

Gel -14-1-2  
Bran -9-2



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MICHAEL ARCHIBALD

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PO Box 639  
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CUSTOMER'S NAME DESERET FEEDERS DATE 10-15-13  
STREET ADDRESS 521 50th ROAD TEST # 3 E. LOG NO  
CITY & STATE SATANTA, KS 67870 DRILLER Dale Guian  
COUNTY Haskell QUARTER NW SECTION 26 TOWNSHIP 27 RANGE 34  
RIG# 37 WO 6473  
LOCATION 31' South & 30' West of old well #2 ELEVATION MEASURED DEC 2012  
GPS N37.67795 W101.01614

%	FOOTAGE			PROPOSED 2" TEST WELL LOCATION DESCRIPTION OF STRATA	Static Water Level: <del>420'</del> Proposed Well Depth: <u>780</u>
	From	Pay	To		
	0		1	Top Soil	
	1		6	Sand fine to med "Old Pit From Well"	
	6		34	Brown sandy clay w/ few sand strips	
	34		40	Fine Sand	
	40		80	Brown sandy clay	
	80		104	Brown sandy clay w/ few sand strips	
	104		125	Sand fine to med w/ some clay stringers	
	125		203	Sand fine to med coarse small med gravel	
	203		285	Sand fine to med coarse small med large gravel	
	285		297	Brown sandy clay	
10	297	23	320	Sand fine to med w/ many clay stringers	
	320		340	Brown sandy clay w/ some sand strips	
	340		356	Brown sandy clay w/ few sand strips	
5	356	26	382	Brown sandy clay w/ many fine sand strips	
	382		399	Brown sandy clay w/ few sand strips - sticky in places	
15	399	49	448	Fine sand w/ few clay stringers	
5	448	20	468	Brown sandy clay w/ some sand strips	
10	468	42	510	Fine sand w/ few clay stringers	
	510		515	Yellow soapstone	
15	515	14	529	Sandstone w/ few small soapstone strips - lost circ. 529' - used water	
	529		539	Iron Pyrite	
15	539	41	580	Sandstone - used water	
	580		700	Black shale w/ few sandstone - Drilled Hard @ 635'-641'	
10	700	15	715	Sandstone - drilled little tight - used some water	
5	715	31	746	Sandstone & Black Shale	
10	746	34	780	Sandstone - used water - (CHEYENNE)	
	780		792	Shale (GREY BLACK TINT)	
	792		820	Red Bed	
				Bran -12	
				Super Gel X -17	
				Grout -5	
				Hole Plug -5	
				Perma Plug -1	
				4 3/4 Drag Blade -1	
				4 1/2 Rock Bit -1	
		295			

DWR records show Existing Well 2 to be  
5070' N & 5030' W of SE cor Sec 26, T27S, R34W  
Haskell Co.

