

01/05/04  
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RECEIVED



**KERR-McGEE CHEMICAL LLC**

POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

2003 DEC 31 PM 12: 55

December 29, 2003

DOMINION  
LAS VEGAS

Mr. Todd Croft  
Nevada Division of Environmental Protection  
1771 E Flamingo Road  
Suite 121-A  
Las Vegas, NV 89119

Subject: Schedule for Resolution of Issues Pertaining to Performance of the Athens Road Well Field Outlined in NDEP Letter of November 19, 2003

Dear Mr. Croft:

In response to your letter of November 19, 2003 discussing Kerr-McGee Chemical LLC (KMCLLC) conclusions regarding the efficiency of the perchlorate capture at the Athens Road Well Field, KMCLLC has performed an analysis of the well field and has found that the available evidence continues to support the original conclusion that about 97.5 percent of the perchlorate in the groundwater is being captured. This supporting evidence was verbally presented to you at the quarterly perchlorate meeting in Henderson on December 10, 2003.

Whereas KMCLLC maintains that the well field is currently operating efficiently we also acknowledge that there are other actions KMCLLC can take to enhance monitoring of the well field's performance. A list of these activities, with the scheduled completion dates, is as follows:

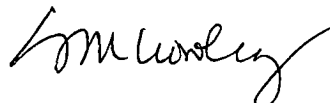
1. **Install one monitor well**, 100 feet east of well ART-7, to check the concentration of perchlorate in groundwater. The expected completion date for drilling and installation of the monitor well is March 1, 2004. Depending upon the perchlorate concentration found and the groundwater available, KMCLLC may install one additional recovery well at this location. If the recovery well is determined helpful, drilling, completion and hookup of this recovery well is to be completed by April 30, 2004. ✓
2. Due to recently developed excessive well losses in wells ART-1, 3 and 4, **switch pumping to adjacent buddy wells ART-1A, 3A and 4A**. Scheduled completion date is January 2, 2004. ✓
3. **Rehabilitate ART-1, 3 and 4** by April 1, 2004
4. In order to better evaluate the southern extent of the Athens Road Well Field cone of depression, KMCLLC will **drill and install up to four additional monitor wells in the area between Athens Road and Sunset Road**. ✓

Conditional on obtaining necessary access agreements, these wells will be completed by March 1, 2004.

5. In order to better evaluate the perchlorate mass flux and groundwater flow moving toward the Athens Road well field, KMCLLC will **drill and install up to nine additional monitor wells in Sunset Road across the alluvium channel.** Conditional on obtaining necessary access agreements, these wells will be completed by March 1, 2004.
6. The written response discussed in your letter of November 19, 2003 will be submitted to you as part of the 4<sup>th</sup> Quarter Performance Report due January 28, 2004.

If you have any questions please call me at 702-651-2234.

Sincerely,

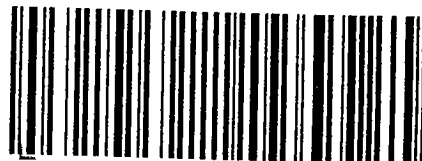


Susan M. Crowley  
Staff Environmental Specialist

**CERTIFIED MAIL**

CC: LKBailey  
PSCorbett  
FRStater  
RLWaters  
Brenda Pohlmann, City of Henderson  
Barry Conaty, City of Henderson  
Jim Najima, NDEP  
Marshall Davis, Metro Water District of Southern California  
Pat Mulroy, Southern Nevada Water District  
Mitch Kaplan, EPA Region IX  
Public Repository

**CERTIFIED MAIL**



7000 1670 0002 1245 9350

**MEMORANDUM TO FILE**

**TO:** KMCC File

**FROM:** Brian Rakvica

**DATE:** December 10, 2003

**CC:** Jim Najima, Todd Croft, Jennifer Carr, Jeff Johnson  
Jon Palm, Darrell Rasner, Nadir Sous, Tamara Pelham

**RE:** KMCC Quarterly Perchlorate Meeting

1. Agenda distributed.
2. Introduction of parties. Attendance list copied and provided to all.
3. Several figures were distributed by NDEP, USEPA and KMCC.
4. Update on Systems
  - a. Plant-site collection continues and is discharged to GW-11.
  - b. Capture continues at the Athens Road well field (ARW) and Seep.
  - c. Seep concentration is currently ~30 ppm (average influent to Wash IX).
  - d. Current total discharge is 1,060 gpm (not including flows to GW-11).
  - e. FBR construction continues.
    - i. Engineering is ~100% complete
    - ii. Procurement is ~100% complete
    - iii. Construction was ~75% as of 11/30/03
  - f. Noted that the new FBR will have a higher influent concentration than any such system on-line. This is why a two-stage system is designed.
  - g. FBR should destroy all nitrate, chlorate and perchlorate to ND (20 ppb).
  - h. Construction schedule
    - i. Fill reactors with sand
    - ii. Inoculate system with biological media next week. Add lake water, nitrate and ethanol to condition the sand. Condition from 12/19/03-1/5/04. No discharge from reactors.
    - iii. Early January – Accept remaining units. Begin batch treatment mode to grow biomass. This water is slated to be discharged if effluent quality is acceptable.
    - iv. Late January/Early February – Initiate continuous operation starting at 200 gpm and increasing.
    - v. End of February – expect to be at full flow rate and meeting current NPDES. Working effluent concentration down towards ND.
    - vi. March – April 23, 2004 – demonstration mode.
5. Discussion of NPDES permit.
  - a. The original NPDES permit was put in place at 847 gpm.
  - b. New temporary permit was issued that in conjunction with the NPDES permit allows for discharge to the Las Vegas Wash at 1,100 gpm.

- c. Application has been submitted for a new permanent NPDES permit. The NPDES should accommodate up to 1,000 gpm discharge and should be effective by early March 2004 when the current temporary discharge permit expires.
    - i. Will be handled as a major modification.
    - ii. Modification to be for an increase in flow rate only.
    - iii. 30- day public comment period.
    - iv. Depending on public comment, hope to have in place by early February.
    - v. Noted that flow rate is still in discussion with KMCC, NDEP and USEPA.
    - vi. Limits on flow rate include: phosphorous load, 1,000 gpm equipment and 1,000 gpm pipeline.
  - d. Noted that the new discharge concentration for perchlorate will be decided once the system is up and fully operational.
6. Discussion of detection limits and discharge limits.
- a. NDEP goal is 4-18 ppb.
  - b. Discussed Texas Tech method for low detection limits in a high saline environment.
  - c. Discussed possibility of using alternate methods during the 2004 year to verify their applicability.
  - d. SNWA noted that they can provide some method information to KMCC.
  - e. KMCC will discuss alternate methods with their laboratory.
  - f. KMCC noted that they might have to perform two analyses. One would be the approved method and the other would be the lower detection limit method.
  - g. USEPA discussed the procedure for approval of alternate methods.
  - h. Discussed interferences with p-CBS. KMCC noted that they had found no such interferences to date.
  - i. Noted that if the effluent concentration was to be reduced in the future it would be a minor modification.
7. Discussion of capture.
- a. This discussion is in response to the 11/19/03 NDEP letter.
  - b. KMCC's response will be documented in their January 2004 quarterly report.
  - c. A new cross section at the Athens Road well field area was presented. This cross section showed that the area between ART-4 and ART-5 is dry and there is now a "Muddy Creek Island". Noted that ART-5 is on the verge of going dry as well.
  - d. Presented a new Net Drawdown map with 2' contours. Noted that a 1-2" drawdown is affected over a 2000' wide section of Athens Road.
  - e. Reviewed the Hackenberry model. KMCC stated that the Hackenberry model was based on limited data (what was currently available). KMCC has refined this model to represent a larger data set. KMCC states that this indicates that nearly 100% capture is being achieved at the ARW. The



comparison for mass flow and groundwater flow will be presented in the January 2004 report.

- f. KMCC noted that there may be the possibility to install a well east of ART-7. KMCC will investigate concentrations in that area.
  - g. Schedule to be submitted to NDEP to comply with requested schedule.
  - h. NDEP noted the importance of getting and documenting at least 90% capture at the ARW.
  - i. Discussed well loss. KMCC has been trying to clean these wells and has been using the backup buddy wells.
8. Discussed Seep Area shut off criteria.
- a. Noted that outer wells that are not good producers could be shut off if capture could be increased elsewhere.
  - b. NDEP and USEPA stressed that no increase should be seen in mass load to the LV Wash.
  - c. KMCC noted that Seep Area water will always be used at least to dilute the high TDS water that is coming from the plant site.
  - d. KMCC will draft a formal proposal and respond to NDEP.
9. Discussed apparent leveling off at Northshore Road.
- a. KMCC presented a graph of the data versus the 90% removal curve from Hackenberry. KMCC had removed the log-log scale from the graph. The data appeared to be tracking reasonably well.
10. Discussion of MWD model and other California issues.
- a. Noted that the MWD model assumes the 90% removal efficiency at the ARW.
  - b. Noted that the California public health goal and MCL schedule appears to be delayed.
11. Other
- a. Personnel from the Central Arizona Project and DWR will be visiting this week for site tours related to the perchlorate project.
  - b. Nevada DWR personnel may want to visit in March 2004.
  - c. USEPA distributed a mass loading graph and noted that the next EPA report will be issued in mid-January.
  - d. Noted that Ed Krisch will retire in April.

See Early Meeting Dec. 10, 2003

<u>Name</u>	<u>Representing</u>	<u>Phone No.</u>	<u>E-Mail</u>
Keita Bailey	Kerr-McGee	(405) 270-3651	kbailey@kmg.com
Susan Crowley	Kerr-McGee	(702) 651-2234	scrowley@kmg.
Pat Corbett	KERR MCGEE	405 478 8671	pcorbett@kmg.
BRAD DOUGHERTY	Kerr M'Gee	917 207-2661	---
Larry Bowerman	EPA, Region 9	415 972-3339	bowerman.Larry@epa.
MITCH KAPLAN	EPA, REGION 9	415-972-3359	KAPLAN.MITCH@EPA.
ED KRISH	Kerr MCGEE	405-270-3752	ekrish@kmg.com
Christine DeLoe	K M	212-770-1411	---
John Tinger	U.S. EPA	415 972-3518	Tinger.John@EPA.
Brian Rakvica	NDEP	702 486 2870	brakvica@ndep.nv.
TAMARA PELHAM	NDEP	775.687.9434	tpelham@ndep.nv.gov
DARRELL RASNER	"	775 687-9435	---
Jon Palm	"	775 687-9433	jpalm@ndep.nv.gov
Nadir E. SOUS	NDEP	702-486-2853	nsous@ndep.nv.gov
J. F. Leising	SWWA	702-822-3373	leisingj@swwa.
Todd Croft	NDEP	702-486-2871	TCroft@NDEP.NV

## MEMORANDUM TO FILE

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**FROM:** Brian Rakvica

**DATE:** December 10, 2003

**CC:** Jim Najima, Todd Croft, Jennifer Carr, Jeff Johnson  
Jon Palm, Darrell Rasner, Nadir Sous, Tamara Pelham

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  - b. New temporary permit was issued at 1,100 gpm. *That incorporation w/ the NPDES permit allows for discharge to the LU wash*
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**Todd Croft**

---

**From:** Brian Rakvica  
**Sent:** Friday, December 19, 2003 8:19 AM  
**To:** Jim Najima; Todd Croft; Jennifer Carr; Jeff Johnson; Nadir Sous; Jon Palm; Darrell Rasner; Tamara Pelham  
**Subject:** mtg notes - KMCC mtg on 12/10/03

All,

Attached are the finalized mtg notes from our mtg on 12/10/03 with KMCC.

Brian

Brian A. Rakvica, P.E.  
Nevada Division of Environmental Protection  
Bureau of Corrective Actions  
1771 East Flamingo Road  
Suite 121-A  
Las Vegas, Nevada 89119  
tel: 702-486-2870  
fax: 702-486-2863  
email: [brakvica@ndep.nv.gov](mailto:brakvica@ndep.nv.gov)

12/24/2003



**KERR-McGEE CHEMICAL LLC**

POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

*Blabla's  
Trex  
M*

December 8, 2003

2003 DEC 10 PM 2:29

RECEIVED  
LAS VEGAS

Jennifer Carr  
Bureau of Corrective Actions  
Nevada Division of Environmental Protection  
333 West Nye Lane, Room 138  
Carson City, NV 89706

NDEP Las Vegas Office

**TREX -031208**

Dear Ms. Carr:

Subject: Reimbursement for Perchlorate Oversight Costs

Kerr-McGee Chemical LLC, KMCLLC, has agreed to reimburse Nevada Division of Environmental Protection, NDEP, for oversight costs associated with the perchlorate investigation / remediation in the Henderson area, splitting these 1:1 with American Pacific. Please find attached, a check for \$3,865.17 to cover KMCLLC's reimbursement of NDEP for costs incurred during the second quarter 2003 (billing #15). A copy of NDEP's cost summary is attached for your reference.

Please feel free to call me at (702) 651-2234 if you have any questions. Thank you.

Sincerely,

Susan Crowley  
Staff Environmental Specialist

Attachments

CERTIFIED MAIL

cc: Todd Croft  
Jim Najima  
Kenya Jones

Date: 04-DEC-03

Vendor No.: 1016 11

NEVADA DIV OF ENVIRO

Check No.: 321033

INVOICE NUMBER	INVOICE DATE	INVOICE DESCRIPTION	DISCOUNT AMOUNT	NET AMOUNT
111303 *11	13-NOV-03	BILLING#1/CIO4 REIMB.COSTS SPECIAL ENVELOPE PROVIDED	0.00	3,865.17
			0.00	3,865.17

Please detach this statement and retain for your records

000105 1120886

VERIFY THE AUTHENTICITY OF THIS MULTI-TONE SECURITY DOCUMENT. CHECK BACKGROUND AREA CHANGES COLOR GRADUALLY FROM TOP TO BOTTOM.



