APPENDIX R

RO Membrane Cleaning Solution Discharge Test Stream Data

Prepared by Poseidon Resources, May 2002

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ORANGE COUNTY DESALINATION PROJECT
DRAFT EIR
RO MEMBRANE CLEANING SOLUTION DISCHARGE TEST STREAM DATA
POSEIDON RESOURCES CORPORATION, 5/22/02

TREATED WASTE CLEANING SOLUTION DISCHARGE

OCSD Correspondence

The Orange County Sanitation District (OCSD) Engineering Division staff was contacted to confirm the availability of sanitary sewer system capacity to accept the cleaning solution discharge (see attached e-mail). The Engineering Dept. staff, Mr. Chuck Winsor, tel. (714) 593-7331 indicated that the OCSD has two sanitary sewer lines: a 48-inch line located on Newland Avenue and a 54-inch line located along the Pacific Coast Highway (PCH), which have adequate capacity to accept the 150 to 250 gpm cleaning solution discharge. The OCSD staff indicated that the 8-inch cleaning solution discharge line would be connected to the two sewer lines via the line manholes. The actual OCSD sanitary sewer discharge line and point of discharge connection will be established during the design phase of the project.

Alternative for Cleaning Solution Discharge to the Ocean

As indicated in our previous clarification submittal, the waste discharge from RO train membrane cleaning will consist of two streams – concentrated cleaning solution and flush water. The concentrated cleaning solution will contain the cleaning chemicals indicated in our previous submittal combined in one of three forms – Low pH Cleaning Solution; High pH Solution No. 1; and High pH Cleaning Solution No. 2. The content of the three concentrated cleaning solutions is presented in detail in the next section.

After being treated with the concentrated cleaning chemicals, the membrane elements will be flushed with desalinated water from the RO system (permeate), which is stored in a flush tank. The used flush water therefore, will contain residual amounts of cleaning chemicals, which remained in the membrane system after the cleaning with the concentrated cleaning chemicals was completed (residual cleaning solution), and will also contain permeate used for the membrane flushing. Besides permeate and residual cleaning solution, the waste flush water will also contain small amount of concentrate, which will be retained in the RO train concentrate lines at the time the RO system operation is stopped for flushing, and as the whole RO train is flushed, the concentrate will be flushed out of these lines.

Under worst-case scenario, the two waste streams will be blended in a designated tank equipped with mixing system (cleaning solution tank), the pH of the blended streams will be adjusted to neutral (pH = 7) and the well mixed solution will be pumped at an average rate of 200 gpm to the desalination plant discharge line. Under worst-case scenario, the waste cleaning solution stream of 200 gpm (0.28 MGD) will be mixed with 50 MGD of desalination plant concentrate, 4 MGD of treated filter backwash water and 20 MGD of

power plant cooling water prior to discharge to the ocean. Taking under consideration that the waste cleaning solution is only 0.28 MGD and that under worst-case dilution conditions the cleaning solution will be diluted with the plant concentrate, filter backwash and cooling water (74 MGD), the chemicals contained in the waste cleaning solution will be diluted in a ratio of 260:1. A detailed chemical characterization of the waste cleaning solution, presented below, indicates that most of the regulated compounds in the cleaning solution will already be below their detection and/or regulatory limits even before the cleaning solution is diluted with the desalination plant and power plant discharges. The dilution of these compounds in a 260:1 ratio will further mitigate their impact on the ocean water quality and assure regulatory compliance.