DESERT PERFOR

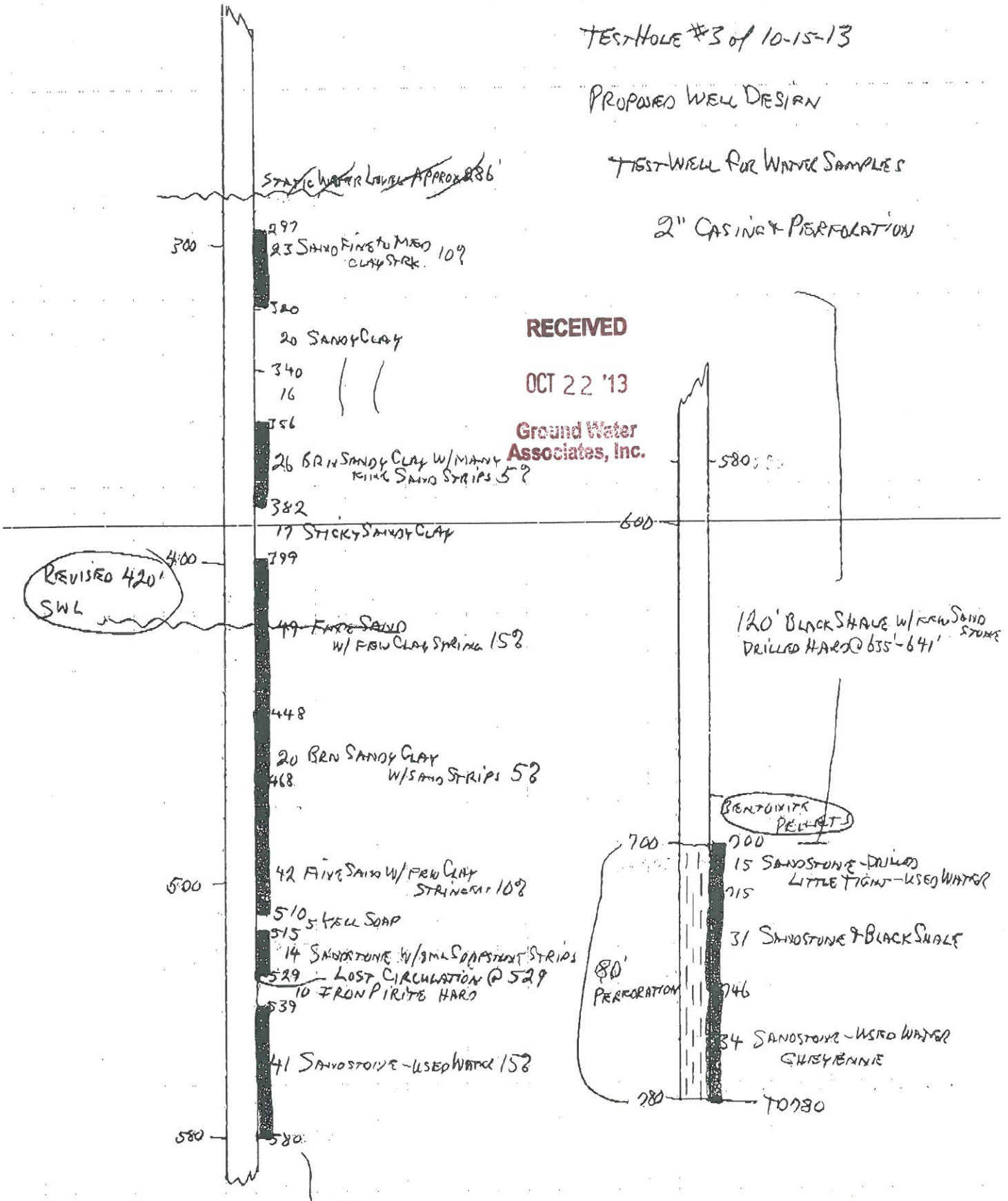
NW 26-27-34 HS

TEST HOLE #3 of 10-15-13

PROPOSED WELL DESIGN

TEST WELL FOR WATER SAMPLES

2" CASING PERFORATION



# Servi-Tech Laboratories

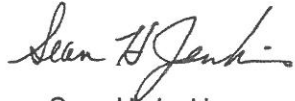
1816 E. Wyatt Earp • PO Box 1397 • Dodge City, KS 67801  
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Phone: 620.227.7123

800.557.7509

Fax: 620.227.2047

Lab #: D-2014NL000492 **LABORATORY REPORT** Report Date: 11/01/2013 03:17 pm

<b>Send To:</b> 8134	GROUND WATER ASSOCIATES PO BOX 3834 WICHITA, KS 67201	 Sean H. Jenkins QA Manager	
<b>Project ID:</b>		<b>Date/Time Received:</b>	10/30/2013 06:00 am
<b>Project Title:</b>	Test No. 3 near	<b>Name of Submitter:</b>	
<b>Sample ID:</b>	WELL #2 ←	<b>Date/Time Sampled:</b>	10/29/2013 01:30 pm
<b>Client Name:</b>	Deseret Feeders	<b>Name of Sampler:</b>	
<b>Subject:</b>	Drinking Water Lab Analysis	<b>Invoice No:</b>	358792
<b>Location:</b>		<b>P.O. #:</b>	
<b>Depth:</b>			