Kerr-McGee Chemical LLC  
A Subsidiary of Kerr-McGee Corporation  
Kerr-McGee Center  
Oklahoma City, OK 73125

Citibank, Delaware  
A Subsidiary of Citicorp  
One Penn's Way  
New Castle, DE 19720

ANTI-FRAUD PROTECTION PATENTS 5,197,963 & 5,197,964

62-20  
311

CHECK DATE	CHECK NO.	NET AMOUNT
04-DEC-03	321033	\$*****3,865.17

VOID AFTER 90 DAYS

PAY Three Thousand Eight Hundred Sixty-Five and 17/100 Dollars

TO THE ORDER OF NEVADA DIV OF ENVIRONMENTAL PROTECTION  
333 W NYE LANE

*Elizabeth J. Wilkinson*  
Vice President & Treasurer

CARSON CITY NV 89706-0851

00321033 031100209 38558173



\* OVERALL - COMBINED \*


BILLINGS:		SFY98	SFY99	SFY00	SFY01	SFY02	SFY03	Cumulative Revenue	Variations	%
		07/01/97- 6/30/1998	07/01/98- 6/30/1999	07/01/99- 6/30/2000	07/01/00- 06/30/2001	07/01/01- 06/30/2002	07/01/02- 6/30/2003		Favorable (Unfavorable)	
#1 Payment (SFY98)		40,286.35						40,286.35		
#2 Payment (SFY99)			12,780.13					12,780.13		
#3 Payment (-09/30/99)				2,717.51				2,717.51		
#4 Payment (-12/31/99)				6,267.52				6,267.52		
#5 Payment (-03/31/00)				3,535.31				3,535.31		
#6 Payment (-06/30/00)				3,601.78				3,601.78		
#7 Payment (-09/30/00)					2,599.03			2,599.03		
#8 Payment (-12/31/00)					1,345.88			1,345.88		
#9 Payment (-03/31/01)					452.84			452.84		
#10 Payment (-06/30/01)					1,462.09			1,462.09		
#11 Payment (-12/31/01)						3,283.08		3,283.08		
#12 Payment (-06/30/02)						16,761.01		16,761.01		
#13 Payment (-12/31/02)							21,376.42	21,376.42		
#14 Payment (-03/31/03)							14,745.35	14,745.35		
								0.00		
								0.00		
ACTUAL CASH RECEIVED TO DATE		40,286.35	12,780.13	16,122.12	5,859.84	20,044.09	36,121.77	131,214.30		
TOTAL REVENUE	135,079.47	40,286.35	12,780.13	16,122.12	5,859.84	20,044.09	39,986.94	135,079.47	0.00	0.00%

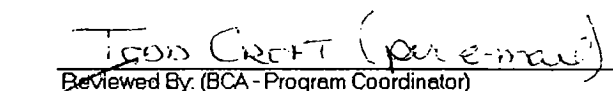
EXPENDITURES	Budget*	SFY1998	SFY1999	SFY00	SFY01	SFY02	SFY03	Cumulative Expenditures	Variations	%
		07/01/97- 06/30/98	07/01/98- 06/30/99	07/01/99- 06/30/00	07/01/00- 06/30/00	07/01/01- 6/30/2002	07/01/02- 6/30/2003		Favorable (Unfavorable)	
Salary/Fringe Benefits	87,184.06	15,182.37	10,017.52	12,136.49	4,146.07	14,425.79	31,275.82	87,184.06	0.00	0.00%
Travel	7,585.34	1,180.46	718.94	962.95	658.72	2,107.41	1,956.86	7,585.34	0.00	0.00%
Operating	3,501.51	474.22	375.80	340.52	14.39	452.62	1,843.96	3,501.51	0.00	0.00%
Training	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
Contracts	20,635.20	20,610.20	25.00	0.00	0.00	0.00	0.00	20,635.20	0.00	0.00%
Total Direct	118,906.11	37,447.25	11,137.26	13,439.96	4,819.18	16,985.82	35,076.64	118,906.11	0.00	0.00%
Indirect Costs	16,173.36	2,839.10	1,642.87	2,682.16	1,040.66	3,058.27	4,910.30	16,173.36	0.00	0.00%
TOTAL EXPENDITURES	135,079.47	40,286.35	12,780.13	16,122.12	5,859.84	20,044.09	39,986.94	135,079.47	0.00	0.00%

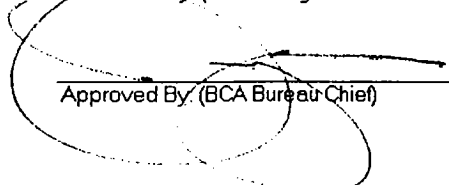
\*Note: Budget is based on State Budgets for each Fiscal Year.

Cumulative Expended: **135,079.47**  
 Less Cash-On-Hand: **(131,214.30)**  
 Total Request for Reimbursement: **3,865.17**

CURRENT BILLING BREAKDOWN:	
BILLING #15:	3,865.17
TOTAL AMOUNT DUE:	3,865.17

  
 Prepared By: (JOPFM) 09/24/03  
Date

  
 Reviewed By: (BCA - Program Coordinator) 9/29/03  
Date

  
 Approved By: (BCA Bureau Chief) 09/24/03  
Date

BCA: Kerr-McGee Perchlorate Agreement  
 SCHEDULE OF EXPENDITURES AND RECONCILIATION  
 For the Period Covered: 04/01/03 - 06/30/03  
 Agreement Budget Period: 07/28/99 - Open

\* SFY03 (07/01/02 - 06/30/03)\*

REVENUES	SFY2003 YTD Revenues
#13 Payment (-12/31/02)	21,376.42
#14 Payment (-03/31/03)	14,745.35
TOTAL CASH RECEIVED TO DATE:	36,121.77
TOTAL REVENUE	39,986.94

EXPENDITURES	SFY2003 YTD Expenditures
Salary/Fringe Benefits	31,275.82
Travel	1,956.86
Operating	1,843.96
Training	0.00
Contracts	0.00
Total Direct	35,076.64
Indirect Costs	4,910.30
TOTAL EXPENDITURES	39,986.94

Fee Share Expended	39,986.94
Less Fee cash on hand	<u>(36,121.77)</u>
Total Reimbursement Amount:	<u>3,865.17</u>

Billing #15:	<u>3,865.17</u>
TOTAL AMOUNT DUE:	3,865.17

ALLEN BIAGGI, Administrator

STATE OF NEVADA  
KENNY C. GUINN  
Governor

12/26/03 *R. Michael Turnipsseed*  
R. MICHAEL TURNIPSEED, Director

(775) 687-4670

Administration  
Facsimile 687-5856

Water Pollution Control  
Facsimile 687-4684

Mining Regulation and  
Reclamation  
Facsimile 684-5259



RECEIVED  
DEC - 5 10 2003  
DOCUMENTS

Waste Management  
Corrective Actions  
Federal Facilities  
  
Air Pollution Control  
Air Quality Planning  
Water Quality Planning  
  
Facsimile 687-6396

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

**DIVISION OF ENVIRONMENTAL PROTECTION**

333 W. Nye Lane, Room 138  
Carson City, Nevada 89706

December 2, 2003

Susan Crowley  
Environmental Scientist  
Kerr McGee Chemical Corp.  
P.O. Box 55  
Henderson, NV 89009

**SUBJECT: Fluidized Bed Reactor Project**

Dear Ms. Crowley:

I would like to clarify two issues that have been raised in our review and approval process of subject project. The first is obtaining Nevada Division of Environmental Protection (NDEP) approval of changes to the project that are occurring during construction. Many of these changes have no impact on the treatment process and do not require NDEP approval. However, any change to the treatment process must have NDEP approval, and a request for that approval must be submitted to Nadir Sous in NDEP's office in Las Vegas. If there is a change in which you are not sure whether approval is required or not, please call Nadir for clarification.

The second issue is the requirement that the fluidized bed reactor effluent meet a particular microbiological limit. We will continue the permit limit for fecal coliform bacteria that presently exists. Once the biological process is established, we will request that you provide the identification of the perchlorate reducing bacteria, genus at a minimum or species if you know it.

Please call me at (775) 687-9433 if you have any questions regarding this letter.

Sincerely,

Handwritten signature of Jonathan C. Palm in cursive.

Jonathan C. Palm, Ph.D., P.E., Chief  
Bureau of Water Pollution Control

cc: Nadir Sous, NDEP LV  
Todd Croft, NDEP LV  
Keith Bailey, Kerr McGee

## MEMORANDUM TO FILE

**TO:** KMCC File

**FROM:** Brian Rakvica

**DATE:** December 2, 2003

**CC:** Todd Croft, Jeff Johnson, Jon Palm, Tamara Pelham

**RE:** Call with KMCC

1. Call held on December 2, 2003 at 1:00 PM.
2. In attendance:
  - a. KMCC – Keith Bailey, Susan Crowley
  - b. NDEP BWPC – Jon Palm, Tamara Pelham, Darrell Rasner
  - c. NDEP BCA- Todd Croft, Brian Rakvica
3. Discussed letter expected from NDEP to KMCC
  - a. Jon is in the final stages of finishing this letter.
  - b. Letter will state that the NDEP only wants to review changes to the process of the new FBR system.
  - c. Letter will note that the microbial monitoring restrictions will not change.
  - d. Letter will request the genus of the microbial strains used in the new process. This will be to determine if any of these strains is more resilient than fecal coliform.
  - e. Noted that KMCC will be conducting daily sampling during the start up periods.
  - f. NDEP requested that KMCC provide start-up plans and criteria and testing to add to our files.
4. Discussed the KMCC plans for start up of the FBR.
  - a. Construction is nearing completion.
  - b. By December 19, 2003 it is expected that the vessels will be loaded and the inoculation of these vessels will begin. This process will take approximately 2 weeks and will not have any discharge.
  - c. In late December or early January the eleven phase start up sequence will be initiated.
  - d. The tanks will be filled with 375,000 gallons of water (most likely with stabilized lake water).
  - e. The stabilized lake water will be discharge under the NPDES permit if it is found that no nitrate, etc is present.
  - f. Next, a batch operation will be initiated to increase the biomass. This will be run until the perchlorate is destroyed. The water will then be discharged through the UV system.
  - g. Next, the system will be moved to low flow continuous operation. Once this operation is stabilized, the flow will be gradually increased.

- h. It was noted that the secondary reactors contain GAC and do not require a conditioning. These reactors will be in operation by the time batch operation is started.
  - i. Currently, it is planned to use 60 gpm of GW-11 pond water and 940 gpm from the IX operations. This mixture will be combined in the on-site equalization chamber.
5. Discussed the hexavalent chrome system.
- a. Noted that approximately 13-14 mL/min of ferrous sulfate are added to the Athens Road well field to result in ND(0.005 mg/L) at Lift Station 2. The highest concentrations are seen at well ART-8 and the ferrous sulfate is injected at this point. It was also noted that ART-8 is the well with the highest flow rate (~70 gpm).
  - b. KMCC currently has a proposal to increase the redundancy of this system.
  - c. NDEP noted that these modifications should be reflected in the O&M manual.
  - d. Noted that the Athens Road well field is monitored daily (unofficial/uncertified) and weekly (certified).
6. Discussed NPDES permit modification.
- a. NDEP noted that it has not been determined if this will be a major or minor modification. NDEP is trying to do this as a minor modification.
  - b. This is currently under NDEP BWPC internal review.
  - c. If necessary, Tamara believes that a major modification can be completed by 3/9/04 (depending on public comment).
7. Discussed the letter from Todd and Brian.
- a. KMCC noted that they will be ready to discuss this issue at our meeting on 12/10/03.
8. Discussed the ~~12/10/03~~ meeting.
- a. Meet at KMCC at 9:00 AM (location TBD).
  - b. This meeting will include a tour of the FBR system.
  - c. Tamara and USEPA will be looking at the off-site systems after the meeting with KMCC.
  - d. Todd and Brian will be meeting with regulatory representatives from Arizona at KMCC at approximately 3:30 PM. An off-site tour will be conducted the following day.
9. Other.
- a. Susan noted that KMCC staff will be returning from furlough over the next several weeks and KMCC will be back up and running at 100% of capacity.

**Todd Croft**

---

**From:** Brian Rakvica  
**Sent:** Monday, December 08, 2003 4:44 PM  
**To:** Todd Croft; Jennifer Carr; Jeff Johnson; Jon Palm; Tamara Pelham  
**Subject:** meeting minutes

All,

Attached are our mtg mins from our call with KMCC on 12/2/03.

Brian

Brian A. Rakvica, P.E.  
Nevada Division of Environmental Protection  
Bureau of Corrective Actions  
1771 East Flamingo Road  
Suite 121-A  
Las Vegas, Nevada 89119  
tel: 702-486-2870  
fax: 702-486-2863  
email: [brakvica@ndep.nv.gov](mailto:brakvica@ndep.nv.gov)

12/8/2003

Administration  
Water Pollution Control  
Air Quality  
(702) 486-2850

Federal Facilities  
Corrective Actions  
Waste Management  
Facsimile 486-2863



DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**  
(Las Vegas Office)  
1771 East Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119-0837

November 19, 2003

Susan M. Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, Nevada 89009

RE: Perchlorate Remediation – 3<sup>rd</sup> Quarter 2003 Performance Report  
Kerr-McGee Chemical LLC  
NDEP Facility ID # H-000539

Dear Ms. Crowley:

The Nevada Division of Environmental Protection (NDEP) has received and reviewed the above referenced report. The NDEP recognizes the significant efforts that have been put forth by Kerr-McGee Chemical LLC (Kerr-McGee) to remediate perchlorate-impacted surface water and groundwater in Henderson, Nevada. We also appreciate the effort that is currently being put forth to construct the fluidized bed reactor system for the long-term remediation of perchlorate. However, we also believe additional optimization efforts are warranted at this time.

The NDEP has several observations regarding the efficiency of the existing Athens Road Well Field Remedial System. In review of this quarter's and previous quarter's potentiometric surface maps it is apparent that the capture of the existing system is not optimized. In the area between wells ART-4 and ART-5 there are no capture wells and the cones of depression do not appear to influence the groundwater movement in this area sufficient for full capture by this system. Perchlorate concentrations in this area appear to exceed 100 ppm. In the area to the east of well ART-7 there are no capture wells and the cones of depression do not appear to influence the groundwater movement in this area sufficient for adequate capture by this system. Perchlorate concentrations in this area appear to exceed 25 ppm. A review of these data and other information by NDEP and our consultant suggests that 100% capture is not being achieved at the Athens Road Well Field. It is possible that Athens Road Well Field capture efficiencies are substantially less than 100%. Furthermore, the MODFLOW scenarios included in Attachment B appear to show more than one particle is passing through the Athens Road Well Field. These diagrams do not agree with the text on pages 5 and 6 of the report which indicates that one particle is passing through the Athens Road Well Field. As such, the NDEP requests that Kerr-McGee perform a quantitative

evaluation of the effectiveness of capture at the Athens Road Well Field and provide these results by **May 1, 2004**.

Additionally, the NDEP has suggestions for improvement of the efficiency of the Athens Road Well Field portion of the perchlorate remedial system. It appears that additional capture wells should be installed between wells ART-4 and ART-5 as well as to the east of well ART-7. A sufficient number of wells should be installed in these areas to permit overlapping cones of depression to coalesce into one large depression. We suggest that any new wells that are installed be coupled with a "buddy well" for contingency purposes. Additionally, a slurry wall could be installed down gradient of the existing Athens Road Well Field to bolster the capture efficiency. Placement of a slurry wall on the Kerr-McGee plant site in October 2001 doubled the yield from the on-site well field in a very short period of time. Use of a slurry wall in conjunction with the Athens Road Well Field could provide similar positive results. An alternate technology such as a permeable reactive barrier or an in-situ bioremediation system could also be applied to the plume in the Athens Road area.

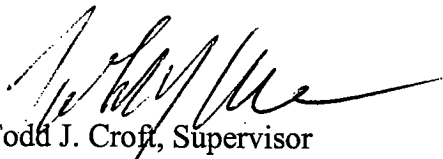
Kerr-McGee is encouraged to present alternatives to the remedial systems outlined herein if such alternatives are focused at increased mass capture and well field optimization at the Athens Road Well Field. This is especially important given the mix of analytes in the groundwater in the Athens Road Well Field vicinity. An optimized well field should address the multiple analytes present in local groundwater.

NDEP requests that optimizations to the existing remedial system or an improved remedial system be on-line by **April 1, 2004**. A schedule for resolution of the issues outlined herein is expected by **January 2, 2004**. Please contact me at your earliest convenience to discuss this matter and to arrange a time to meet.