Chemical Characterization of Waste Membrane Cleaning Solution

In order to characterize the membrane cleaning solution discharge, a series of analyses were conducted. Two samples of each cleaning solution were prepared at bench scale. The first was a mixture of full-strength cleaning solution, made from pilot desalination unit permeate, and the second was a dilution of this solution with permeate and concentrate representing flush water. The discharge volumes and blended water ratios for the diluted solution are as follows:

Discharge Volumes per Cleaning

Concentrated Waste Cleaning Solution	4,000 gallons	4.4 %
Waste Flush Water		
• Residual Cleaning Solution	11,000 gallons	12.0 %
• Permeate Used for Membrane Flushing	45,600 gallons	50.2 %
• Concentrate Removed During Flushing	30,400 gallons	33.4 %
Subtotal Waste Flush Water	87,000 gallons	
TOTAL MEMBRANE CLEANING DISCHARGE	91,000 gallons	100 %

The tested streams are listed as follows:

Matrix No. 1 - RO Permeate

RO permeate will be used a solution makeup water and represents the permeate portion of the flush water.

Matrix No. 2 – RO Concentrate.

This stream represents the concentrate portion of the waste flush water.

Matrix No. 3 – Low pH Cleaning Solution Made Up with Permeate

- 2 % Citric Acid
- NaOH to adjust cleaning solution pH to 4.0
- Waste cleaning solution pH adjusted to 7.0 with NaOH for neutralization

Matrix No. 4 – Low pH Cleaning Solution (Matrix No. 3) Blended with Flush Water at the percentages Shown Above

Matrix No.5 – High pH Solution No. 1 Made Up With Permeate

- 0.5 % NaOH
- 0.25 % Sodium Dodecyl Sulfonate
- Sulfuric Acid to Adjust cleaning Solution pH to 10.0.
- Waste cleaning solution pH adjusted to 7.0 with sulfuric acid for neutralization

Matrix No. 6 – High pH Cleaning Solution No. 1 (Matrix No. 5) Blended with Flush Water at the Percentages Shown Above

Matrix No.7 – High pH Solution No.2 Made Up With Permeate

- 0.25 % Sodium Dodecyl Sulfonate
- 0.8 % Tetrasodium EDTA (Versene 220)
- 2.0 % Sodium Tri-polyphosphate
- Sulfuric Acid to Adjust cleaning Solution pH to 10.0.
- Waste cleaning solution pH adjusted to 7.0 with sulfuric acid for neutralization

Matrix No. 8 – High pH Cleaning Solution No. 2 (Matrix No. 7) Blended with Flush Water at the Percentages Shown Above

The results of the chemical characterization study are presented in the attached Table 14B and 15 B. Table 15 B includes only the parameters that were determined to be above the detection limit. All other parameters are below their detection limits. Please note that these concentrations represent only the concentration of the waste cleaning discharge. This discharge will be further diluted in a 260:1 ratio with plant concentrate, treated filter backwash water and power plant water prior to their discharge to the ocean.

Table 14B
Membrane Cleaning Solution Chemical Characterization Results

Parameter	Units	Matrix 1 Permeate	Matrix 2 Concentrate	Matrix 3 Low pH Clean sol.	Matrix 5 Hi pH 1 Clean sol.	Matrix 7 Hi pH 2 Clean sol.
2-Chloroethylvinyl Ether	ug/L	<10.0000	<10.0000	<10.0000	<1000	<1000
Arsenic	mg/L	<1.0000	<.01	<4.0000	<4.0000	0.21
BOD5	mg/L	320	<3.0000	860	<3.0000	310
Cyanide	mg/L	<0.0050	<.004	<0.0050	<0.0250	<0.0250
Mercury	ug/L	<0.2000	<.001	<2.0000	1.57	<2.0000
Manganese	mg/L	<0.0150	<.05	0.028	<0.0150	<0.3750
Molybdenum	mg/L	0.025	<.05	0.063	0.027	<0.5000
Sodium	mg/L	54.9	31800	5810	2860	6400
Lead	ug/L	<0.5000	<.005	3.3	2.7	6.7
pH	pH	5.6	7	7.7	7	7
Phenols	mg/L	<0.0100	<0.0100	<0.0100	<0.2000	<0.5000
Selenium	ug/L	<5.000	<.01	<20.0000	<0.0100	<0.0100
TDS	mg/L	220	74364	10400	7000	10800
Thallium	ug/L	<1.0000	<.002	<4.0000	<4.0000	<4.0000
TSS	mg/L	<4.000	10	18	10	29
1,2,4-Trichlorobenzene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
1,2-Dichlorobenzene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
1,2-Diphenylhydrazine	ug/L	<10.000	<10.000	<10.000	<10.000	<10.000
1,3-Dichlorobenzene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
1,4-Dichlorobenzene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
2,4,5-Trichlorophenol	ug/L	<5.000	<5.0000	<5.0000	<5.0000	<5.0000
2,4,6-Trichlorophenol	ug/L	<5.000	<5.0000	<5.0000	<5.0000	<5.0000
2,4-Dichlorophenol	ug/L	<5.000	<5.0000	<5.0000	<5.0000	<5.0000
2,4-Dimethylphenol (m-xylenol)	ug/L	<5.000	<5.0000	<5.0000	<5.0000	<5.0000
2,4-Dinotrophenol	ug/L	<50.0000	<50.0000	<50.0000	<50.0000	<50.0000