Analysis	Result	Unit	grams / gallon	MCL	SMCL
Nitrate Nitrogen, NO3-N	0.12	mg/L	<0.1	10	N/A
Chloride, Cl	12	mg/L	<0.1	N/A	250
Fluoride, F	1.6	mg/L	<0.1	4	2
Sulfate, SO4	230	mg/L	0.9	N/A	250
Sulfate-Sulfur, SO4-S	75	mg/L	0.3	N/A	N/A
Hardness (CaCO3)	85	mg/L	0.3	N/A	N/A
Hardness (CaCO3)	5.0	grains/gal		N/A	N/A
Total Calcium, Ca	21	mg/L	<0.1	N/A	N/A
Total Magnesium, Mg	8	mg/L	<0.1	N/A	N/A
Total Potassium, K	3	mg/L	<0.1	N/A	N/A
Total Sodium, Na	130	mg/L	0.5	N/A	N/A
Total Iron, Fe	0.05	mg/L	<0.1	N/A	0.3
Total Manganese, Mn	0.006	mg/L	<0.1	N/A	0.05
Electrical Conductivity, EC	804	µmho/cm		N/A	N/A
Total Dissolved Solids (Calc), TDS	515	mg/L		N/A	500
pH, at 23°C	8.3	units		N/A	6.5-8.5

**Result Notes**

1 The sample was received and analyzed outside the regulatory holding time for this analyte.

**Interpretations for Drinking Water (40 CFR 141)**

**NITRATE LEVEL** (less than 10.0 mg/L NO3-N) - SAFE: The U.S. Public Health Service (USPHS) considers water with nitrate nitrogen levels at or below 10 mg/L to be acceptable for all uses (below the standard). Recommend testing for nitrate nitrogen each year until a consistent record of low nitrate is established.

**FLUORIDE LEVEL** - GOOD: Fluoride concentrations in this range will aid in prevention of dental cavities.

**HARDNESS LEVEL** - HARD: Hard water requires more detergent for cleaning and often forms "soap scum". When heated above 140 degrees F, hardness minerals may form scale deposits in plumbing and appliances. Pretreatment with a water softener or softening agent may be beneficial. If water is heated or frozen, minerals may precipitate and form deposits in ice and beverages.

N/A = Not Applicable

MCL = Maximum Contamination Level  
(Primary standard, health effects)

SMCL = Secondary Maximum  
Contamination Levels (Non-health effects)

Report formatted for regulatory compliance available upon request.

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# Servi-Tech Laboratories

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www.servitechlabs.com

Lab #: D-2014NL000492

## LABORATORY REPORT

Report Date: 11/01/2013 03:17 pm

Sample ID: WELL #2

Client Name: Deseret Feeders

Location:

**DISSOLVED SALTS - ACCEPTABLE:** A TDS level between 500 and 1000 mg/L is considered to be acceptable. Depending upon the salts present, there might be some affect on the palatability of the water.

**SODIUM:** Individuals on a restricted sodium diet should consider the contribution of the sodium in drinking water when planning diets. Each 1 mg/L (part per million) sodium in this drinking water is equivalent to 1.1 mg (milligram) per quart. It may be possible to adjust treatment equipment or use a potassium regenerant material to reduce the sodium level. Consult your physician if dietary sodium is a concern.

### Interpretations for Livestock Use

**NITRATE-NITROGEN: VERY LOW:** No harmful effects are expected.

**SULFATE LEVEL - LOW:** Safe for all classes of livestock.

**TOTAL DISSOLVED SOLIDS, CONDUCTIVITY: EXCELLENT QUALITY ("fresh" water):** Low salinity level. Suitable for all classes of livestock and poultry.

**pH - ALKALINE.**

### AVERAGE DAILY WATER CONSUMPTION (gallons per day)

Beef cattle ..... 7 to 12 per head

Sheep, goats ..... 2 to 4 per head

Dairy cattle ..... 10 to 40 per head

Chickens ..... 8 to 10 per hundred birds

Swine ..... 2 to 8 per head

Turkeys ..... 10 to 15 per hundred birds

Horses ..... 8 to 12 per head

(Note: Water consumption may increase by 1½ to 2 times when temperatures exceed 80°F.)