Sincerely,



Brian A. Rakvica, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
NDEP-Las Vegas Office



Todd J. Croft, Supervisor  
Remediation & LUST Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

cc: Leo Drozdoff, NDEP, Carson City  
Jon Palm, NDEP, BWPC, Carson City  
Jim Najima, NDEP, BCA, Carson City  
Jennifer Carr, NDEP, BCA, Carson City  
Jeff Johnson, NDEP, BCA, Carson City  
Brian Rakvica, NDEP, BCA, Las Vegas  
Alan Timney, NDEP, BWPC, Carson City  
Valerie King, NDEP, BWPC, Carson City  
Tamara Pelham, NDEP, BWPC, Carson City  
Mitch Kaplan, USEPA, Region IX, mail code: WST-5, 75 Hawthorne Street, San Francisco, CA 94105  
Larry Bowerman, USEPA, Region IX, mail code: WST-5, 75 Hawthorne Street, San Francisco, CA 94105  
Peggy Roefer, SNWA, 1900 E. Flamingo Road, Suite 170, Las Vegas, Nevada 89119  
Joe Leising, SNWA, 1900 E. Flamingo Road, Suite 170, Las Vegas, Nevada 89119  
Keith Bailey, Kerr-McGee, Kerr-McGee Center, PO Box 25861, Oklahoma City, Oklahoma 73125  
Ranjit Sahu, BRC, 875 West Warm Springs Road, Henderson, Nevada 89015





**KERR-McGEE CHEMICAL LLC**

POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

November 13, 2003

2003 NOV 17 AM 10:27

CONFIDENTIAL  
LAS VEGAS

Brian Rakvica  
Nevada Division of Environmental Protection  
1771 East Flamingo, Suite 121-A  
Las Vegas, NV 89119

Dear Mr. Rakvica:

Subject: Third Quarter 2003 - UIC Permit 94218 Report

In response to your correspondence of October 20, 2003 (attached for your reference) Kerr-McGee Chemical LLC (Kerr-McGee) requested the contract laboratory provide an evaluation of the total chromium and hexavalent chromium analytical information provided in the UIC permit NEV94218 third quarter report. Their response is also attached. Based upon their response, it is evident that there is no error in reporting. Information provided in the third quarter 2003 UIC report is within the analytical method accuracy bounds. The analytical methods have been EPA approved for the analytes at issue.

Please feel free to contact me at (702) 651-2234 if you have any questions related to this information. Thank you.

Sincerely,

Susan M. Crowley  
Staff Environmental Specialist

By Express Mail

Attachments

cc: Todd Croft, NDEP (Las Vegas)  
Jennifer Carr, NDEP  
Jon Palm, NDEP  
Val King, NDEP  
LK Bailey  
FRStater  
D Ward  
Andrew Eaton, MWH Laboratories  
Linda Geddes, MWH Laboratories

Administration  
Water Pollution Control  
Air Quality  
(702) 486-2850

Federal Facilities  
Corrective Actions  
Waste Management  
Facsimile 486-2863



DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**  
(Las Vegas Office)  
1771 East Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119-0837

October 20, 2003

Susan M. Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, Nevada 89009

RE: Third Quarter 2003, Quarterly Report UIC Permit # NEV94218  
Kerr-McGee Chemical LLC  
NDEP Facility ID # H-000539

Dear Ms. Crowley:

Our office is in receipt of your third quarter report regarding the UIC Permit #NEV94218 for the Kerr-McGee facility located in Henderson, Nevada. The values presented for hexavalent chromium exceed the values presented for total chromium. This problem appears to have occurred consistently since December 2002. Please provide justification for these apparent errors and a schedule for resolution of this issue. A written response is expected by November 21, 2003.

Please contact me if there are any questions or comments.

Sincerely,

A handwritten signature in black ink that reads "Brian A. Rakvica".

Brian A. Rakvica, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

cc: Todd Croft, BCA, NDEP, Las Vegas.  
Jeff Johnson, BCA, NDEP, Carson City  
Jennifer Carr, BCA, NDEP, Carson City  
Jon Palm, BWPC, NDEP, Carson City  
Val King, BWPC, NDEP, Carson City

October 31, 2003

Ms. Susan Crowley  
Kerr-McGee Chemical LLC  
P.O. Box 55  
Henderson, NV 89009

Subject: Hexavalent Chromium vs. Total Chromium Results

Dear Ms. Crowley:

MWH Laboratories analyzes hexavalent chromium for Kerr-McGee using a colorimetric method, SW 7196. The expected Relative Percent Difference (RPD) for this method is 10-20%. The samples are typically diluted because the linear range only goes up to 0.1 mg/L, adding additional error to the results depending on the size of the dilution.

The total chromium was analyzed using ICAP, EPA Method 200.7 or ICP-MS, EPA Method 200.8. The expected RPD for both of these methods are in the 10-20% range as well. The samples were also diluted for these methods adding additional error.

Enclosed is a table comparing the hexavalent chromium results with the total chromium results. In only 2 cases is the RPD above 20%. In one case it is a sample that required extensive dilution for both total chrome and hexavalent chrome. In the other case, the result for total chrome is very close to the reporting limit and it is possible that the hexavalent chrome was the result of a contaminated equipment blank.

In all other cases the results are within the expected error, assuming that all of the chromium is hexavalent chromium.

Please feel free to forward this information to your regulator. Call me if you have any questions.

Very truly yours,



Linda Geddes  
Project Manager

Kerr-McGee  
 3rd Q Hexavalent Chromium  
 vs.  
 Total Chromium Data

SAMPLE #	SAMPLE ID	CR-VI, mg/L	CR-VI DF	CR-MS, ug/L	CR-MS DF	CR, mg/L	CR DF	% RPD
2307090311	M-44	1.61	50	1600	5			0.62
2307090315	M-94	1.49	50	1300	10			14
2307110090	M-36	43.5	500			35	10	22
2307110091	EB-2	0.014	1			<0.010	1	33
2307110093	M-100	1.45	50			1.4	2	3.5
2307110103	MD-2	1.45	50			1.4	2	3.5
2307110106	M-84	1.5	50			1.3	2	14
2307080240	M-11	6.7	500			7	5	4.4
2307080241	M-12A	21.4	500			20	10	6.8

RECORD OF COMMUNICATION	DISCUSSION FIELD TRIP CONFERENCE PHONE CALL <input checked="" type="checkbox"/> OTHER (SPECIFY)	
	(Record of item checked above)	
TO: Randy Gardiner Alpha Analytical	FROM: Brian Rakvica	DATE:11/7/03 TIME:3:30 pm
SUBJECT: hexavalent chromium		
SUMMARY OF COMMUNICATION:		
<ol style="list-style-type: none"> <li>1. Brian called Randy to discuss analytical methods and reporting limits for total and hexavalent chromium.</li> <li>2. Total and hexavalent chromium are analyzed with two different methods. The hexavalent method is less precise as it is a colormetric method. Randy thought that is the total and hexavalent numbers were within 10-15% of each other that the numbers were essentially equal.</li> <li>3. Alpha's RDL for hexavalent chromium is 0.02 ppm and their MDL is 0.0103 ppm. Randy indicated that he could get down to 0.01 ppm, however, the data would carry the "J" flag. BAR asked if there was an alternate method. Randy indicated that he did not have an alternate method.</li> </ol>		

4. called Randy on 11/21 @ 1:15 pm  
↳ Randy does not use 7199  
due to high TDS issues w/ FC

Administration  
Water Pollution Control  
Air Quality  
(702) 486-2850



Federal Facilities  
Corrective Actions  
Waste Management  
Facsimile 486-2863

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**  
(Las Vegas Office)

1771 East Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119-0837

November 6, 2003

Susan M. Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, Nevada 89009

RE: Figure Request  
Kerr-McGee Chemical LLC  
NDEP Facility ID # H-000539

Dear Ms. Crowley:

Per my previous requests via electronic mail on October 7, 2003 and October 27, 2003 I am now writing to request two copies of Figure 9 from the January 2001 Kerr-McGee Seep Area Groundwater Characterization Report. Please provide these copies to our office by November 21, 2003.

Please contact me if there are any questions or comments.

Sincerely,

A handwritten signature in black ink, appearing to read "B. Rakvica", with a long horizontal line extending to the right.

Brian A. Rakvica, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

cc: Todd Croft, BCA, NDEP, Las Vegas.  
Jeff Johnson, BCA, NDEP, Carson City  
Jennifer Carr, BCA, NDEP, Carson City



**KERR-McGEE CHEMICAL LLC**

POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

November 3, 2003

Jon Palm  
Bureau of Water Pollution Control  
Nevada Division of Environmental Protection  
333 West Nye Lane, Room 138  
Carson City, NV 89706

Subject: NPDES Permit NV0023060 Modification

Dear Mr. Palm:

Kerr-McGee Chemical LLC (Kerr-McGee) maintains an NPDES permit NV 0023060, for a treated water discharge associated with the perchlorate remediation project in the Henderson area. Under Nevada Division of Environmental Protection (NDEP) direction, Kerr-McGee has increased their groundwater collection volume to increase the scope of the remediation efforts. To allow this, the treated discharge volume above and beyond that authorized by NV0023060 has been discharge under the authority of Temporary discharge permit TNEV 2003328 and then TNEV2003423. These temporary permits have allowed Kerr-McGee to expand our remedial efforts; we now request a modification of the NPDES permit NV0023060 to include discharge of this added volume.

In addition, you have requested a description of the final remedy for inclusion in the modified permit. While Kerr-McGee is currently using an ion exchange process for perchlorate removal, Kerr-McGee is constructing a two-stage biological treatment system to destroy perchlorate. The system will treat up to 1000 gallons per minute of water (950 gpm average) collected and transferred to the existing equalization area. Four first stage fluidized bed reactors (FBRs) will destroy all nitrate, all chlorate and much of the perchlorate entering the system. Four second stage FBRs will reduce perchlorate to non-detect concentrations (detection limit likely about 20 ppb in this water). The FBRs operate by growing bacteria on sand (first stage) or granular activated carbon particles (second stage). In addition to the FBRs, the plant will incorporate an aeration tank (adding dissolved oxygen to the discharge water), two dissolved air flotation units (to remove suspended solids), a UV disinfection system, and sludge conditioning/filtration equipment. Denatured ethanol (95%) will be used as the electron donor or food source for the bacteria. Micro-nutrient additions and pH control are also incorporated in the design. Kerr-McGee requests that the NPDES permit NV0023060 be modify to increase the allowable discharge volume from the current values to 1.45 MGD – 30-day average flow and 1.50 MGD – 7-day average flow.

RECEIVED  
LAS VEGAS  
DEPARTMENT

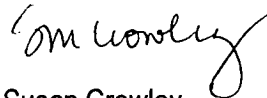
2003 NOV -6 PM 12: 26

RECEIVED

Jon Palm  
November 3, 2003  
Page 2

Please feel free to call me at (702) 651-2234 if you have any question regarding this information.  
Thanks you.

Sincerely,



Susan Crowley  
Staff Environmental Specialist

CERTIFIED MAIL  
Enclosure

cc: Todd Croft, NDEP  
Brian Rakvica, NDEP  
Jim Najima, NDEP  
Doug Zimmerman, NDEP





**State of Nevada  
Department of Conservation  
and Natural Resources  
Division of Environmental Protection**

**National Pollutant Discharge  
Elimination System**

<b>FOR BWPC USE ONLY:</b>	
Check No.:	_____
Receipt No.:	_____
Amount:	\$ _____

**NPDES PERMIT APPLICATION SUPPLEMENTAL**

APPLICATION – NEW     APPLICATION – RENEWAL     APPLICATION – MODIFICATION

**PERMIT NUMBER: NV 0023060 (LEAVE BLANK IF NEW PERMIT)**

**1. OWNER/RESPONSIBLE PARTY INFORMATION:**

Business/Agency Name: Kerr-McGee Chemical LLC

Contact Person: Susan Crowley Phone Number: (702) 651-2234

Mailing Address: PO Box 55 Fax Number: (702) 651-2310

City: Henderson County: Clark State: NV Zip Code: 89009

Email Address: scrowley@kmg.com

Federal Tax ID No.: \_\_\_\_\_

*Note: The Federal Tax ID number is necessary in the event of any error in monetary transaction, i.e. refund or reimbursement, from the State of Nevada*

**2. BILLING ADDRESS:**

Business/Agency Name: Kerr-McGee Chemical LLC

Contact Person: Susan Crowley Phone Number: (702) 651-2234

Mailing Address: PO Box 55 Fax Number: (702) 651-2310

City: Henderson County: Clark State: NV Zip Code: 89009

**3. FACILITY/SITE INFORMATION:**

**Note:** A separate permit application form must be completed for each discharging facility operated by the applicant.

Facility Name: Kerr-McGee Chemical LLC, Henderson Facility

Contact Person: Susan Crowley Phone Number(s): 1. (702) 651-2234  
2. \_\_\_\_\_

Email Address: scrowley@kmg.com Fax Number: (702) 651-2310

Street Address/ Location: 8000 West Lake Mead Dr.

City: Henderson County: Clark State: NV Zip Code: 89015

Township: T-22S Range: R-62E Section(s): Section 12

Latitude: 36° 02' 35.4" Longitude: -114° 59' 58.7"

Discharge Location(s): Stream Feeding the Las Vegas Wash

Discharge Latitude: 36° 5' 15" Discharge Longitude: -114° 59' 30"

Name of Operator\*: NA Certification Grade\*: \_\_\_\_\_

\* If applicable

4. FLOW:

	<u>30-Day Average</u>				<u>Daily Maximum</u>			
Design Capacity:	1.45	MGD	1000	gpm	1.50	MGD	1040	gpm
Requested Flow Limit:	1.45	MGD	1000	gpm	1.50	MGD	1040	gpm
Current Operational Flow*:		MGD		gpm		MGD		gpm

\* If applicable  
 MGD: million gallons per day  
 gpm: gallons per minute

5. DISCHARGE ACTIVITY:

Describe the activity producing the discharge. (Example – wastewater treatment, dewatering, cooling, manufacturing, etc.) Include pertinent elements of water processing or treatment that could affect the quality of the water discharged. **Include a Process Flow Diagram.**

Description of facility process (if applicable): Biological Perchlorate Remediation Process  
 Currently Kerr-McGee is utilizing an ion exchange perchlorate remediation process; however within 2 to 6 months Kerr-McGee will have constructed a two-stage biological treatment system to destroy perchlorate. The system will treat up to 1000 gallons per minute of water (950 gpm average) collected and transferred to the existing equalization area. Four first stage fluidized bed reactors (FBRs) will destroy all nitrate, all chlorate and much of the perchlorate entering the system. Four second stage FBRs will reduce perchlorate to near non-detect concentrations (detection limit likely about 20 ppb in this water). The FBRs operate by growing bacteria on sand (first stage) or granular activated carbon particles (second stage). In addition to the FBRs, the plant will incorporate an aeration tank (adding dissolved oxygen to the discharge water), two dissolved air flotation units (to remove suspended solids), a UV disinfection system, and sludge conditioning/filtration equipment. Denatured ethanol (95%) will be used as the electron donor or food source for the bacteria. Micro-nutrient additions and pH control are also incorporated in the design.

6. TREATMENT:

Describe the treatment or process that will be used to meet the discharge limits:  
 Same as item 5 above.