*Shaded cells represent data taken from previous chemical characterization results

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Table 14B
Membrane Cleaning Solution Chemical Characterization Results

Parameter	Units	Matrix 1 Permeate	Matrix 2 Concentrate	Matrix 3 Low pH Clean sol.	Matrix 5 Hi pH 1 Clean sol.	Matrix 7 Hi pH 2 Clean sol.
2,4-Dinitrotoluene	ug/L	<5.000	<5.0000	<5.0000	<5.0000	<5.0000
2,6-Dinitrotoluene	ug/L	<5.000	<5.0000	<5.0000	<5.0000	<5.0000
2-Chloronaphthalene	ug/L	<5.000	<5.0000	<5.0000	<5.0000	<5.0000
2-Chlorophenol	ug/L	<5.000	<5.0000	<5.0000	<5.0000	<5.0000
2-Methylnaphrhalene	ug/L	<5.000	<5.0000	<5.0000	<5.0000	<5.0000
2-methylphenol (o-cresol)	ug/L	<5.000	<5.0000	<5.0000	<5.0000	<5.0000
2-Nitroaniline	ug/L	<10.000	<10.0000	<10.0000	<10.0000	<10.0000
2-Nithrophenol	ug/L	<5.000	<5.0000	<5.0000	<5.0000	<5.0000
3,3-Dichlorobenzidine	ug/L	<50.0000	<50.0000	<50.0000	<50.0000	<50.0000
3-Nitroaniline	ug/L	<20.0000	<20.0000	<20.0000	<20.0000	<20.0000
4,6-Dinitro-o-cresol	ug/L	<50.0000	<50.0000	<50.0000	<50.0000	<50.0000
4-Bromophenyl Phenyl Ether	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
4-Chloroaniline	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
4-Chlorophenyl Phenyl Ether	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
4-MethylPhenol (p-cresol)	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
4-Nitroaniline	ug/L	<20.0000	<20.0000	<20.0000	<20.0000	<20.0000
4-Nitrophenol	ug/L	<10.0000	<10.0000	<10.0000	<10.0000	<10.0000
Acenaphthene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Acenaphthylene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Aniline	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Anthracene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Benzo (A) Anthracene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Benzo (A) Pyrene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Benzo(B) Fluoranthene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Benzo (G.H,I) Perylene	ug/L	<10.0000	<10.0000	<10.0000	<10.0000	<10.0000

*Shaded cells represent data taken from previous chemical characterization results

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Table 14B
Membrane Cleaning Solution Chemical Characterization Results

