

INFORMATION SHEET

WASTE DISCHARGE REQUIREMENTS ORDER R5-2018-XXXX
FORMER SPRECKELS MENDOTA FACILITY,
SURFACE IMPOUNDMENTS CLOSURE AND POST-CLOSURE MAINTENANCE
FRESNO COUNTY

Spreckels Sugar Company, Inc. (SSCI), presently a wholly-owned subsidiary of Southern Minnesota Beet Sugar Cooperative (SMBSC), previously owned and operated a sugar beet processing facility (Facility) in Fresno County, near Mendota.

SSCI began operating the Facility in approximately 1962. Although SSCI initially operated as a subsidiary of AMSTAR Corporation (AMSTAR), now ASR Group International, Inc. (ASR), corporate ownership of SSCI was eventually sold to Spreckels Industries, Inc. (SII) in 1987. In 1996, the Facility and other SII assets were acquired by Holly Sugar Corporation (HSC), a subsidiary of the Imperial Holly Corporation (IHC). In 2001, IHC filed for bankruptcy protection. SSCI assets were sold to SMBSC in 2005. SSCI and SMBSC subsequently ended all sugar beet processing activity in fall 2008, and all sugar beet packaging operations in spring 2009.

The Facility has been regulated under Resolution No. 61-147, which was adopted on 14 December 1961. The Facility's operators disposed of a nutrient-rich and high-salt waste to 28 shallow unlined surface impoundments, referred to as "Steffens Ponds," covering approximately 130 acres. Discharges to the Steffens Ponds occurred between 1962 and 1991. Discharges to the Steffens Ponds ended once the operators began using a Concentrated Steffens Filtrate evaporator, which recovered the salts for inclusion with the beet pulp that was then sold as cattle feed.

In addition to waste discharged at Steffens Ponds, approximately two to four million gallons of wastewater were discharged each day to 10 unlined wastewater and sedimentation ponds covering approximately 130 acres in total size (Factory Ponds). SSCI and SII also discharged Precipitated Calcium Carbonate (PCC) generated during the sugar beet purification process to five unlined ponds covering approximately 10 acres (PCC Ponds). Discharges to the Factory Ponds and PCC Ponds ended with all other sugar beet-related operations in 2009.

The geologic deposits beneath the Facility consist of younger alluvium near the surface, older alluvium to depths of approximately 3,000 feet, and a mixture of continental and marine rocks and deposits extending to depths greater than 9,000 feet below ground surface (bgs). Younger alluvial sediments consist of Holocene river and flood-basin deposits. Older alluvium consists of Oligocene to Holocene continental rocks and deposits consisting of a heterogeneous mixture of generally poorly sorted clay, silt, sand, and gravel, with some beds of claystone, siltstone, sandstone, and conglomerate. Continental and marine rocks and deposits consist of Pre-Tertiary to Oligocene deposits of clay, shale, sandstone and conglomerate.

First encounter groundwater beneath the Facility occurs in the upper unconfined aquifer and ranges in depth from approximately 20 to 40 feet bgs. The upper unconfined aquifer in the vicinity of the Facility has been subdivided into two water-bearing zones—the "shallow zone" and the "deep zone". The "shallow zone" is termed for the zone above the A-clay and the "deep zone", which is termed for the zone between the A-clay and the E-Clay (Corcoran Clay). The A-clay is encountered at a depth of approximately 70 to 80 feet bgs and the E-Clay is encountered at a depth of approximately 450 feet bgs.

The current groundwater monitoring network for the Facility is comprised of 24 monitoring wells in the “shallow zone,” and eight monitoring wells in the “deep zone.” Although not originally required, SSCI began groundwater monitoring in 1982, with a majority of the monitoring wells installed between 1984 and 1990. Since the advent of monitoring in 1982, groundwater has predominantly flowed northeast across the Facility in the “shallow zone” of the upper unconfined aquifer, and north-to-northeast in the “deep zone” of the aquifer.

Analyses of groundwater samples from on-site monitoring wells indicate that discharges of wastes from previous activities at the facility have degraded groundwater. The concentrations of total dissolved solids (TDS), in milligrams per liter (mg/L), detected in the various on-site monitoring wells are presented in **Table 1**, below.