- A. Has NDEP approved the design of this treatment system?  YES Date Approved: 10-20-03  
 NO
- B. Does this facility have an approved Operations and Maintenance Manual or Effluent Management Plan?  YES Date Approved: in progress  
 NO

7. NOTIFICATION REQUIREMENTS:

In the event of an unauthorized diversion, bypass, spill, overflow, or discharge while operating under an NPDES permit, the Permittee must notify all agencies, organizations, tribes, utilities, and local governments responsible for, having a legal interest in, or impacted by downstream water quality affecting public health and welfare, biological integrity, or designated uses. On the attached form, provide the list of any agencies, organizations, tribes, utilities, and local governments that would be required to be contacted in the event of an unauthorized discharge.

See Attached Form

**RENEWAL APPLICANTS ONLY: PERMITTEES RENEWING EXISTING PERMITS MUST ALSO COMPLETE ITEMS 9-11.**

**8. MODIFICATIONS:**

List and briefly describe any changes to the production, treatment, or disposal processes of the facility since issuance of the current permit:

**9. DISCHARGE DISCREPANCIES:**

List Discharge Monitoring Report (DMR) dates and parameters where the facility exceeded the permitted discharge limits (attach additional sheets if necessary):

**10. DISCHARGE HISTORY:**

Submit graphs of the monitored parameters in the discharge and in any groundwater wells over the time period of the existing permit (e.g., plot BOD<sub>5</sub> vs. month). The time scale should not be less frequent than the permitted sampling frequency. Attach a tabulated compilation of all compliance data for all monitoring parameters analyzed or measured during the preceding five (5) years or the lifetime of the permit, whichever is shorter. Provide the tabulated data in hard copy, and if available, an electronic file compatible with Microsoft Office software (version 97 or later).

I hereby certify that I am familiar with the information contained in the application and that to the best of my knowledge and ability such information is true, complete, and accurate.

Print Name of Applicant: Fredrick R. Stater

Title: Plant Manager

Signature of Applicant: *Fredrick R. Stater*

Date: 11/4/03

Any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained by the provisions of NAC445A.070 to 445A.348, inclusive, or by any permit, rule, regulation, or order issued pursuant thereto, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under the provisions of NAC 445A.070 to 445A.348, inclusive, or by any permit, rule, regulation, or order issued pursuant thereto, is guilty of a gross misdemeanor and shall be punished by a fine of not more than \$10,000 or by imprisonment in the county jail for not more than 1 year, or by both fine and imprisonment.

**REMIT APPLICATION AND FEE (PER NAC445A.232) TO:**

**NEVADA DIVISION OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER POLLUTION CONTROL  
333 WEST NYE LANE  
CARSON CITY, NEVADA 89706-0851  
ATTENTION: PERMITS BRANCH**

**PHONE: 775.687.9418**

<b>FORM 1</b> <b>GENERAL</b>	<b>U.S. ENVIRONMENTAL PROTECTION AGENCY</b> <b>GENERAL INFORMATION</b> <i>Consolidated Permits Program</i> <i>(Read the "General Instructions" before starting.)</i>	<b>I. EPA I.D. NUMBER</b> FNVD 008290330
<b>LABEL ITEMS</b> I. EPA I.D. NUMBER III. FACILITY NAME V. FACILITY MAILING ADDRESS VI. FACILITY LOCATION	PLEASE PLACE LABEL IN THIS SPACE	<b>GENERAL INSTRUCTIONS</b> If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent (the area to the left of the label space lists the information that should appear), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete items I, III, V, and VI (except VI-B which must be completed regardless). Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

**II. POLLUTANT CHARACTERISTICS**

**INSTRUCTIONS:** Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.

SPECIFIC QUESTIONS	MARK 'X'			SPECIFIC QUESTIONS	MARK 'X'		
	YES	NO	FORM ATTACHED		YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X		B. Does or will this facility (either existing or proposed) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)	X		X	D. Is this a proposed facility (other than those described in A or B above) which will result in a discharge to waters of the U.S.? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)		X		F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X		H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X		J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

**III. NAME OF FACILITY**

1 KERR-MCGEE PERCHLORATE TREATMENT SYSTEM

**IV. FACILITY CONTACT**

A. NAME & TITLE (last, first, & title)  
 2 CROWLEY, SUSAN ENV SPECIALIST 702 651 2234

**V. FACILITY MAILING ADDRESS**

A. STREET OR P.O. BOX  
 3 PO Box 55

B. CITY OR TOWN  
 4 HENDERSON

C. STATE  
 NV

D. ZIP CODE  
 89 009

**VI. FACILITY LOCATION**

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER  
 5 8000 WEST LAKE MEAD DR

B. COUNTY NAME  
 CLARK

C. CITY OR TOWN  
 6 HENDERSON

D. STATE  
 NV

E. ZIP CODE  
 80015

F. COUNTY CODE (if known)

VII. SIC CODES (4-digit, in order of priority)

A. FIRST				B. SECOND			
7	2	8	1	7			
(specify) Industrial Inorganic Chemicals, nec				(specify)			
C. THIRD				D. FOURTH			
7				7			
(specify)				(specify)			

VIII. OPERATOR INFORMATION

A. NAME															B. Is the name listed in Item VIII-A also the owner?	
KERR-MCGEE CHEMICAL LLC															<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box: if "Other", specify.)										D. PHONE (area code & no.)				
F = FEDERAL      M = PUBLIC (other than federal or state) S = STATE        O = OTHER (specify)										P (specify)				
										702 651 2234				

E. STREET OR P.O. BOX														
PO BOX 55														

F. CITY OR TOWN										G. STATE		H. ZIP CODE		IX. INDIAN LAND		
BENDERSON										NV		89009		Is the facility located on Indian lands? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)						D. PSD (Air Emissions from Proposed Sources)					
NV0023060						NA					

B. UIC (Underground Injection of Fluids)						E. OTHER (specify)					
NEV94218						COH 0201 City permit for sanitary waste to sewer					

C. RCRA (Hazardous Wastes)						E. OTHER (specify)					
NA						NV0000078 Stormwater NPDES Permit					

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

The Kerr-McGee facility historically produced ammonium perchlorate. Groundwater near the facility is impacted by perchlorate, presumed the result of historic operations at the site. Remedial efforts have been on-going at this site, under the authority of Nevada Division of Environmental Protection approved permit NV0023060. This application requests an increase in the flow allocation, to expand remedial efforts beyond the original permit (0023060) application.  
 Note: Please see the original permit application dated September 1999.

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)		B. SIGNATURE		C. DATE SIGNED	
Fredrick R. Stater Plant Man				11-4-03	

COMMENTS FOR OFFICIAL USE ONLY														

EPA I.D. NUMBER (copy from Item 1 of Form 1)

NV0 008 290330

Please print or type in the unshaded areas only.

FORM  
2C  
NPDES



U.S. ENVIRONMENTAL PROTECTION AGENCY  
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER  
EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURAL OPERATIONS  
Consolidated Permits Program

I. OUTFALL LOCATION

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. OUTFALL NUMBER (list)	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER (name)
	1. DEG.	2. MIN.	3. SEC.	1. DEG.	2. MIN.	3. SEC.	
001	36	5	15	114	59	30	Las Vegas Wash (groundwater seep approximately 2 miles north of Kerr-McBee site)

II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

1. OUTFALL NO. (list)	2. OPERATION(S) CONTRIBUTING FLOW		3. TREATMENT	
	a. OPERATION (list)	b. AVERAGE FLOW (include units)	a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1
001	Effluent from groundwater treatment system	1.45 MGD	1) ion exchange currently	2J
	(See original Sept 1989 application for addition information)		2) anoxic biological in 2 to 6 months	3C

OFFICIAL USE ONLY (effluent guideline sub-categories)

**CONTINUED FROM THE FRONT**

G. Except for storm runoff, leaks, or spills, any of the discharges described in Items II-A or B intermittent or seasonal?  
 YES (complete the following table)  NO (go to Section III)

1. OUTFALL NUMBER (list)	2. OPERATION(S) CONTRIBUTING FLOW (list)	3. FREQUENCY		4. FLOW				C. DURATION (in days)
		a. DAYS PER WEEK (specify average)	b. MONTHS PER YEAR (specify average)	a. FLOW RATE (in mgd)		b. TOTAL VOLUME (specify with units)		
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	

**III. PRODUCTION**

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?  
 YES (complete Item III-B)  NO (go to Section IV)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (or other measure of operation)?  
 YES (complete Item III-C)  NO (go to Section IV)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS (list outfall numbers)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (specify)	

**IV. IMPROVEMENTS**

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operation of waste-water treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.  
 YES (complete the following table)  NO (go to Item IV-B)

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
NDEP Administrative Order on Consent, with follow-on NDEP directive to increase treatment capacity.	001	Groundwater collector	Perchlorate remediation of affected groundwater	NA	3-04

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedule for construction.  MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

JD 008290330

CONTINUED FROM PAGE 2

**V. INTAKE AND EFFLUENT CHARACTERISTICS**

A, B, & C: See instructions before proceeding - Complete one set of tables for each outfall - Annotate the outfall number in the space provided.  
 NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE
Please see original application September 1999 - form EPA 2d.			

**VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS**

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

YES (list all such pollutants below)

NO (go to Item VI-B)

Perchlorate. Also, please see original application September 1999 - form EPA 2d.



**VII. BIOLOGICAL TOXICITY TESTING DATA**

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (Identify the test(s) and describe their purposes below)

NO (go to Section VIII)

Evaluation of dissolved solids' effect on test species.

**VIII. CONTRACT ANALYSIS INFORMATION**

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
See original application form EPA 2d and supporting information for permit NV 0023060 development.			

**IX. CERTIFICATION**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

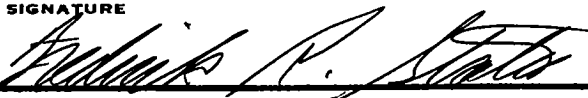
A. NAME & OFFICIAL TITLE (type or print)

Frederick R. States

B. PHONE NO. (area code & no.)

(702) 651-2200

C. SIGNATURE



D. DATE SIGNED

Nov 4, 2003

## MEMORANDUM TO FILE

**TO:** KMCC File

**FROM:** Brian A. Rakvica

**DATE:** October 23, 2003

**CC:** Jeff Johnson, Jennifer Carr, Todd Croft

**RE:** Discussion with Todd Croft regarding hexavalent chromium issue.

1. Todd had spoken with Keith Bailey regarding the issue of hexavalent chromium detected in their perchlorate remediation system discharge. KMCC has evaluated this and found that it is coming from the Athens Road well field.
2. Keith indicated that KMCC had positive results from the jar tests that they had performed using ferric sulfate to reduce hexavalent chromium to trivalent chromium.
  - a. This process does result in an increased level of TDS (sulfate) and solids. Solids will be primarily ferric hydroxide and chromium hydroxide.
  - b. It is uncertain if the solids will drop out in the lift station or the GAC columns. This process will be brought on line for a 30 day test to allow KMCC to determine this. This may require an increased frequency of backwashing the GAC columns to the GW-11 pond.
  - c. The amount of hexavalent chromium that needs to be removed is very small (0.02 ppm minimum) and the amount of additional TDS and solids that will be generated is expected to be relatively insignificant (approximately 5 pounds/day).
  - d. The ferric sulfate (approximately 1 ppm) will be added in the pipeline that transfers the water from Athens Road well field to lift station 3 and then on to the plant site. Water at the lift station has a 40 minute residence time and the reaction is only expected to require a 10 minute residence time.
  - e. If this process proves to be successful, KMCC may evaluate replacement of the existing chromium mitigation system with this new process. This new process requires significantly less maintenance.
  - f. An update is expected from Keith in the next week or so.
3. Keith had also discussed this issue with Jon Palm and Jon had given him oral approval to proceed with this test. The 30 day test should start on 10/27/03 or 10/28/03. A verbal report is expected by the end of October and a written report will be generated at the end of the test.

Administration  
Water Pollution Control  
Air Quality  
(702) 486-2850



Federal Facilities  
Corrective Actions  
Waste Management  
Facsimile 486-2863

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**

(Las Vegas Office)

1771 E. Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119-0837

October 20, 2003

Keith Bailey  
Kerr-McGee  
PO Box 25861  
Oklahoma City, Oklahoma 73125

RE: Kerr-McGee Chemicals; Ammonium Perchlorate Remedial Project; Biological Treatment System, Plans and Specifications

Dear Mr. Bailey:

After a careful review of the plans and specifications for the above-mentioned project, the Bureau of Water Pollution Control grants the plans a conditional approval. This approval is conditioned upon the potential need for Kerr-McGee and U.S. Filter to provide for the installation of proper filter media and or membrane processes up stream from the UV Disinfection system, should future effluent test results indicate the need for such unit or units. An Operation and Maintenance Manual must be developed and submitted to this office for review and approval.

The O&M Manual document must be wet stamped, signed, and dated by a registered professional engineer in the State of Nevada.

A registered professional engineer **must provide** this office with certification that the project was constructed in accordance with the plans and specifications upon completion of construction. The division must approve all addenda and change orders.

Review or approval of facilities plans, design drawings and specifications or other documents by or for the division is for administrative purposes only and does not relieve the owner of the responsibility to properly plan, design, build and effectively operate and maintain the facility as required under law, regulation, permits, and good management practices. The division is not responsible for increased costs resulting from defects in the design, plans and specifications or pertinent documents.

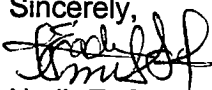
Keith Bailey  
October 20, 2003  
Page 2

The Permittee is responsible for all the permits required which may include, but not limited to:

Dam permits	- Division of Water Resources
Well Permits	- Division of Water Resources
404 Permits	- Army Corps of Engineers/NDEP
Air Permits	- NDEP
Local Permits	- Local Government
Health Permits	- Local Government

If you have any further questions, please feel free to contact me at (702) 486-2853.

Sincerely,



Nadir E. Sous, Supervisor  
Staff Engineer/Technical Services  
Bureau of Water Pollution Control

CC: Darrell Rasner, BWPC/NDEP, Carson City  
Jon Palm, BWPC/NDEP, Carson City  
Diana Silsby, BWPC/NDEP, Carson City  
Jim Najima, BCA/NDEP, Carson City  
Todd Croft, BCA/NDEP, Las Vegas  
Brian Rakvica, BCA/NDEP, Las Vegas  
James Gearhart, US Filter, Engineering & Construction, 181 Thorn Hill Rd.,  
Warrendale, PA 15086  
Susan Crowley, Kerr-McGee, Henderson  
David Moll, Kerr-McGee, PO Box 25861, Oklahoma City, Oklahoma 73125

Administration  
Water Pollution Control  
Air Quality  
(702) 486-2850

Federal Facilities  
Corrective Actions  
Waste Management  
Facsimile 486-2863



DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**  
(Las Vegas Office)  
1771 East Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119-0837

October 20, 2003

Susan M. Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, Nevada 89009

RE: Third Quarter 2003, Quarterly Report UIC Permit # NEV94218  
Kerr-McGee Chemical LLC  
NDEP Facility ID # H-000539

Dear Ms. Crowley:

Our office is in receipt of your third quarter report regarding the UIC Permit #NEV94218 for the Kerr-McGee facility located in Henderson, Nevada. The values presented for hexavalent chromium exceed the values presented for total chromium. This problem appears to have occurred consistently since December 2002. Please provide justification for these apparent errors and a schedule for resolution of this issue. A written response is expected by November 21, 2003.

