / 2	0 / 0	1 / 1	1 / 0	0 / 0	1 / 2	1 / 2
	22	0 / 0	2 / 2	1 / 2	1 / 2	1 / 2	0 / 1	0 / 0	0 / 1	0 / 0	0 / 0
	23	0 / 0	1 / 2	1 / 1	1 / 1	1 / 1	1 / 1	1 / 2	1 / 1	0 / 1	1 / 1
	26	0 / 0	2 / 2	2 / 2	2 / 2	1 / 0	2 / 2	0 / 0	0 / 0	0 / 1	1 / 1
	28	0 / 0	1 / 2	3 / 3	-	-	-	-	-	-	-
	30	0 / 0	2 / 2	1 / 1	2 / 2	0 / 1	0 / 0	1 / 2	2 / 2	2 / 2	1 / 2
	32	0 / 0	1 / 2	1 / 2	2 / 2	2 / 2	0 / 1	1 / 1	0 / 0	2 / 2	1 / 2
	34	0 / 0	0 / 0	1 / 2	2 / 2	1 / 2	1 / 1	1 / 1	1 / 2	1 / 2	0 / 1
	35	0 / 0	0 / 0	1 / 1	1 / 1	1 / 2	1 / 2	1 / 2	2 / 2	2 / 2	-
	38	0 / 0	1 / 2	2 / 2	1 / 1	0 / 0	1 / 2	1 / 2	1 / 2	1 / 1	1 / 2
	39	0 / 0	1 / 1	1 / 2	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2	-	-
Calves Fed Colostrum from Vaccinated Dams	01	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	04	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 2
	06	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	0 / 1	0 / 0
	09	0 / 0	1 / 1	0 / 1	0 / 0	2 / 2	1 / 2	2 / 2	1 / 2	3 / -	-
	11	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 0	1 / 2	0 / 1	0 / 0	0 / 0
	13	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	2 / 2	0 / 1	1 / 2	2 / 2	1 / 2
	16	0 / 0	0 / 1	0 / 0	1 / 2	2 / 2	2 / 2	3 / -	-	-	-
	18	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 2	1 / 2	1 / 2
	19	0 / 0	0 / 1	2 / 2	1 / 2	0 / 0	0 / 0	0 / 0	1 / 2	1 / 2	2 / 2
	21	0 / 0	0 / 0	0 / 0	1 / 2	0 / 1	1 / 2	2 / 2	1 / 2	1 / 1	1 / 1
	24	0 / 0	1 / 2	1 / 2	0 / 1	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	25	0 / 0	1 / 2	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	1 / 1	0 / 1	1 / 2
	27	0 / 0	1 / 0	0 / 1	0 / 0	0 / 0	0 / 0	1 / 2	0 / 1	1 / 2	1 / 1
	29	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	1 / 1	0 / 1	1 / 1	1 / 0
	31	0 / 1	1 / 1	0 / 0	0 / 0	1 / 2	1 / 1	1 / 2	2 / 2	1 / 0	0 / 0
	33	0 / 0	0 / 0	0 / 2	0 / 0	1 / 1	2 / 2	2 / -	-	-	-
	36	0 / 0	0 / 0	0 / 0	0 / 1	0 / 1	1 / 2	0 / 1	1 / 1	0 / 1	0 / 1
	37	0 / 0	0 / 0	0 / 0	0 / 0	1 / 2	1 / 2	2 / 2	1 / 2	-	-
	40	0 / 0	0 / 1	0 / 1	0 / 1	0 / 1	0 / 0	0 / 0	0 / 1	0 / 1	0 / 0

\*Day 0 = day of challenge

# Animals were scored in the AM and PM (Score recorded as AM / PM)

- = Animal no longer on study

Fecal Scores: 0 = Normal; 1, 2, 3 = Abnormal

<b>Study Type</b>	Safety																																																																				
<b>Pertaining to</b>	All fractions																																																																				
<b>Study Purpose</b>	Demonstrate safety in cattle under field conditions																																																																				
<b>Product Administration</b>	Two doses administered intramuscularly (IM) with the first dose 6 weeks and second dose 3 weeks before scheduled calving																																																																				
<b>Study Animals</b>	<p>Nine hundred fifty-two (952) 6-7-month pregnant animals in 3 geographic locations. About 700 animals were vaccinated, the remaining animals received a placebo control.</p> <p>Site 1: 374 (94 controls and 280 vaccinates)</p> <p>Site 2: 355 (116 controls and 239 vaccinates)</p> <p>Site 3: 221</p>																																																																				
<b>Challenge Description</b>	N/A																																																																				
<b>Interval observed after vaccination</b>	Animals were observed individually for 28 days after first vaccination for injection site reactions and adverse events.																																																																				
<b>Results</b>	<p><b>Site 1:</b></p> <table border="1"> <thead> <tr> <th>Treatment Group</th><th>Depression</th><th>Injection site Swelling</th><th>Diarrhea</th><th>Ataxia</th><th>Abortion</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Controls</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr> <td>Vaccinates</td><td>2*</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1**</td></tr> </tbody> </table> <p>*Animal 331 was reported to be depressed and sore (Study Day 1). Animal 388 was described as sore, sluggish, no appetite (Study Day 3).</p> <p>**Animal 067 experienced a cervical prolapse (Study Day 1).</p> <p><b>Site 2:</b></p> <table border="1"> <thead> <tr> <th>Treatment Group</th><th>Depression</th><th>Injection site Swelling</th><th>Diarrhea</th><th>Ataxia</th><th>Abortion</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Controls</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td></tr> <tr> <td>Vaccinates</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1*</td></tr> </tbody> </table> <p>* Dystocia and dead calf delivered (Study Day 24)</p> <p><b>Site 3:</b></p> <table border="1"> <thead> <tr> <th>Treatment Group</th><th>Depression</th><th>Injection site Swelling</th><th>Diarrhea</th><th>Ataxia</th><th>Abortion</th><th>Other</th></tr> </thead> <tbody> <tr> <td>Controls</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td></tr> <tr> <td>Vaccinates</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1*</td></tr> </tbody> </table> <p>* Dystocia and dead calf delivered (Study Day 20)</p> <p>Only 2 animals had adverse events due to vaccination; depression/soreness in one and inappetence/soreness in the other. No injection site swellings, or other vaccine related local or systemic reactions, were reported.</p>						Treatment Group	Depression	Injection site Swelling	Diarrhea	Ataxia	Abortion	Other	Controls	0	0	0	0	0	0	Vaccinates	2*	0	0	0	0	1**	Treatment Group	Depression	Injection site Swelling	Diarrhea	Ataxia	Abortion	Other	Controls	0	0	0	0	1	0	Vaccinates	0	0	0	0	0	1*	Treatment Group	Depression	Injection site Swelling	Diarrhea	Ataxia	Abortion	Other	Controls	0	0	0	0	1	0	Vaccinates	0	0	0	0	0	1*
Treatment Group	Depression	Injection site Swelling	Diarrhea	Ataxia	Abortion	Other																																																															
Controls	0	0	0	0	0	0																																																															
Vaccinates	2*	0	0	0	0	1**																																																															
Treatment Group	Depression	Injection site Swelling	Diarrhea	Ataxia	Abortion	Other																																																															
Controls	0	0	0	0	1	0																																																															
Vaccinates	0	0	0	0	0	1*																																																															
Treatment Group	Depression	Injection site Swelling	Diarrhea	Ataxia	Abortion	Other																																																															
Controls	0	0	0	0	1	0																																																															
Vaccinates	0	0	0	0	0	1*																																																															
<b>USDA Approval Date</b>	12/07/2004																																																																				