N/A = Not Applicable

MCL = Maximum Contamination Level  
(Primary standard, health effects)

SMCL = Secondary Maximum  
Contamination Levels (Non-health effects)

Report formatted for regulatory compliance available upon request.

Page 2 of 2



**rvincent**

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**From:** "Don Whittmore" <donwhitt@kgs.ku.edu>  
**To:** "Robert Vincent" <rvincent@gwaks.com>  
**Sent:** Wednesday, November 27, 2013 3:22 PM  
**Attach:** Cheyenne well chemical data 2013.docx  
**Subject:** Chemical data for Cheyenne well

Bob,

I have attached a Word file with a table of the chemical data for the water samples from the Cheyenne Sandstone well in Haskell County. The table is also included below in this email.

The values are essentially the same (within analytical error or significant digits of Servi-Tech) for both samples, indicating that no significant change occurred from the first sample to the second sample. This is good in that it suggests that the samples appear to represent well the formation water from the Cheyenne.

The water is fresh (520 mg/L total dissolved solids); the division between fresh and saline water is 1000 mg/L TDS.

The water is very low in chloride, indicating that either the Permian has low chloride, there are laterally continuous shales that prevent the movement of saline water from the Permian into the Cheyenne, the hydraulic gradient during recent geologic time has been downward at the location, or a combination of some or all these factors.

The constituent in highest concentration is sulfate. The concentration is still below the recommended drinking limit of 250 mg/L. A sulfate concentration around that of the samples is not unusual for the Dakota aquifer because the strata often contain pyrite that oxidizes to dissolved iron and sulfate. The dissolved iron then precipitates as ferric oxyhydroxides, also called hydrated iron oxides (rust-colored minerals) that are common in Dakota sediments.

The nitrate concentration is very low.

The fluoride concentration is not low for fluoride but is lower than the recommended value of 2 mg/L for drinking water (and the 4 mg/L maximum contaminant limit for public supplies of drinking water. The soluble sodium percentage, which I calculated from the sodium, calcium, and magnesium concentrations, is about 77% for both sample analyses. This is relatively high because the sodium concentration is high relative to the calcium and magnesium concentrations. At the specific conductance of 804 to 810 uS/cm for the water, the sodium hazard for soils for use of the water for irrigation is medium for sandy soils, high for loamy soils, and very high for clayey soils. (See KSU Extension publication C-396 Revised, Determining Water Quality for Irrigation.) Thus, if the soils are clayey, it would be good to mix some of the Ogallala-High Plains aquifer water with the Cheyenne water for irrigation to prevent problems with decreased permeability in the soils.

Please share this email with Deseret Feeders.

Don

#### **Chemical data for water samples from well in Cheyenne Sandstone at 700-780 ft depth**

<b>Sample source</b>	Groundwater from Cheyenne Sandstone	Groundwater from Cheyenne Sandstone
<b>Site name</b>	Test Hole #3 (Well #2)	Test Hole #3 (Well #2)
<b>County</b>	Haskell	Haskell
<b>Legal location</b>	27S-34W-26BBB	27S-34W-26BBB

11/27/2013

<b>Sample date</b>	10/30/2013	10/30/2013
<b>Sample information</b>	Taken after 4 days of pumping at 11 gpm	Taken 8 hrs after prior sample at 5 gpm pumping
<b>Analytical laboratory</b>	Servi-Tech Laboratories	Kansas Geological Survey
<b>Specific conductance, <math>\mu</math>S/cm</b>	804	810
<b>Lab pH, units</b>	8.3	8.28
<b>Silica, SiO<sub>2</sub>, mg/L</b>		11.6
<b>Calcium, Ca, mg/L</b>	21	23.4
<b>Magnesium, Mg, mg/L</b>	8	8.07
<b>Sodium, Na, mg/L</b>	130	145
<b>Potassium, K, mg/L</b>	3	3.16
<b>Strontium, Sr, mg/L</b>		0.56
<b>Boron, B, mg/L</b>		0.46
<b>Bicarbonate, HCO<sub>3</sub>, mg/L</b>		197
<b>Sulfate, SO<sub>4</sub>, mg/L</b>	230	219
<b>Chloride, Cl, mg/L</b>	12	9.15
<b>Fluoride, F, mg/L</b>	1.6	1.34
<b>Nitrate-nitrogen, NO<sub>3</sub>-N, mg/L</b>	0.1	0.014
<b>Bromide, Br, mg/L</b>		0.031
<b>Total dissolved solids, mg/L</b>		520
<b>Soluble sodium percentage</b>	76.8	77.5