Please contact me if there are any questions or comments.

Sincerely,

A handwritten signature in cursive script, appearing to read "Brian A. Rakvica".

Brian A. Rakvica, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

cc: Todd Croft, BCA, NDEP, Las Vegas.  
Jeff Johnson, BCA, NDEP, Carson City  
Jennifer Carr, BCA, NDEP, Carson City  
Jon Palm, BWPC, NDEP, Carson City  
Val King, BWPC, NDEP, Carson City

Administration  
Water Pollution Control  
Air Quality  
(702) 486-2850



Federal Facilities  
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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**  
(Las Vegas Office)  
1771 East Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119-0837

October 20, 2003

Stanley D. Bauer  
US Army Corps of Engineers  
CENWO-HX-S  
12565 West Center  
Omaha, NE 68144-3869

RE: **Freedom of Information Act**  
Kerr-McGee Chemical Corporation Projects  
NDEP Facility ID #H-000539

Dear Mr. Bauer,

Enclosed we are transmitting a copy of correspondence related to the Kerr-McGee Chemical Corporation. This item was inadvertently not copied with your original copy request. If there is anything further please do not hesitate to contact me.

Sincerely,

A handwritten signature in cursive script, appearing to read "Brian A. Rakvica".

Brian A. Rakvica  
Remediation and LUST Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

cc: Mr. Brian Lynk, Esq., Environmental Defense Section, US Department of Justice,  
601 D Street, NW; Suite 8546, Washington, D.C. 20004  
Ms. Danna O'Neill, USACE, HTRW Center of Expertise, CENWO-HX  
12565 West Center Road, Omaha, NE 68144-3869  
Mr. Todd Croft, Supervisor, BCA, NDEP, Las Vegas.  
Mr. Jeff Johnson, BCA, NDEP, Carson City  
Mr. Jon Palm, BWPC, NDEP, Carson City  
Ms. Diane Benson, CAPP, NDEP, Carson City  
Ms. Julie Maurer, Office of the Administrator, NDEP, Carson City



December 4, 2001  
By FAX and Federal Express

Mr. Todd J. Croft  
Supervisor  
Remediation and LUST Branch  
Nevada Division of Environmental Protection  
555 E. Washington Avenue, Suite 4300  
Las Vegas, Nevada 89101-1049

3.

Dear Mr. Croft,

This letter is in follow-up to our verbal *force majeure* notification of November 29, 2001. Kerr-McGee Chemical LLC (Kerr-McGee) is invoking *force majeure* under Section V of the Administrative Order on Consent (AOC) executed October 8, 2001 between Kerr-McGee and the Nevada Division of Environmental Protection (NDEP). Kerr-McGee has determined that due to permitting delays and resulting equipment changes, it will be unable to meet both the specified January 15, 2002 date for mechanical completion and the February 28, 2002 date for start-up of the 825 gallon per minute perchlorate treatment plant, as specified in Section II.2.E of the AOC. At this time, we anticipate that the date for "treating perchlorate containing water" will be March 29, 2002 or 90 days from issuance of an Authority to Construct permit from Clark County, whichever is later. In the interim, Kerr-McGee will continue to operate the temporary ion-exchange system. Accordingly, in the opinion of Kerr-McGee, this event should have negligible effect on achieving the goals of the AOC and therefore, does not present any imminent and substantial hazard to human health, welfare, or the environment.

As you know, Kerr-McGee has worked closely with Clark County Division of Air Quality Management (DAQM) representatives in seeking an Authority to Construct (ATC) for the two fired heaters integral to the 825 gpm treatment plant process. We were both surprised and disappointed to learn in the November 16, 2001 meeting with the DAQM, which you attended, that issuing the ATC would require 4-6 months if the original plant heater/burner design was utilized. Kerr-McGee immediately sought other burner vendors and, after much effort, obtained an agreement on another much more expensive burner system. The new system is able to reduce CO emissions to below de minimis levels and thus accelerate issuance of the ATC. An ATC application reflecting the replacement burners has been submitted to the County and action is pending. Unfortunately, despite all the efforts we could exert, on November 28, 2001 the vendor of the new burner systems definitively apprised us that they cannot be delivered until the end of January 2002. We therefore, will miss the AOC January 15 deadline

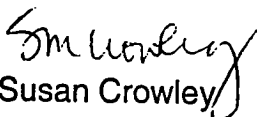
Page 2  
December 4, 2001

We therefore, will miss the AOC January 15 deadline for mechanical completion of the plant. Consultation between USEPA and the County resulted in the opinion that early installation of the heater cabins and coils without burners or fuel trains would "constitute construction" and would be precluded by clean air act regulations in the absence of an ATC. Kerr-McGee will proceed with the balance of construction activities other than the fired heater systems until the ATC is approved. Most of the plant will be complete by January 15<sup>th</sup>.

Assuming the burners arrive by the end of January, we hope to have them installed by the end of February and proceed with check-out of the treatment system. If all goes well, we anticipate meeting the March 29, 2002 date for plant start-up. Any delays in obtaining the ATC beyond the end of December 2001 will adversely impact this revised schedule.

Kerr-McGee is committed to working effectively with NDEP and the USEPA in completion of the perchlorate remediation project. If you have any questions or comments on this letter, please contact me at (702) 651-2234 or Keith Bailey at (405) 270-3651.

Sincerely,

  
Susan Crowley

CC: Keith Bailey  
Larry Bowerman USEPA  
George Christiansen  
Pat Corbett  
Bill Frey Nevada AG Office  
William Green  
Mitch Kaplan USEPA  
David Moll  
Brenda Pohlman NDEP  
John Reichenberger  
JT Smith  
James Worthington  
Doug Zimmerman NDEP



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(702) 486-2850



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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**  
(Las Vegas Office)

1771 East Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119-0837

October 16, 2003

Susan M. Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, Nevada 89009

RE: Third Quarter 2003, Quarterly Report  
Kerr-McGee Chemical LLC  
NDEP Facility ID # H-000539

Dear Ms. Crowley:

Our office is in receipt of your third quarter progress report for the Kerr-McGee facility located in Henderson, Nevada. For the fourth quarter progress report please include the following types of information: meetings held or attended as they pertain to this project; planning activities conducted; and future activities anticipated in the next quarter. It would also be helpful to identify any outstanding items that require action by the NDEP.

Please contact me if there are any questions or comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian A. Rakvica".

Brian A. Rakvica, P.E.  
Staff Engineer III  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

cc: Todd Croft, BCA, NDEP, Las Vegas.  
Jeff Johnson, BCA, NDEP, Carson City  
Jennifer Carr, BCA, NDEP, Carson City  
Jon Palm, BWPC, NDEP, Carson City  
Val King, BWPC, NDEP, Carson City

Administration  
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Corrective Actions  
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Facsimile 486-2863



DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**  
(Las Vegas Office)  
1771 East Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119-0837

October 14, 2003

Stanley D. Bauer  
US Army Corps of Engineers  
CENWO-HX-S  
12565 West Center  
Omaha, NE 68144-3869

RE: **Freedom of Information Act**  
Kerr-McGee Chemical Corporation Projects  
NDEP Facility ID #H-000539

Dear Mr. Bauer,

Enclosed we are transmitting a copy of the perchlorate consent agreement and related correspondence with Kerr-McGee Chemical Corporation. This item was inadvertently not copied with your original copy request. If there is anything further please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian A. Rakvica".

Brian A. Rakvica  
Remediation and LUST Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

cc: Mr. Brian Lynk, Esq., Environmental Defense Section, US Department of Justice,  
601 D Street, NW; Suite 8546, Washington, D.C. 20004  
Ms. Danna O'Neill, USACE, HTRW Center of Expertise, CENWO-HX  
12565 West Center Road, Omaha, NE 68144-3869  
Mr. Todd Croft, Supervisor, BCA, NDEP, Las Vegas.  
Mr. Jeff Johnson, BCA, NDEP, Carson City  
Mr. Jon Palm, BWPC, NDEP, Carson City  
Ms. Diane Benson, CAPP, NDEP, Carson City  
Ms. Julie Maurer, Office of the Administrator, NDEP, Carson City

(775) 687-4670

Administration  
Facsimile 687-5856

Water Pollution Control  
Facsimile 687-4684

Mining Regulation and  
Reclamation  
Facsimile 684-3259



Waste Management  
Corrective Actions  
Federal Facilities

Air Pollution Control  
Air Quality Planning  
Water Quality Planning

Facsimile 687-6996

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**

333 W. Nye Lane, Room 138  
Carson City, Nevada 89706

March 12, 2003

Mr. Patrick Corbett  
Kerr-McGee Chemical LLC  
Kerr-McGee Center  
Oklahoma City, OK 73125

RE: Perchlorate Remediation – Henderson, Nevada

Dear Mr. Corbett:

I am sending you this letter to document our previous instructions requiring Kerr-McGee to extract and treat for perchlorate removal a total of 1,100 gallons per minute by any means currently available. It is recognized that water treated beyond the current NPDES permit limit will be managed under a temporary permit.

If you have any questions on these matters, please contact me at (775) 687-9366.

Sincerely,

A handwritten signature in black ink that reads "Doug Zimmerman".

Doug Zimmerman  
Bureau Chief



# KERR-MCGEE CHEMICAL LLC

KERR-MCGEE CENTER - OKLAHOMA CITY, OKLAHOMA 73125

(405) 270-1313  
FAX (405) 270-3977

January 27, 2003

State of Nevada  
Department of Conservation and Natural Resources  
Division of Environmental Protection  
Attention: Mr. Douglas Zimmerman

Re: Perchlorate Destruction System at Henderson

Gentlemen:

Pursuant to that certain Administrative Order on Consent between the State of Nevada, Department of Conservation and Natural Resources, Division of Environmental Protection (NDEP) and Kerr-McGee Chemical LLC (Kerr-McGee) dated October 8, 2001, (the AOC) Kerr-McGee agreed, among other things, to promptly complete construction of a treatment system capable of treating 825 gallons per minute for removal of perchlorate. This system was identified in the AOC as the "New Ion Exchange\Catalytic Destruction Plant" (the New Plant).

As you are well aware, Kerr-McGee completed construction of the New Plant but encountered a number of mechanical and start-up difficulties that have proven difficult to solve. In an effort to address the possibility the New Plant problems cannot be thoroughly resolved within a reasonable time frame, Kerr-McGee has investigated certain alternatives, the most promising of which seems to be a bio-remediation system.

Kerr-McGee wants to investigate thoroughly its options for dealing with perchlorate in ground water but does not want to expend significant time and resources on an option NDEP finds unacceptable. Therefore, we ask that you confirm NDEP would have no objection to, and would accept, a bio-remediation system being substituted for the New Plant contemplated under the AOC *provided* such bio remediation system met the requirements of Article II paragraph 2 of said AOC.

January 27, 2003

Page 2

If you are in agreement with the foregoing, please so signify by countersigning this letter where provided for below and returning a copy for our records.

Very truly yours,

Kerr-McGee Chemical LLC

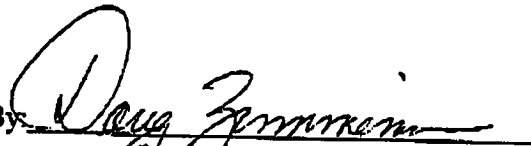


By:

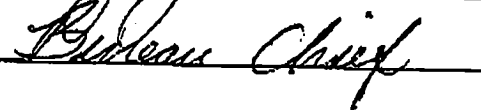
Agreed to and accepted this 11<sup>th</sup> day of  
February, 2003

State of Nevada, Department of Conversation and Natural Resources,  
Division of Environmental Protection

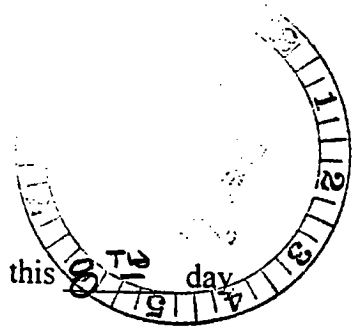
By:



Title:



ADMINISTRATIVE ORDER ON CONSENT



This Administrative Order on Consent (AOC) is made and entered into this 8<sup>th</sup> day of October 2001, by and between the State of Nevada, Department of Conservation and Natural Resources, Division of Environmental Protection ("NDEP" or "Division") and Kerr-McGee Chemical LLC, a Delaware Limited Liability Company ("Kerr-McGee"). Kerr-McGee and the Division are referred to collectively herein as the "Parties."

**WHEREAS**, the Parties entered a Consent Agreement in July 1999, (the "Phase I Agreement"), to govern implementation of a removal action addressing perchlorate in surface water in a seep adjacent to the Las Vegas Wash;

**WHEREAS**, Kerr-McGee began in November 1999, the treatment of perchlorate contaminated seep water using a temporary, ion-exchange system and has discharged treated water from the system under Clean Water Act permits issued by the Division;

**WHEREAS**, consistent with Paragraph II.4. of the Phase I agreement, the Parties have been cooperating in resolving issues regarding discharge of groundwater after treatment for perchlorate, including issues relating to necessary permits, and, on August 7, 2000, NDEP issued Kerr-McGee a five-year permit for discharge of effluent from a proposed remedial system, which includes the possibility of Division authorization of discharge of treated groundwater as well as seep water;

**WHEREAS**, Kerr-McGee wants to cooperate fully with the Division in addressing the problem of perchlorate releases in the Henderson, Nevada area, while preserving its rights to seek contribution from third parties who are likely to share responsibility for these releases, including, but not limited to, the United States Navy and PEPCON;

**NOW THEREFORE.** in consideration of and in exchange for the mutual undertakings and covenants herein, intending to be legally bound hereby, the Division and Kerr-McGee agree as follows:

**I. STATEMENT OF PURPOSE**

The Division and Kerr-McGee are entering into this AOC to document their respective rights and responsibilities during the conduct of a perchlorate remedial action designed to reduce the amount of perchlorate in ground and surface water reaching the Las Vegas Wash ("Wash") and Lake Mead in both the near and long-term, and to continue to provide for reimbursement to the Division of Kerr-McGee's fair share of oversight costs incurred by the Division with respect to cleanup of perchlorate in the groundwater.

**II. WORK TO BE PERFORMED**

1. The parties intend that the work to be performed in accordance with this AOC shall be carried out in manner consistent with applicable federal and Nevada statutes, implementing regulations, and with the National Contingency Plan, 40 C.F.R. § 300.1 *et seq.*

2. Upon execution of this AOC, Kerr-McGee shall promptly complete construction of a treatment system capable of treating 825 gallons per minute for removal of the perchlorate and subsequent discharge in accordance with the permit limits set forth in NPDES Permit No. NV0023060 of August 7, 2000, and shall undertake certain related measures pursuant to the schedule set forth herein:

A. **Slurry Wall** -- Kerr-McGee is installing a slurry wall downgradient of its chromium recovery line wells to increase the capture of perchlorate flux at this location. Kerr-McGee expects to complete construction of this slurry wall by October 31, 2001.