Table 1—Concentrations of TDS in Monitoring Wells						
Monitoring Well	Well Type	Historic High (mg/L)	Oct. 1991, End of Discharge to Steffens Ponds (mg/L)	Sept. 2008, End of All Operations (mg/L)	Oct. 2015 (mg/L)	Oct. 2015 divided by Historic High
MW-1	Shallow	3,045	1,365	1,100	1,900	0.62
MW-2	Shallow	2,190	1,255	1,600	1,500	0.68
MW-3	Shallow	3,040	1,995	940	650	0.21
MW-4	Shallow	1,623	1,120	1,200	1,100	0.68
MW-5	Shallow	1,500	775	870	960	0.64
MW-6	Shallow	1,600	950	1,300	1,600	1.00
MW-7	Deep	5,000	3,860	4,000	3,800	0.76
MW-8	Deep	1,100	485	1,000	920	0.84
MW-9	Shallow	1,300	650	1,000	770	0.59
MW-10	Deep	1,400	1,000	880	1,400	1.00
MW-11	Deep	1,400	1,000	1,400	1,300	0.93
MW-12	Deep	3,540	2,540	2,100	1,300	0.37
MW-13	Shallow	1,900	1,310	380	420	0.22
MW-14	Deep	1,190	860	640	690	0.58
MW-15	Shallow	17,300	11,200	5,600	3,400	0.20
MW-16	Deep	6,800	4,360	3,300	3,000	0.44
MW-17	Shallow	4,700	1,985	2,700	2,100	0.45
MW-18	Shallow	4,660	2,930	2,200	1,400	0.30
MW-19	Shallow	9,600	7,320	5,000	4,500	0.47
MW-20	Shallow	2,520	2,125	1,800	1,800	0.71
MW-21	Shallow	3,900	2,340	NA	2,300	0.59
MW-22	Deep	2,780	2,540	1,700	2,100	0.76
MW-23	Shallow	4,460	3,930	NA	2,300	0.52
MW-24	Shallow	2,900	1,280	1,400	2,100	0.72

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MW-25	Shallow	8,100	1,635	2,300	2,200	0.27
MW-26	Shallow	10,800	8,400	4,000	1,400	0.13
MW-27	Shallow	7,020	2,560	3,700	1,200	0.17
MW-28	Shallow	1,500	NA	1,200	1,500	1.00
MW-29	Shallow	1,760	NA	1,300	1,100	0.63
MW-30	Shallow	900	NA	590	640	0.71
MW-31	Shallow	650	NA	590	610	0.94
MW-32	Shallow	600	NA	210	290	0.48

Twelve supply wells have been installed on-site. The initial and highest total concentrations of TDS for each well are presented in **Table 2**, below.

Table 2—Concentrations of TDS in On-Site Supply Wells

Supply Well	Initial Concentration (mg/L)	Initial Date	High Concentration (mg/L)	Oct. 2015 Concentration (mg/L)
PW-1	235	Mar. 1962	1,975	Closed & Sealed
PW-2	121	Oct. 1963	1,605	Closed & Sealed
PW-3	138	Oct. 1963	617	Closed & Sealed
PW-4	382	Oct. 1963	1,600	Closed & Sealed
PW-5	134	Oct. 1963	4,433	Closed & Sealed
PW-6	310	April 1983	1,600	750
PW-7	270	May 1983	1,200	870
PW-8	265	Sept. 1984	2,300	Closed & Sealed
PW-9	670	Nov. 1984	2,400	1,500
PW-10	390	Dec. 1988	840	800
PW-11	96	Oct. 2001	500	450
PW-12	320	Mar. 2004	900	900

Monitoring data from groundwater monitoring wells indicate that the wastes discharged at the facility have impacted underlying groundwater. Concentrations of TDS, chloride, and sulfate for water samples collected in October 2015 from monitoring wells for the “shallow zone” of the upper unconfined aquifer are presented in **Table 3**, below.

Table 3—Oct. 2015 Concentrations of TDS, Chloride, and Sulfate in Shallow Monitoring Wells			
Shallow Zone Monitoring Well	TDS (mg/L)	Chloride (mg/L)	Sulfate (mg/L)
MW-1	1,900	270	420
MW-2	1,500	250	7
MW-3	650	99	86
MW-4	1,100	240	150
MW-5	960	210	130
MW-6	1,600	440	180
MW-9	770	130	190
MW-13	420	100	79
MW-15	3,400	400	1,000
MW-17	2,100	450	260
MW-18	1,400	260	130
MW-19	4,500	730	850
MW-20	1,800	330	240
MW-21	2,300	330	160
MW-23	2,300	360	140
MW-24	2,100	490	120
MW-25	2,200	440	170
MW-26	1,400	210	180
MW-27	1,200	250	160
MW-28	1,500	240	470
MW-29	1,100	170	410
MW-30	640	39	240
MW-31	610	59	210
MW-32	290	19	98

Concentrations of TDS, chloride, and sulfate for water samples collected in October 2015 from monitoring wells and supply wells for the “deep zone” of the upper unconfined aquifer are summarized below.