Parameter	Units	Matrix 1 Permeate	Matrix 2 Concentrate	Matrix 3 Low pH Clean sol.	Matrix 5 Hi pH 1 Clean sol.	Matrix 7 Hi pH 2 Clean sol.
Benzo (K) Fluoranthene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Bis (2-Chlroethyl) Ether	ug/L	<10.0000	<10.0000	<10.0000	<10.0000	<10.0000
Bis (2-Chloroethoxy) methane	ug/L	<10.0000	<10.0000	<10.0000	<10.0000	<10.0000
Bis (2-Chloroisopropyl) Ether	ug/L	<10.0000	<10.0000	<10.0000	<10.0000	<10.0000
Di(2-Ethylhexyl) Phthalate	ug/L	<4.0000	<4.0000	<4.0000	<4.0000	<4.0000
Butyl Benzyl Phthalate	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Benzidine	ug/L	<50.0000	<50.0000	<50.0000	<50.0000	<50.0000
Benzoic Acid	ug/L	<50.0000	<50.0000	<50.0000	<50.0000	<50.0000
Benzyl Alcohol	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Chrysene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Dibenzo(A.H.) Anthracene	ug/L	<10.0000	<10.0000	<10.0000	<10.0000	<10.0000
Dibenzofuran	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Diethyl Phthalate	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Dimethyl Phthalate	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Di-N-Butyl Phthalare	ug/L	<10.0000	<10.0000	<10.0000	<10.0000	<10.0000
DI-N-Ocryl Phalate	ug/L	<10.0000	<10.0000	<10.0000	<10.0000	<10.0000
Fluoranthene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Fluroene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Hexachlorobenzene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Hexachlorobutadiene	ug/L	<10.0000	<10.0000	<10.0000	<10.0000	<10.0000
Hexachlorocyclopentdiene	ug/L	<10.0000	<10.0000	<10.0000	<10.0000	<10.0000
Hexachloroethane	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Indeno(1,2,3-CD) Pyrene	ug/L	<10.0000	<10.0000	<10.0000	<10.0000	<10.0000
Isophorone	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Naphthalene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000

*Shaded cells represent data taken from previous chemical characterization results

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Table 14B
Membrane Cleaning Solution Chemical Characterization Results

Parameter	Units	Matrix 1 Permeate	Matrix 2 Concentrate	Matrix 3 Low pH Clean sol.	Matrix 5 Hi pH 1 Clean sol.	Matrix 7 Hi pH 2 Clean sol.
Nitrobenzene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
N-Nitrosodimethylamine	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
N-Nitrosodi-N-Propylamine	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
N-Nitrosodiphenylamine	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
p-Chloro-m-cresol	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Pentachlorophenol	ug/L	<20.0000	<20.0000	<20.0000	<20.0000	<20.0000
Phenanthrene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Phenol	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Pyrene	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
Bis (Chloromethyl) Ether	ug/L	<5.0000	<5.0000	<5.0000	<5.0000	<5.0000
PCB-1016	ug/L	<0.5000	<0.01	<0.5000	<50.0000	<50.0000
PCB-1221	ug/L	<0.5000	<0.01	<0.5000	<50.0000	<50.0000
PCB-1232	ug/L	<0.5000	<0.01	<0.5000	<50.0000	<50.0000
PCB-1242	ug/L	<0.5000	<0.01	<0.5000	<50.0000	<50.0000
PCH-1248	ug/L	<0.5000	<0.01	<0.5000	<50.0000	<50.0000
PCB-1254	ug/L	<0.5000	<0.01	<0.5000	<50.0000	<50.0000
PCB-1260	ug/L	<0.5000	<0.01	<0.5000	<50.0000	<50.0000
α-BHX	ug/L	<0.0200	[illegible]	<0.0200	<2.0000	<2.0000
Aldrin	ug/L	<0.0200	<.003	<0.0200	<2.0000	<2.0000
β-BHX	ug/L	<0.5000	[illegible]	<0.5000	<50.0000	<50.0000
Chlordane	ug/L	<0.2000	<.003	<0.2000	<20.0000	<20.0000
δ-BHX	ug/L	<0.0200	[illegible]	<0.0200	<2.0000	<2.0000
p,p' DDD	ug/L	<0.0200	[illegible]	<0.0200	<2.0000	<2.0000
p,p' DDE	ug/L	<0.0200	[illegible]	<0.0200	<2.0000	<2.0000
p,p' DDT	ug/L	<0.0200	<.003	<0.0200	<2.0000	<2.0000