B. Athens Road Groundwater Extraction -- Kerr-McGee will complete installation of an extraction well system at the Athens Road area, designed to remove up to 400 gallons per minute of groundwater with the objective of capturing perchlorate flux at this location. Kerr-McGee shall begin operation of this extraction system as soon as it begins operation of the planned Ion Exchange/Catalytic Destruction Plant as set forth in Section II.2.E. below.

C. Las Vegas Wash and Seep -- Kerr-McGee has installed and tested four wells to recover approximately 350 gallons per minute of groundwater in the area of the seep adjacent to the Wash. These wells will be used to enable extraction of approximately 35 million gallons of groundwater for conveyance to the 11 acre pond on Kerr-McGee's property and thereby increase the amount of perchlorate removed from the area adjacent to the Wash. Assuming City of Henderson approval of the necessary permit, installation of pipelines connecting the wells to Lift Station No. 1 will be completed by October 31, 2001, to coincide with completion of the pipeline work described in Section II.2.D.

D. Pipeline from Las Vegas Wash to Kerr-McGee Facility -- Kerr-McGee has begun construction of pipelines and associated Lift Station No. 2 to carry water from the Las Vegas Wash area to its plant and to return treated water to the Wash for discharge. Construction of the pipelines and Lift Station will be completed by October 31, 2001.

E. New Ion Exchange/Catalytic Destruction Plant -- Kerr-McGee is engineering and installing a new treatment plant with a capacity of 825 gallons per minute. Kerr-McGee will complete mechanical construction of this plant by January 15, 2002, and shall begin treating perchlorate containing water by February 28, 2002.



F. Existing Ion Exchange—Upon startup of the new treatment plant, Kerr McGee agrees to maintain the existing ion exchange system in a ready mode for contingency use for one year unless NDEP and Kerr McGee mutually agree it is no longer needed.

### III. STIPULATED PENALTIES

Unless there has been a written modification approved by NDEP, any failure by Kerr-McGee to meet a schedule deadline or otherwise carry out the work described in Section II may result in NDEP assessing stipulated penalties against Kerr-McGee. All penalty amounts are maximum amounts. Nothing in this AOC shall be construed to limit in any manner NDEP's discretion with respect to whether to take enforcement action or to assess less than the maximum penalty. Failure to commence, perform and/or complete work as described in Section II in a manner acceptable to NDEP will result in the following penalties subject, however, to a cap of \$250,000:

<u>Period of Noncompliance</u>	<u>Maximum Penalty per Day</u>
1 <sup>st</sup> – 7 <sup>th</sup> day	\$ 1,000
8 <sup>th</sup> – 21 <sup>st</sup> day	\$ 2,500
22 <sup>nd</sup> day and thereafter	\$ 5,000

The assessment of stipulated penalties shall not alter Kerr-McGee's obligation to comply with the terms of this AOC.

### IV. DISPUTE RESOLUTION

1. The Parties shall use their best efforts informally and in good faith to resolve any dispute or differences of opinion. The Parties agree that the procedures contained in this Section are the sole and exclusive procedures for resolving disputes arising under this AOC. If Kerr-

McGee fails to follow any of the requirements contained in this Section, then it shall have waived its right to further consideration of the dispute in issue.

2. If Kerr-McGee disagrees, in whole or in part, with any written determination by the Division pursuant to this AOC, Kerr-McGee shall notify the Division in writing of the dispute ("Notice of Dispute").

3. Any dispute that arises under or with respect to this AOC shall in the first instance be the subject of informal negotiations between the Parties. The period for informal negotiations shall not exceed ten (10) days following the date the dispute arises, unless such period is extended by written agreement of the Parties. The dispute shall be considered to have arisen when the Division receives a written Notice of Dispute.

4. In the event that the Parties cannot resolve a dispute by informal negotiations under the preceding paragraph, then the position advanced by the Division shall be considered binding unless, within ten (10) days after the conclusion of the informal negotiation period, Kerr-McGee invokes the formal dispute resolution procedures of this Section by serving on the Division Administrator a written Statement of Position which shall set forth the specific points of the dispute, the position Kerr-McGee claims should be adopted as consistent with the requirements of this AOC, the basis for Kerr-McGee's position, any factual data, analysis or opinion supporting that position, any supporting documentation relied upon by Kerr-McGee, and any matters which it considers necessary for the Administrator's determination. The Statement of Position also may include a request for an opportunity to make an oral presentation of factual data, supporting documentation and expert testimony to the Administrator and to answer questions that the Administrator may pose. It is within the sole discretion of the Administrator to grant or deny a request for an oral presentation.

5. Within fifteen (15) days following receipt of a Statement of Position, or after any oral presentation by Kerr-McGee, the Administrator shall issue his/her decision. The Administrator's written decision shall include a response to Kerr-McGee's arguments and evidence. The written decision of the Administrator shall be incorporated into and become an enforceable element of this AOC, and shall be considered the Division's final decision as provided in paragraph 6 of this Section.

6. As to any final Division decision, Kerr-McGee may, as appropriate, pursue the dispute before the State Environmental Commission ("SEC") as a "contested case" pursuant to NRS §§ 233B.010 *et seq.* and NAC §§ 445.988 – 445.995, and shall be entitled to both administrative and judicial review as provided therein.

#### V. FORCE MAJEURE

1. Kerr-McGee shall perform the requirements of this AOC within the time limits prescribed, unless the performance is prevented or delayed by events which constitute a *force majeure*. Kerr-McGee shall have the burden of proving such a *force majeure*. A *force majeure*, for purposes of this AOC, is defined as any event arising from causes not reasonably foreseeable and beyond the reasonable control of Kerr-McGee, or of any person or entity controlled by Kerr-McGee, which delays or prevents the timely performance of any obligation under this Consent Agreement despite Kerr-McGee's best efforts to fulfill such obligation. A *force majeure* may include: extraordinary weather events, natural disasters, strikes and lockouts [by other than Kerr-McGee employees], national emergencies, delays in obtaining access or use of property not owned or controlled by Kerr-McGee despite timely best efforts to obtain such access or use approval, and delays in obtaining any required approval or permit from the Division or any other public agency that occur despite Kerr-McGee's complete, timely and appropriate submission of

all information and documentation required for approval or applications for permits within a timeframe that would allow the work to proceed in a manner contemplated by the schedule of the AOC. A *force majeure* does not include (i) increased costs of the work to be performed under the AOC, (ii) financial inability to complete the work or (iii) normal precipitation events.

2. If any event occurs or has occurred that may delay the performance of Kerr-McGee's obligations under this Consent Agreement, whether or not caused by a *force majeure* event, Kerr-McGee shall notify the Division orally within two (2) business days of when Kerr-McGee first knew that the event might cause a delay. If Kerr-McGee wishes to claim a *force majeure* event, then within five (5) business days thereafter, Kerr-McGee shall provide to the Division a written explanation and description of the obligation(s) delayed or affected by the *force majeure* event; the reasons for the delay; the anticipated duration of the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Kerr-McGee's rationale for attributing such delay to a *force majeure* event; and a statement as to whether, in the opinion of Kerr-McGee, such event may cause or contribute to an imminent and substantial hazard to human health, welfare, or the environment. Kerr-McGee shall include with any notice all available documentation supporting its claim that the delay was attributable to a *force majeure*. Failure to comply with the above requirements shall preclude Kerr-McGee from asserting any claim of *force majeure* for that event.

3. The Division shall notify Kerr-McGee in writing of its *force majeure* determination within ten (10) days after receipt of the written notice from Kerr-McGee. If the Division determines that the delay has been or will be caused by circumstances constituting a *force majeure* event, the time for performance of the obligations under this AOC that are affected by the *force majeure* event will be extended by the Division in writing for such time as the

Division determines is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the *force majeure* event shall not, of itself, extend the time for performance of any other obligation, unless Kerr-McGee can demonstrate to the Division's satisfaction that more than one obligation was affected by the *force majeure* event.

4. In the event that the Division and Kerr-McGee cannot agree that any delay or failure has been or will be caused by circumstances constituting a *force majeure*, or if there is no agreement on the length of the extension, the dispute shall be resolved in accordance with the dispute resolution provisions set forth in Section V of this AOC.

## VI. REPORTING REQUIREMENTS

1. **Monthly Progress Reports** -- Until Kerr-McGee begins operation of the proposed new ion exchange/catalytic destruction plant, Kerr-McGee shall prepare and provide to NDEP written monthly Progress Reports which: (1) describe the actions which have been taken toward achieving compliance with Section II of this AOC during the previous months, and (2) include information regarding percentage of completion, unresolved delays encountered, or anticipated delays that may affect the future schedule for implementation of the measures described in Section II, including a description of efforts made to mitigate these delays or anticipated delays. Such Progress Reports are to be submitted to NDEP by the 5th day of each month following the month for which the report covers.

2. **Quarterly Progress Reports** -- Once Kerr-McGee begins operation of the new ion exchange/catalytic destruction treatment system, in lieu of the monthly reports described in Section VI.1., Kerr-McGee shall submit to NDEP a written quarterly report describing the operations of its remedial system, including estimates of amounts of perchlorate removed, and

the results of any monitoring of ground or surface water quality. Such quarterly reports shall be due on the 28th day of July, October, January and April for the previous three-month period.

## **VII. REIMBURSEMENT OF OVERSIGHT COSTS**

1. Kerr-McGee shall reimburse the Division for costs reasonably incurred for the oversight of this AOC, following the effective date and for the effective period of this AOC.
2. The Division shall account for oversight costs associated with implementing this AOC and related work and shall submit to Kerr-McGee copies of all invoices on a quarterly basis, commencing with the first full calendar quarter after the effective date of this Consent Agreement. Submittals shall be made promptly after the Division's internal review. Such invoices shall contain sufficient detail to identify individual daily time entries and all invoices or cost details for administrative and vendor expenses (such as travel, training, equipment, photocopying expense and similar items). These invoices shall be prepared consistent with standard State billing practices and shall not require the creation of new billing practices. Amounts due hereunder shall be paid within thirty (30) days after receipt by Kerr-McGee of the invoices. Kerr-McGee may dispute particular invoiced costs if it determines that the Division has made an accounting error or if it alleges that the particular cost is not reimbursable pursuant to paragraph 3. In the event of any such dispute, Kerr-McGee shall pay in a timely fashion undisputed costs. With respect to the disputed cost, Kerr-McGee may pay such amount under protest and without prejudice to recovery of all or any portion thereof at the conclusion of any dispute resolution timely commenced pursuant to Section IV.

3. All payments due by Kerr-McGee shall be by checks payable to the State of Nevada for the full amount due and owing to:

Nevada Division of Environmental Protection  
333 W. Nye Lane  
Carson City, Nevada 89710

ATTENTION: Chief, Bureau of Corrective Actions

All checks shall reference the Site and Kerr-McGee's name and address.

### **VIII. RESERVATION OF RIGHTS**

1. The Division reserves all of its statutory and regulatory powers, authorities, rights, and remedies, both legal and equitable, which may pertain to Kerr-McGee's failure to comply with any of the requirements of this AOC or of any requirement of federal or state laws, regulations, or permit conditions. Except as provided in Section VIII (Other Claims; Covenant Not to Sue), this AOC shall not be construed as a covenant not to sue, release, waiver, or limitation of any rights, remedies, powers, and/or authorities, civil or criminal, which the Division has under any applicable statutory or common law authority of the State. This AOC in no way relieves Kerr-McGee of its responsibility to comply with any federal, state or local law or regulation.
2. The Division reserves the right to disapprove work performed by Kerr-McGee pursuant to this AOC subject to Dispute Resolution under Section IV.
3. The Division reserves any and all legal rights and equitable remedies available to enforce (1) the provisions of this AOC, or (2) any applicable provision of state or federal law.
4. Kerr-McGee reserves all rights, claims and/or defenses it may have in any action brought or taken by the Division, the EPA or any third party pursuant to applicable law, with

respect to the specific claims that can be asserted and further reserves the right to pursue potentially responsible parties to recover all costs incurred in the performance of this AOC.

5. Nothing in this AOC shall be construed as an admission of liability by Kerr-McGee.

#### **IX. OTHER CLAIMS: COVENANT NOT TO SUE**

Nothing in this AOC shall constitute or be construed as a release from, or covenant not to sue with respect to, any claim, cause of action, demand or defense in law or equity, against any person, firm, partnership, or corporation for, or in respect of any liability it may have arising out of or relating in any way to the generation, storage, treatment, handling, management, transportation, release, threatened release, or disposal of any perchlorate at or otherwise associated with the Site, except that the Division covenants not to sue Kerr-McGee with respect to perchlorate contamination at Henderson, Nevada so long as Kerr-McGee is in compliance with the terms of this AOC.

#### **X. APPLICABLE LAW**

This AOC shall be construed in accordance with and governed by the law of the State of Nevada.

#### **XI. EFFECTIVE DATE**

This AOC shall become effective when it is fully executed by the parties. The effective date will be the date of last signature.

#### **XII. TERMINATION**

This AOC shall terminate upon the occurrence of any of the following events:

1. Any agency or department of the United States government asserts and undertakes lead responsibility for addressing perchlorate contamination at Henderson.



2. The Division, Kerr-McGee and any other Party(ies) enter a new order or agreement to govern long-term remedial action with respect to perchlorate contamination and/or other contamination in groundwater at Henderson, and this later agreement expressly supersedes the present AOC.

3. Upon application by Kerr-McGee for termination of this AOC, Kerr-McGee demonstrates to the satisfaction of the Division that response activities have reduced perchlorate concentrations in the Henderson groundwater to a point that continued operation of the treatment system is unlikely to result in further measurable benefit to water quality in the Las Vegas Wash or Lake Mead.

### XIII. SIGNATORIES

Each undersigned individual represents and warrants that he or she is fully authorized by the party he or she represents to enter into this AOC and to legally bind such party to the terms and conditions of this AOC.

IN WITNESS WHEREOF, the Division and Kerr-McGee execute this AOC by their duly authorized representatives on this 8<sup>th</sup> day of October, 2001.

THE STATE OF NEVADA  
DIVISION OF ENVIRONMENTAL  
PROTECTION

KERR-McGEE CHEMICAL LLC

By: 

Name: ALLEN BLAXTER

Title: ADMINISTRATOR

By: 

Name: W. P. Woodward

Title: Sr. Vice President Chemical

APPROVED AS TO FORM ONLY this 4<sup>th</sup> day of October, 2001.

  
ATTORNEY GENERAL



# KERR-McGEE CHEMICAL LLC

POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

2003 OCT 15 PM 12: 03  
October 13, 2003

Mr. Brian Rakvica  
Nevada Division of Environmental Protection  
1771 East Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119

Dear Mr. Rakvica:

Subject: Kerr-McGee Environmental Conditions Investigation Quarterly Report – 3<sup>rd</sup> Q 2003

Pursuant to Section XIII of the Consent Agreement, signed September 5, 1996, between Nevada Division of Environmental Protection (NDEP) and Kerr-McGee Chemical LLC (Kerr-McGee), formerly Kerr-McGee Chemical Corporation (KMCC), Kerr-McGee submits the following quarterly progress report for the Henderson facility's Environmental Conditions Investigation.

**Activities Conducted 07/01/03 to 09/30/03**

- A report, describing field activities associated with the KMCLLC's Supplemental Phase II Sampling Plan, was duplicated and forwarded to NDEP's Las Vegas office.