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 Kansas Geological Survey  
 University of Kansas  
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 Lawrence, KS 66047-3726

Phone 785-864-2182  
 Email [donwhitt@kgs.ku.edu](mailto:donwhitt@kgs.ku.edu)

## Web sites:

KGS: <http://www.kgs.ku.edu/>  
 Water Information: <http://www.kgs.ku.edu/Hydro/hydroIndex.html>  
 Geohydrology Section: <http://www.kgs.ku.edu/Staff/gh.html>

*Haswell 81*

**SAMPLE PROCESSING FORM**

Processing Time 1) Start 3:42 End 3:59 Minutes 17 2) Start \_\_\_:\_\_\_ End \_\_\_:\_\_\_ Minutes \_\_\_  
 3) Start \_\_\_:\_\_\_ End \_\_\_:\_\_\_ Minutes \_\_\_ 4) Start \_\_\_:\_\_\_ End \_\_\_:\_\_\_ Minutes \_\_\_ TOTAL 17

- A) Process:  Yes  No B) Well Name & Number: TEST #3 STR:26 27 34 W  
 C) Sample preservation requested by:  KGS  Operator  Geologically significant  Not requested  
 D) Reason sample significant:  1/4 SECTION  DEPTH > 100'  TIME > 40 YEARS  SEE COMMENTS  
 E) KCC sample confidentiality:  Not requested  Requested Hold samples to: ..  
 F) Intake: SS Form  Y  N  I Duplicates  Yes  No **Bag**  G  F  P  Scan Dry  Wet   
 G) Type sample:  Partially  Prepared  Regular  Confidential  Duplicate  Irregular  Minimum  
 H) Comments: D - Samples unique - preserve *\* Send invoice to ground water associates -> Bob Vincent*

Geologically significant as samples are shallow and include the Cheyenne Sandstone.

No charge to Deseret Feeders or Hydro

- I) Sample processing conditions: Grouped  G  F  P Label  G  F  P Clean  G  F  P  
 J) Billing: Skip Length: \_\_\_ ft. Re-label interval: \_\_\_ ft. Admin time: \_\_\_ minutes  
 K) Box ID: F0044 from 297 to 780 Box ID: \_\_\_ from \_\_\_ to \_\_\_  
 Box ID: \_\_\_ from \_\_\_ to \_\_\_ Total footage processed: 483  
 L)  Processed  Discarded By: RP Date: 2/17/2016

DEPTH FROM	DEPTH TO	INTERVAL FEET	INTERVAL SKIP	CIRCULATION TIME (minutes)
297	320	23	<input type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
320	356	<u>          </u>	<input checked="" type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
356	382	26	<input type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
382	399	<u>          </u>	<input checked="" type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
399	448	49	<input type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
448	468	20	<input type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
468	510	42	<input type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
510	515	<u>          </u>	<input checked="" type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
515	529	14	<input type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
529	539	<u>          </u>	<input checked="" type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
539	580	41	<input type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
580	700	<u>          </u>	<input checked="" type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
700	715	15	<input type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
715	746	31	<input type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
746	780	34	<input type="checkbox"/>	<input type="checkbox"/> 15 <input type="checkbox"/> 20 <input type="checkbox"/> 30 <input type="checkbox"/> 40 <input type="checkbox"/> 45 <input type="checkbox"/> 60
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