*Shaded cells represent data taken from previous chemical characterization results

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Table 14B
Membrane Cleaning Solution Chemical Characterization Results

Parameter	Units	Matrix 1 Permeate	Matrix 2 Concentrate	Matrix 3 Low pH Clean sol.	Matrix 5 Hi pH 1 Clean sol.	Matrix 7 Hi pH 2 Clean sol.
Dieldrin	ug/L	<0.0200	<.003	<0.0200	<2.0000	<2.0000
Endrin Aldehyde	ug/L	<0.0200	<.003	<0.0200	<2.0000	<2.0000
Endrin Ketone	NA					
Endrin	ug/L	<0.0100	<.003	<0.0100	<1.0000	<1.0000
Endosulfan I	ug/L	<0.0200	<.003	<0.0200	<2.0000	<2.0000
Endosulfan II	ug/L	<0.0200	<.003	<0.0200	<2.0000	<2.0000
Endosulfan Sulfate	ug/L	<0.0200	<.003	<0.0200	<2.0000	<2.0000
g-BHC (Lindane)	ug/L	<0.0200	<.003	<0.0200	<2.0000	<2.0000
Heptachlor	ug/L	<0.0100	<.003	<0.0100	<1.0000	<1.0000
Heptachlor Epoxide	ug/L	<0.0100	<.003	<0.0100	<1.0000	<1.0000
Methoxychlor	ug/L	<0.2000	<.003	<0.2000	<20.0000	<20.0000
Mirex	ug/L	<0.0500		<0.0500	<5.0000	<5.0000
Toxaphene	ug/L	<0.5000	<.003	<0.5000	<50.0000	<50.0000
Silver	ug/L	<5.0000	<.001	<2.0000	<5.0000	<2.0000
Beryllium	ug/L	<1.0000	<.001	<4.0000	<4.0000	<4.0000
Cadmium	ug/L	<0.5000	<.001	<10.0000	<2.0000	<2.0000
Chromium, total	ug/L	<2.0000	<.01	70	21	39
Copper	ug/L	<2.0000	<.01	<8.0000	21	31
Nickel	ug/L	<5.0000	<.005	<20.0000	<20.0000	<20.0000
Antimony	ug/L	<1.0000	<.05	<4.0000	<4.0000	145
Zinc	ug/L	<5.0000	<.01	105	58	180
1,1,2-Trichloroethane	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
1,1-Dichloroethylene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
1,1-Dichloroethane	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
1,2-Dichlorobenzene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000

*Shaded cells represent data taken from previous chemical characterization results

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Table 14B
Membrane Cleaning Solution Chemical Characterization Results

Parameter	Units	Matrix 1 Permeate	Matrix 2 Concentrate	Matrix 3 Low pH Clean sol.	Matrix 5 Hi pH 1 Clean sol.	Matrix 7 Hi pH 2 Clean sol.
1,2-Dichloroethane	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
1,2-Dichloropropane	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
1,3-Dichlorobenzene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
1,4-Dichlorobenzene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
2-Butanone	ug/L	<100.0000	<100.0000	<100.0000	<10000	<10000
2-Hexanone	ug/L	<100.0000	<100.0000	<100.0000	<10000	<10000
4-Methyl-2-pentanone	ug/L	<100.0000	<100.0000	<100.0000	<10000	<10000
Acetone	ug/L	<100.0000	<100.0000	<100.0000	<10000	<10000
Acrolein	ug/L	<500.0000	<500.0000	<500.0000	<50000	<50000
Acrylonitrile	ug/L	<500.0000	<500.0000	<500.0000	<50000	<50000
Benzene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Cis-1,2-Dichloroethene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Chlorobenzene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Cis-1,3-Dichloropropene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Bromoform	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Chloroform	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Chloroethane	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Carbon Disulfide	ug/L	<5.0000	37	15	<500.0000	<500.0000
Carbon Tetrachloride	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Dibromochloromethane	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Dichlorobromomethane	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Ethylbenzene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Dichlorodifluoromethane	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Methyl Bromide	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Methyl Chloride	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000