Please feel free to call me at (702) 651-2234, if you have any questions. Thank you.

Sincerely,

Susan M. Crowley  
Staff Environmental Specialist

smc\Quarterly (3rd Q 03) Progress Report to Kelso.doc

cc: Jennifer Carr, NDEP  
Todd Croft, NDEP  
PSCorbett  
RAWaters  
RHJones  
FRStater

TWReed  
JTSmith (Covington & Burling)  
Doug Zimmerman (NDEP)  
RSimon (ENSR)

Administration  
Water Pollution Control  
Air Quality  
(702) 486-2850



Federal Facilities  
Corrective Actions  
Waste Management  
Facsimile 486-2863

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**  
(Las Vegas Office)  
1771 East Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119-0837

October 8, 2003

Stanley D. Bauer  
US Army Corps of Engineers  
CENWO-HX-S  
12565 West Center  
Omaha, NE 68144-3869

**RE: Freedom of Information Act Copying Job**  
Kerr-McGee Chemical Corporation Projects  
NDEP Facility ID #H-000539

Dear Mr. Bauer,

This letter is to follow up to your FOIA request from September 11, 2003. The requested documents were sent to Legal Copy Cats for reproduction. The originals have been returned to our office on October 1, 2003 and the copies should have been sent to your office at the same time. It is our understanding that your FOIA request has been fulfilled.

If there is anything further please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian A. Rakvica".

Brian A. Rakvica  
Remediation and LUST Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

October 8, 2003

Page 2

cc: Mr. Brian Lynk, Esq., US Department of Justice, Washington, D.C.  
Ms. Danna O'Neill, USACE, Omaha, NE  
Mr. Todd Croft, Supervisor, BCA, NDEP, Las Vegas.  
Mr. Jeff Johnson, BCA, NDEP, Carson City  
Mr. Jon Palm, BWPC, NDEP, Carson City  
Ms. Diane Benson, CAPP, NDEP, Carson City  
Ms. Julie Maurer, Office of the Administrator, NDEP, Carson City

Administration  
Water Pollution Control  
Air Quality  
(702) 486-2850



Federal Facilities  
Corrective Actions  
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Facsimile 486-2863

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**  
(Las Vegas Office)

1771 East Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119-0837

September 24, 2003

Stanley D. Bauer  
US Army Corps of Engineers  
CENWO-HX-S  
12565 West Center  
Omaha, NE 68144-3869

RE: **Freedom of Information Act Request**  
Kerr-McGee Chemical Corporation Projects  
NDEP Facility ID #H-000539

Dear Mr. Bauer,

The Nevada Division of Environmental Protection has received your Freedom of Information Act (FOIA) Request via electronic mail on September 11, 2003 and your electronic mail follow-ups to that dated September 15, 2003 and September 17, 2003.

Pursuant to your electronic mail dated September 17, 2003, your office is still in the process of securing a contract with a copy service. You had indicated that the copy service will contact us to coordinate the reproduction effort once the contract has been secured.

Please keep us apprised of any new developments.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian A. Rakvica".

Brian A. Rakvica  
Remediation and LUST Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

cc: Mr. Brian Lynk, Esq, US Department of Justice, Washington, D.C.  
Ms. Donna O'Neill, USACE, Omaha, NE  
Mr. Todd Croft, Supervisor, BCA, NDEP, Las Vegas.  
Mr. Jeff Johnson, BCA, NDEP, Carson City  
Mr. Jon Palm, BWPC, NDEP, Carson City  
Ms. Diane Benson, CAPP, NDEP, Carson City  
Ms. Julie Maurer, Office of the Administrator, NDEP, Carson City

**Brian Rakvica**

**From:** Stanley.D.Bauer@nwo02.usace.army.mil  
**Sent:** Wednesday, September 24, 2003 1:09 PM  
**To:** Brian Rakvica; Stanley.D.Bauer@nwo02.usace.army.mil  
**Cc:** Danna.J.O'Neill@nwd02.usace.army.mil  
**Subject:** RE: FOIA Request - Update

Brian, I think the message got forwarded too many times. Stan

<p>US Army Corps of Engineers  HTRW Center of Expertise  CENWO-HX-S (Stan Bauer)  12565 West Center  Omaha, NE 68144-3869</p> <p>Phone: 402-697-2619  Fax: 402-697-2613  <a href="mailto:stanley.d.bauer@usace.army.mil">stanley.d.bauer@usace.army.mil</a></p> <p>Technical POC</p>	<p>Brian H. Lynk, Esq.  Environmental Defense Section  US Department of Justice  601 D Street, NW  Suite 8546  Washington, DC 20004</p> <p>Phone: 202-514-6187  Fax: 202-514-8865</p> <p>Legal POC</p>	<p>Ms Danna O'Neill  US Army Corps of Engineers  HTRW Center of Expertise  CENWO-HX (Danna O'Neill)  12565 West Center Road  Omaha, NE 68144-3869</p> <p>Phone: 402-697-2556  Fax: 402-697-2595  <a href="mailto:danna.j.o'neill@usace.army.mil">danna.j.o'neill@usace.army.mil</a></p> <p>Financial POC</p>
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**From:** Brian Rakvica [mailto:brakvica@ndep.nv.gov]  
**Sent:** Wednesday, September 24, 2003 3:32 PM  
**To:** Bauer, Stanley D  
**Cc:** O'Neill, Danna J  
**Subject:** RE: FOIA Request - Update

Stan,

Can you please provide your address to me?

Any change in status on securing the copy contract?

Also, can you provide Danna and Brian's addresses to me?  
It is difficult to decipher from the email below.

Thanks,

Brian

-----Original Message-----

**From:** Stanley.D.Bauer@nwo02.usace.army.mil [mailto:Stanley.D.Bauer@nwo02.usace.army.mil]  
**Sent:** Wednesday, September 17, 2003 6:34 AM  
**To:** Brian Rakvica  
**Cc:** Todd Croft; Stanley.D.Bauer@nwo02.usace.army.mil  
**Subject:** RE: FOIA Request - Update

Brian,

**Brian Rakvica**

---

**From:** Stanley.D.Bauer@nwo02.usace.army.mil  
**Sent:** Wednesday, September 17, 2003 6:34 AM  
**To:** Brian Rakvica  
**Cc:** Todd Croft; Stanley.D.Bauer@nwo02.usace.army.mil  
**Subject:** RE: FOIA Request - Update

Brian,

I apologize for this effort not moving along. We have one person in our office with the designated authority to arrange for this purchase and she has been out for the last week and so far this week. She is training someone else but he is not authorized yet. That said, we will contact Legal Copy Cat as soon as possible and have them arrange the pickup of documents, etc.

We are still intending to get the copies, it is just being delayed for reasons beyond my control.

Thanks.

Stan

-----Original Message-----

**From:** Brian Rakvica [mailto:brakvica@ndep.nv.gov]  
**Sent:** Monday, September 15, 2003 10:40 AM  
**To:** Bauer, Stanley D  
**Subject:** RE: FOIA Request

Stanley,

Sorry if there was any misunderstanding, you will need to coordinate with Legal Copy Cats to have them contact us, come in and pick the documents up. Their contract will be directly coordinated with your office. We will provide the documents to them when they come in.

I am not sure, but they may be able to provide you with an estimate or a "not to exceed" dollar amount if necessary.

Please contact me with any questions.

Thanks,

Brian

-----Original Message-----

**From:** Stanley.D.Bauer@nwo02.usace.army.mil [mailto:Stanley.D.Bauer@nwo02.usace.army.mil]  
**Sent:** Monday, September 15, 2003 7:16 AM  
**To:** Brian Rakvica  
**Cc:** Danna.J.O'Neill@nwd02.usace.army.mil  
**Subject:** RE: FOIA Request

Thanks Brian,

We need to obligate the funding for these copies with "Legal Copy Cats" as soon as possible before the end of our Fiscal Year (30 Sep). Please let us know when you take the copies in or what the quantity will be or have them contact us directly.

Stan

-----Original Message-----

**From:** Brian Rakvica [mailto:brakvica@ndep.nv.gov]  
**Sent:** Monday, September 15, 2003 10:13 AM  
**To:** Bauer, Stanley D



**Cc:** Jim Najima; Jeff Johnson; Jennifer Carr; Leo Drozdoff; Julie Maurer; Doug Zimmerman; Todd Croft

**Subject:** FOIA Request

Stan,

We are in receipt of your FOIA Request for the Kerr-McGee site in Henderson, Nevada. I have cc'd the other parties which may have information related to this site.

In the past we have used the following copy service with success:

Legal Copy Cats & Printing  
300 4th Street  
Las Vegas, Nevada  
(702) 598-4455

Please feel free to contact me with any questions.

Brian

Brian A. Rakvica, P.E.  
Nevada Division of Environmental Protection  
Bureau of Corrective Actions  
Las Vegas, Nevada  
tele: (702) 486-2870  
fax: (702) 486-2863  
brakvica@ndep.nv.gov

Todd,

Pursuant to our phone conversation this morning, I would like to request copies of all reports and official correspondence regarding the Kerr-McGee site that have been produced since May 2001 to the present. Please include any sampling data for all contaminants, chemicals, conductivity and similar information not limited to perchlorates. We would also like any data which may have been generated in an electronic format. We understand that there may be an electronic database used for modeling but have not seen such database or the model.

Please include information from all bureaus of NDEP whether in Las Vegas, Carson City or elsewhere, as appropriate.

I understand that NDEP has specific contractors or copy centers to perform this work. Please provide us with the name, address and phone number for the firm selected to do the copy work so we can make receive an estimated cost and set up a purchase order for payment.

I understand there may be large colored maps and/or drawings which are relatively expensive to copy, however, we still want those in color and full size.

We request that two sets of the copies be made.

Please send one set each by overnight mail to:  
**Engineer Financial POC is**

**US Army Corps of**

**Ms Danna O'Neill at:**

9/24/2003

US Army Corps of Engineers <b>Corps of Engineers</b> HTRW Center of Expertise <b>Center of Expertise</b> CENWO-HX-S (Stan Bauer) <b>(Danna O'Neill)</b> 12565 West Center Road <b>Road</b> Omaha, NE 68144-3869	Brian H. Lynk, Esq.  Environmental Defense Section  US Department of Justice  601 D Street, NW  Suite 8546  Washington, DC 20004	<b>US Army</b>  <b>HTRW</b>  <b>CENWO-HX</b>  <b>12565 West Center</b>  <b>Omaha, NE 68144-3869</b>
Phone: 402-697-2619 <b>2556</b> Fax: 402-697-2613	Phone: 202-514-6187  Fax: 202-514-8865	<b>Phone: 402-697-</b>  <b>Fax: 402-697-2595</b>
e-mail: stanley.d.bauer@usace.army.mil <b>danna.j.o'neill@usace.army.mil</b>		<b>e-mail:</b>

Thank you for your assistance and please contact me with any questions or clarifications.  
Stan

stanley - D. Bower @ nwo02@usa.c  
army.mil

Stw Bowers - Army Corp of Eng.

↳ kmcc contract

↳ Legal copy cats info

cc: Julie Mower - NWS CC

↳ FOIA representative

↳ cc: Jon Palm - Bull

Ray Zimmerman

Jim Raymond

Leo

Administration  
Water Pollution Control  
Air Quality  
(702) 486-2850



Federal Facilities  
Corrective Actions  
Waste Management  
Facsimile 486-2863

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**  
(Las Vegas Office)  
1771 East Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119-0837

September 29, 2003

Legal Copy Cats & Printing  
300 4<sup>th</sup> Street  
Las Vegas, Nevada 89101

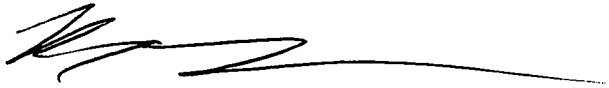
RE: **Freedom of Information Act Copying Job**  
BMI Projects

Dear Sir/Madam:

- The accompanying files are the property of the State of Nevada, Division of Environmental Protection (NDEP). They are **ORIGINAL** official state case files, and are irreplaceable.
- In accordance with the Freedom of Information Act, copies of the accompanying files have been requested by Ms. O'Neil.
- Please make one set of copies in the same order as they have been presented to you. Please maintain the page-to-page order of the files. Double sided originals may be copied to single sided sheets if it makes your process easier and more cost effective.
- Please assure that the exact order of the files and their contents are maintained throughout the process. This is very important.
- Please separate the copies from the originals. Do not bind the copies. You may place a rubber band around each separate copied report.
- When the copying job has been completed, please contact the undersigned. All reproduction costs shall be billed to Ms. Danna O'Neil, US Army Corp of Engineers, HTRW Center of Expertise, CENWO-HX (Danna O'Neil), 12565 West Center Road, Omaha, NE 68144-3869. The copy job **must** be completed by Thursday, October 2, 2003.

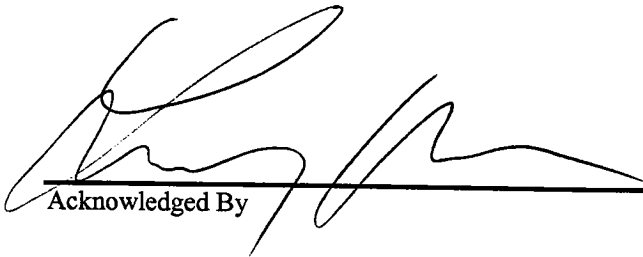
- The Nevada Division Case Officer responsible for these files is Brian Rakvica. He can be reached in the Las Vegas Office at 486-2870. Please feel free to call myself or Ms. O'Neil (402-697-2556) with any questions.

Sincerely,



Brian A. Rakvica  
Remediation and LUST Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

cc: Mr. Todd Croft, Supervisor, BCA, NDEP, Las Vegas.