Table 4—Oct. 2015 Concentrations (mg/L) of TDS, Chloride and Sulfate in Deep Zone Monitoring Wells and Production Wells

Deep Zone Well	TDS (mg/L)	Chloride (mg/L)	Sulfate (mg/L)
MW-7	3,800	1,000	<1
MW-8	920	210	12
MW-10	1,200	280	9
MW-11	1,300	300	5
MW-12	1,300	260	16
MW-14	690	120	97
MW-16	3,000	530	130
MW-22	2,100	430	13
PW-6	750	140	68
PW-7	870	160	54
PW-9	1,500	320	87
PW-10	800	180	72
PW-11	450	50	97
PW-12	900	150	120

Because monitoring wells were installed at the site approximately 20 years after facility operations began, pre-facility operation groundwater data is unavailable. Upgradient groundwater (west of the Mendota Pool) has high salinity originating from natural causes and irrigation practices and does not reflect background conditions for the Spreckels site.

In their 2 December 2009 report, *Revised Comments on the Steffens Ponds Closure Plan*, Luhdorff & Scalmanini Consulting Engineers (Luhdorff & Scalmanini) estimated background groundwater quality for the Facility. Luhdorff & Scalmanini used historical and contemporaneous data from onsite and offsite wells not yet affected by the plume originating from the former Steffen's Ponds. Upper Tolerance limits were calculated for the western, central, and eastern portions of the site in both the shallow and deeper groundwater zones. Luhdorff & Scalmanini's background groundwater quality estimates are included in **Table 5**, below.

Table 5—Upper Tolerance Bounds for Background TDS Concentrations

	Location	Sample Size	Upper Tolerance Bound (mg/L)
Shallow Zone	Western Area	51	1,170
	Central Area	55	740
	Eastern Area	70	362
Deep Zone	Western Area	35	1,100
	Central Area	93	453
	Eastern Area	26	380

The Central Valley Water Board concurs with Luhdorff & Scalmanini's estimates. A calculation of background groundwater quality was also made by consulting engineer John Minney.

Mr. Minney's calculation includes data from west of the Mendota Pool, as well as data from wells as much as three miles away from the Facility. Much of this data originates from groundwater regimes distinctly different than that of the Facility, which are not reflective of groundwater conditions beneath the Facility. Accordingly, the Central Valley Water Board does not consider Mr. Minney's background estimates to be correct for the site.

Past discharges have caused soils and underlying groundwater to be impacted with TDS, chloride and sulfate, at greater than background concentrations. Impacts to groundwater from the Facility are being addressed by a separately-issued Cleanup and Abatement Order.

SMBSC and SSCI propose to close the former surface impoundments by removing impacted sediments and soils from the PCC Ponds and Factory Ponds and incorporating these wastes into the footprint of the Steffens Ponds. The entire footprint of the former Steffens Ponds is proposed to be closed as a landfill using an engineered alternative to the prescriptive final cover requirements contained in California Code of Regulations, title 27, section 21090, subdivisions (a)(1)-(3). The proposed final cover is an evapotranspiration (ET) cover design, which is an engineered alternative. In an ET cover design, the low-hydraulic conductivity layer is replaced by a vegetated soil layer that is engineered and constructed to absorb moisture during precipitation events and expel moisture by evaporation and transpiration before it flows through the base of the cover.

Section 20080(b) of Title 27 allows the Central Valley Water Board to consider the approval of an engineered alternative to the prescriptive standard. The proposed engineered alternative cover system needs to be consistent with the performance goal addressed by the particular prescriptive standard, and provide protection against water quality impairment equivalent to the prescriptive standard in accordance with Section 20080(b)(2) of Title 27. Steffens Ponds Closure Specification D.1 of this Order requires submittal of final construction and design plans for Executive Officer approval to ensure the ET cover meets the standard for the engineered alternative approved by the Central Valley Water Board.