Attachment T

HCR Calculations

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Sheet No. 1 **of** 1
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SUBJECT: Stream Flow Calculations

The following calculations demonstrate the amount of flow required in Loutre Creek at Lion Oil's Outfall 001 discharge location to reach the specified in-stream concentrations.

Gulf Costal Ecoregion Stream Quality Data (ADEQ CPP)
Sulfate = 13 mg/L
Chloride = 5 mg/L
TDS = 67 mg/L

Proposed Effluent Concentrations
Sulfate = 1,967 mg/L
Chloride = 503 mg/L
TDS = 3,240 mg/L

Target In-Stream Concentrations
Sulfate = 68 mg/L
TDS = 86 mg/L

Lion Oil Effluent Flow Rate
2.62 MGD (Highest monthly average flow rate recorded Jan. 2004 through Dec. 2005)

Required Stream Flow Calculations

Sulfate

$(Q_s \times 13\ mg/L) + (2.62\ MGD \times 1{,}967\ mg/L) = (Q_s + 2.62\ MGD) \times 68\ mg/L$

$Q_s = 90.5\ MGD = 140\ CFS$

TDS

$(Q_s \times 67\ mg/L) + (2.62\ MGD \times 3{,}240\ mg/L) = (Q_s + 2.62\ MGD) \times 86\ mg/L$

$Q_s = 434.9\ MGD = 673\ CFS$

Resulting In-Stream Chloride Concentration

$(434.9\ MGD \times 5\ mg/L) + (2.62\ MGD \times 503\ mg/L) = (434.9\ MGD + 2.62\ MGD) \times C_{Cl}$

$C_{Cl} = 8.0\ mg/L$

Loutre Creek

RUN-OFF MODEL

	NORMAL	DRY	WET
CN (CURVE NUMBER) =		54.02	89.54
AMC (ANTESEDENT COND. FACT.) =			
P (AMT. OF RAINFALL) =			
AREA (sq. mi.) =			
AREA (ACRES) =	1380.48		
S =	3.51	8.51	1.17
Q =	11.59616	8.21318	13.80722
RUN-OFF (ACRE-FT) =	1334.02	944.84	1588.38
RUN-OFF (MGD) =	434.76	307.92	517.65
RUN-OFF (CFS) =	673.00	476.66	801.32

NOTE: All run-off flow rates and rainfall events based on 24-hour period (run-off assummed to be complete in 24-hours)

Each Box Self Calculates

Reference: Ward and Trimble, 2004

Curve Number Adjustments		
CN (AMCII)	AMCI (dry)	AMCIII (wet)
10	0.4	2.22
15	0.43	2.04
20	0.45	1.85
25	0.48	1.8
30	0.5	1.67
35	0.53	1.59
40	0.55	1.5
45	0.59	1.45
50	0.62	1.4
55	0.65	1.35
60	0.67	1.3
65	0.7	1.26
70	0.73	1.21
75	0.76	1.18
80	0.79	1.14
85	0.83	1.11
90	0.87	1.07
95	0.94	1.04
100	1	1