*Shaded cells represent data taken from previous chemical characterization results

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Table 14B
Membrane Cleaning Solution Chemical Characterization Results

Parameter	Units	Matrix 1 Permeate	Matrix 2 Concentrate	Matrix 3 Low pH Clean sol.	Matrix 5 Hi pH 1 Clean sol.	Matrix 7 Hi pH 2 Clean sol.
Methylene Chloride	ug/L	<30.0000	<30.0000	<30.0000	<500.0000	<500.0000
m,p-Xylenes	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
o-Xylene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
1,1,1,2-Tetrachloroethane	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Tetrachlroethylene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Styrene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Trans-1,2-Dichloroethene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
1,1,1-Trichloroethane	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Trichloroethylene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Trichlorofluoromethane	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Trans-1,3-Dichloropropene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Tetrahydrofuran	ug/L	<100.0000	<100.0000	<100.0000	<10000	<10000
Toluene	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Vinyl Chloride	ug/L	<5.0000	<5.0000	<5.0000	<500.0000	<500.0000
Vinyl Acetate	ug/L	<100.0000	<100.0000	<100.0000	<10000	<10000
Asbestos, total (Fiber length > 10 micron)	MFL	<0.2352	<0.2352	<0.1792	<0.1568	<0.2352
2,3,7,8 TCDD	ug/L	<0.00096		<0.0012	<0.0023	<0.0013

*Shaded cells represent data taken from previous chemical characterization results

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Table 15B
Membrane Cleaning Solution Dilution Calculations

Parameter	Units	Matrix 1 Permeate	Matrix 2 Concentrate	Matrix 3 Low pH Clean sol.	*Calc. Matrix 4* *(DILUTED MATRIX 3)*	Matrix 5 Hi pH 1 Clean sol.	*Calc. Matrix 6* *(DILUTED MATRIX 5)*	Matrix 7 Hi pH 2 Clean sol.	*Calc. Matrix 8* *(DILUTED MATRIX 7)*
Arsenic	mg/L	<1.0000	<.01	<4.0000	*n/a*	<4.0000	*n/a*	0.21	*0.54*
BOD5	mg/L	320	<3.0000	860	*302.68*	<3.0000	*n/a*	310	*212.48*
Mercury	ug/L	<0.2000	<.001	<2.0000	*n/a*	1.57	*0.026*	<2.0000	*n/a*
Manganese	mg/L	<0.0150	<.05	0.028	*0.017*	<0.0150	*n/a*	<0.3750	*n/a*
Molybdenum	mg/L	0.025	<0.5	0.063	*0.190*	0.027	*0.184*	<0.5000	*n/a*
Sodium	mg/L	54.9	31800	5810	*11601.60*	2860	*11117.80*	6400	*11698.36*
Lead	ug/L	<0.5000	<.005	3.3	*0.79*	2.7	*0.70*	6.7	*1.35*
pH	pH	5.6	7	7.7	*n/a*	7	*n/a*	7	*n/a*
TDS	mg/L	220	74364	10400	*26654*	7000	*26096*	10800	*26719*
TSS	mg/L	<4.000	10	18	*8.30*	10	*6.99*	29	*10.10*
Chromium, total	ug/L	<2.0000	<.01	70	*12.49*	21	*4.45*	39	*7.40*
Copper	ug/L	<2.0000	<.01	<8.0000	*n/a*	21	*4.45*	31	*n/a*
Zinc	ug/L	<5.0000	<.01	105	*19.73*	58	*12.03*	180	*32.03*
Carbon Disulfide	ug/L	<5.0000	37	15	*17.33*	<500.0000	*n/a*	<500.0000	*n/a*

*Shaded cells represent data taken from previous chemical characterization results

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