Acknowledged By

9-29-03  
Date

Date	Title	Site	Author
May-98	Hydrogeologic Investigation of Perchlorate in GW	AmPac	Broadbent & Assoc.
April-99	Hydrogeologic Investigation	AmPac	Kleinfelder
January-00	Supplemental Hydrogeologic Investigation	AmPac	Kleinfelder
June-81	Henderson Industrial Complex Hazardous Waste Investigation	BMI	JRB Associates
April-93	NDEP Recommendations Based Upon BMI Complexes Companies Phase I Environmental Conditions Assesment (DRAFT) Reports	BMI	NDEP
January-98	Abatement of Asbestos Containing Cell Tops - 4th Street Property	BMI	ERM - West
April-99	Village East Project (Sunset North Area)	BMI	ERM
July-99	Supplemental Sampling Results Mohawk and Sunset North Areas	BMI	ERM
August-99	Village East Project (Sunset North Area)	BMI	ERM
June-00	Settlement Agreement for the Corrective Action Management Unit Rule	BMI	Parsons
April-93	Phase I Environmental Conditions Assesment for the BMI Complex	BMI - Common	Geraghty & Miller Inc.
February-96	Project Workplan BMI Common Areas Environmental Conditions Investigation	BMI - Common	ERM - West
January-98	Abatement of Asbestos Containing Materials and ACM-Impacted Soils BMI Common Areas Parcel 5/6	BMI - Common	ERM - West
October-99	Public Involvement Plan Common Areas	BMI - Common	ERM
November-99	Soi/GW Nexus Evaluation	BMI - Common	ERM
November-99	Background Arsenic BEC Common Areas	BMI - Common	ERM
December-99	Final Draft Risk Assesment for Remdial Alternatives for the Upper Ponds Portion of the BMI Common Areas	BMI - Common	NewFields Inc.
March-00	Final Draft Soil/GW Nexus Evaluation	BMI - Common	ERM
April-96	Sampling and Analysis for Characterization of BMI Exclusion Areas	BMI - Exclusion	ERM - West
August-96	Environmental Characterization Report BMI Exclusion Areas 3, 4A, 4B, 5/6	BMI - Exclusion	ERM - West
April-97	Environmental Characterization Report BMI Exclusion Areas 3, 4A, 4B, 5/6	BMI - Exclusion	ERM-West Inc.
April-97	Environmental Characterization Report BMI Exclusion Areas 3, 4A, 4B, 5/6	BMI - Exclusion	ERM - West
June-97	Exclusion Areas 5/6 ACM Removal Workplan	BMI - Exclusion	ERM - West
June-97	Technical Specifications ACM Removal Parcel 5/6	BMI - Exclusion	ERM - West
July-97	Bid Documents ACM Removal Parcel 5/6	BMI - Exclusion	ERM - West
November-98	Technical Drainage Study for Basic Management Inc. Landfill	BMI - Landfill	Post, Buckley, Schuh & Jernigan, Inc.
December-98	BMI Landfill GW Monitoring Results	BMI - Landfill	ERM
October-99	GW Monitoring Results Former BMI Landfill	BMI - Landfill	ERM
November-99	Permit Application for Class III Landfill	BMI - Landfill	Parsons
August-96	Draft Environmental Conditions Investigation Report BMI Common Areas	BMI -Common	ERM-West Inc.
April-93	Phase I Environmental Conditions Assesment Report	Chemstar Lime	Chemstar Lime
October-84	Closure/Post-closure Plan for HW Landfill	Kerr-McGee	Kerr-McGee
July-85	Geohydrological Investigation	Kerr-McGee	Kerr-McGee
March-92	Draft Phase I Environmental Conditions Assesment Report	Kerr-McGee	Weston
July-92	Semi-Annual Performance Report - Cr Mitigation System (Jan-June 1992)	Kerr-McGee	Kerr-McGee
January-93	Semi-Annual Performance Report - Cr Mitigation System (July-Dec 1992)	Kerr-McGee	Kerr-McGee

Date	Title	Site	Author
March-93	Phase I Environmental Conditions Assessment Report	Kerr-McGee	Weston
April-93	Environmental Conditions Assessment	Kerr-McGee	Kleinfelder
August-93	Sampling and Analysis Plan	Kerr-McGee	Kerr-McGee
August-93	Semi-Annual Performance Report - Cr Mitigation System (Jan-June 1993)	Kerr-McGee	Kerr-McGee
September-93	GW Interception System Evaluation Report	Kerr-McGee	Kerr-McGee
October-93	HW Storage Unit SWMU-KMCC-005 Sodium Chlorate Filter Cake Drying Area	Kerr-McGee	Kleinfelder
November-93	Revised Sampling and Analysis Plan	Kerr-McGee	Kerr-McGee
August-94	Phase II LOU Between NDEP and KMCC	Kerr-McGee	NDEP
January-95	Semi-Annual Performance Report - Cr Mitigation System (July-Dec 1994)	Kerr-McGee	Kerr-McGee
July-95	Semi-Annual Performance Report - Cr Mitigation System (Jan-June 1995)	Kerr-McGee	Kerr-McGee
January-96	Semi-Annual Performance Report - Cr Mitigation System (July-Dec 1995)	Kerr-McGee	Kerr-McGee
May-96	Response to LOU	Kerr-McGee	Kerr-McGee
July-96	Semi-Annual Performance Report - Cr Mitigation System (Jan-June 1996)	Kerr-McGee	Kerr-McGee
October-96	KMCC Phase II Written Response to LOU	Kerr-McGee	Kerr-McGee
October-96	Phase II Work Plan and Health and Safety Plan	Kerr-McGee	Kerr-McGee
November-96	KMCC Phase II Written Response to LOU - Additions	Kerr-McGee	Kerr-McGee
January-97	Semi-Annual Performance Report - Cr Mitigation System (July-Dec 1996)	Kerr-McGee	Kerr-McGee
July-97	Semi-Annual Performance Report - Cr Mitigation System (Jan-June 1997)	Kerr-McGee	Kerr-McGee
August-97	Phase II Environmental Conditions Assessment	Kerr-McGee	ENSR
September-97	Perchlorates in Water: a position paper to furnish supplemental information on identifying and treating the contaminant	Kerr-McGee	Environmental Modeling Consultants Corp.
November-97	Chromium Mitigation Program Performance Report	Kerr-McGee	Kerr-McGee
January-98	Semi-Annual Performance Report - Cr Mitigation System (July-Dec 1997)	Kerr-McGee	Kerr-McGee
July-98	Phase II GW Perchlorate Investigation Report	Kerr-McGee	Kerr-McGee
July-98	Semi-Annual Performance Report - Cr Mitigation System (Jan-June 1998)	Kerr-McGee	Kerr-McGee
August-98	Pittman Lateral Characterization Work Plan	Kerr-McGee	Kerr-McGee
January-99	Semi-Annual Performance Report - Cr Mitigation System (July-Dec 1998)	Kerr-McGee	Kerr-McGee
July-99	Semi-Annual Performance Report - Cr Mitigation System (Jan-June 1999)	Kerr-McGee	Kerr-McGee
September-99	Work Plan for the Long-Term GW Perchlorate Removal Action	Kerr-McGee	ENSR
January-00	Semi-Annual Performance Report - Cr Mitigation System (July-Dec 1999)	Kerr-McGee	Kerr-McGee
March-00	Las Vegas Wash Seep Characterization Plan	Kerr-McGee	Kerr-McGee
July-00	Semi-Annual Performance Report - Cr Mitigation System (Jan-June 2000)	Kerr-McGee	Kerr-McGee
January-01	Seep Area GW Characterization Report	Kerr-McGee	Kerr-McGee
January-01	Semi-Annual Performance Report - Cr Mitigation System (July-Dec 2000)	Kerr-McGee	Kerr-McGee
	Semi-Annual Performance Report - Cr Mitigation System (Jan-June 2001)	Kerr-McGee	Kerr-McGee
	Semi-Annual Performance Report - Cr Mitigation System (July-Dec 2001)	Kerr-McGee	Kerr-McGee

Date	Title	Site	Author
April-02	NPDES Permit NV0023060 Las Vegas Wash Tracer Study	Kerr-McGee	NDEP
	Semi-Annual Performance Report - Cr Mitigation System (Jan-June 2002)	Kerr-McGee	Kerr-McGee
	Semi-Annual Performance Report - Cr Mitigation System (July-Dec 2002)	Kerr-McGee	Kerr-McGee
April-03	Supplemental Phase II Report - ECA	Kerr-McGee	Kerr-McGee
	Semi-Annual Performance Report - Cr Mitigation System (Jan-July 2003)	Kerr-McGee	Kerr-McGee
April-93	Phase I ECA for Former Montrose Chemical Corporation Facility	Montrose	Converse Environmental Consultants, Southwest, Inc.
September-96	Revised Montrose Environmental Conditions Investigation Project Workplan	Montrose	Secor
December-96	Environmental Conditions Investigation Project Workplan Former Montrose Facility	Montrose	Secor
April-97	Draft Supplemental Environmental Conditions Investigation Project Workplan Former Montrose Facility	Montrose	Secor
August-97	Draft Phase II Environmental Conditions Investigation Report Former Montrose Facility	Montrose	Secor
September-97	Amended Closure/Post-closure Plan Henderson Facility Ponds #2 and #5	Montrose	Montrose
May-98	October 1997, Bi-Annual Analytical Results Report	Montrose	Converse Consultants
November-99	Results of Sampling and Aerial Photograph Review of Area South and East of Former Montrose Lease Holdings	Montrose	Secor
February-00	Additional GW Investigation Report	Montrose	Secor
February-00	CSM Closed Montrose Ponds	Montrose	Secor
March-02	Revised Report of the Investigation of Deeper Water Bearing Zones at the Closed Ponds and Former Plant Site	Montrose	Secor
February-03	October 2002, Bi-Annual Analytical Results Report	Montrose	Converse Consultants
June-01	Interim final Scientific and Technical Report for Perchlorate Biotransport Investigation	Perchlorate	Air Force IERA
July-02	External Review Draft Scientific and Technical Report for Development of Freshwater Aquatic Life Criteria for Perchlorate	Perchlorate	Air Force IERA
August-02	Technical/Regulatory Guidelines - a systematic approach to in-situ bioremediation in GW including: decision trees on in-situ bioremediation for nitrates, carbon tetrachloride and perchlorate	Perchlorate	ITRC
March-03	Final Report - The Fate and Transport of Perchlorate in a Contaminated Site in the LV Valley	Perchlorate	UNLV
June-03	Perchlorate Monitoring Results - Henderson, NV to the Lower Colorado River	Perchlorate	US EPA
August-03	DRAFT LV Wash Initial Perchlorate Investigation	Perchlorate	McGinley and Associates
various	File Folder - Correspondence	Perchlorate	various
various	File Folder - Email	Perchlorate	various
various	File Folder - News	Perchlorate	various
various	File Folder - sample data	Perchlorate	various
various	File Folder - toxicology information and studies Volume II	Perchlorate	various



Date	Title	Site	Author
May-98	Hydrogeologic Investigation of Perchlorate in GW	Perchlorate - Ampac	Broadbent & Assoc.
November-98	GW Depth and Elevation Data	Perchlorate - Ampac	GES
March-99	Former PEPCON Plant Quarterly GW Monitoring 1st Quarter 1999 - February 1999	Perchlorate - Ampac	GES
March-99	History of Water Wells	Perchlorate - Ampac	Ampac
April-99	GW Elevation Contour Map	Perchlorate - Ampac	GES
April-99	Hydrogeologic Investigation	Perchlorate - Ampac	Kleinfelder
June-99	Former PEPCON Plant Quarterly GW Monitoring 2nd Quarter 1999 - May 1999	Perchlorate - Ampac	GES
September-99	Former PEPCON Plant Quarterly GW Monitoring August 1999	Perchlorate - Ampac	GES
September-99	Former PEPCON Plant Quarterly GW Monitoring December 1999/January 2000	Perchlorate - Ampac	GES
January-00	Supplemental Hydrogeologic Investigation	Perchlorate - Ampac	Kleinfelder
January-00	Analytical Results for Wells near the former Pepcon Plant	Perchlorate - Ampac	Ampac
February-00	Former Pepcon Plant GW - Well MW-D2	Perchlorate - Ampac	Ampac
June-00	Former PEPCON Plant Quarterly GW Monitoring June 2000	Perchlorate - Ampac	GES
December-00	Former PEPCON Plant Quarterly GW Monitoring June 2000	Perchlorate - Ampac	GES
January-01	Supplemental Results of MW-D2D	Perchlorate - Ampac	GES
February-01	In-Situ Bioremediation Treatability Studies for Perchlorate Impacted GW	Perchlorate - Ampac	GeoSyntec Consultants
May-01	Former PEPCON Plant Quarterly GW Monitoring March 2001	Perchlorate - Ampac	GES
August-01	Former PEPCON Plant Quarterly GW Monitoring July/August 2001	Perchlorate - Ampac	GES
October-01	GW Modeling Results	Perchlorate - Ampac	Kleinfelder
December-01	Former PEPCON Plant Quarterly GW Monitoring November 2001	Perchlorate - Ampac	GES
February-02	Workplan for a Pilot Test of ISB of Perchlorate in GW	Perchlorate - Ampac	GeoSyntec Consultants
April-02	Progress on a pilot test of ISB of perchlorate in GW...; Sampling and Data Collection for MW in Henderson; LV Wash Sampling	Perchlorate - Ampac	Ampac
June-02	Former PEPCON Plant GW Monitoring May 2002	Perchlorate - Ampac	GES
September-02	Rebuttal to KMCC....	Perchlorate - Ampac	Ampac
May-03	Report on the pilot test for ISB of perchlorate impacted GW in the vicinity of the former PEPCON facility	Perchlorate - Ampac	Ampac
June-03	Former PEPCON Plant GW Monitoring Spring 2003	Perchlorate - Ampac	GES
June-03	Rebuttal to KMCC and Description of Plans to Remediate Certain GW that Contains Perchlorate....	Perchlorate - Ampac	Ampac
July-98	Phase II GW Perchlorate Investigation Report	Perchlorate - KMCC	KMCC
October-98	Preliminary Report on a Hydrogeologic Investigation of Channel Fill Alluvium at the Pittman Lateral	Perchlorate - KMCC	KMCC
February-99	Perchlorate design assessment for remedial action	Perchlorate - KMCC	KMCC
January-01	Seep Area GW Characterization Report	Perchlorate - KMCC	KMCC
	Seep Area GW Capture	Perchlorate - KMCC	KMCC
	Authority to Construct Application	Perchlorate - KMCC	KMCC

Date	Title	Site	Author
[REDACTED]	Perchlorate Remediation - Monthly Progress Report	Perchlorate - KMCC	KMCC
[REDACTED]	Perchlorate Remediation - Monthly Progress Report	Perchlorate - KMCC	KMCC
[REDACTED]	Perchlorate Remediation - Monthly Progress Report	Perchlorate - KMCC	KMCC
[REDACTED]	ISEP Operation	Perchlorate - KMCC	KMCC
[REDACTED]	LV Wash Tracer Study	Perchlorate - KMCC	KMCC
[REDACTED]	Perchlorate Remediation - 2nd Quarter 2002 Performance Report	Perchlorate - KMCC	KMCC
[REDACTED]	clarification of perchlorate plume locations in the E/2 sec. 11 and W/2 sec 12, T22S, R62E	Perchlorate - KMCC	KMCC
[REDACTED]	Temporary Discharge Permit Application	Perchlorate - KMCC	KMCC
[REDACTED]	Test Reports from Calgon	Perchlorate - KMCC	KMCC
[REDACTED]	Perchlorate Remediation - 4th Quarter 2002 Performance Report	Perchlorate - KMCC	KMCC
[REDACTED]	Seep Well field GW Capture Report on New Wells	Perchlorate - KMCC	KMCC
March-03	Submission of Information by KMCC in 2001 and 2002 Relating to Certain Hydrogeological Depictions of Perchlorate Concentrations in the GW	Perchlorate - KMCC	KMCC
[REDACTED]	Letter Report to EPA	Perchlorate - KMCC	KMCC
[REDACTED]	Perchlorate Remediation - First Quarter 2003 Performance Report	Perchlorate - KMCC	KMCC
[REDACTED]	Lithology logs and well completion forms	Perchlorate - KMCC	KMCC
[REDACTED]	Perchlorate Remediation - 2nd Quarter 2003 Performance Report	Perchlorate - KMCC	KMCC
[REDACTED]	Temporary Discharge Permit Application	Perchlorate - KMCC	KMCC
[REDACTED]	KMCC DMRs for Permit # NV0023060 - July 2001 - June 2003	Perchlorate - KMCC	KMCC
[REDACTED]	KMCC DMRs for Permit # NV0023060 - July 2003 - ?	Perchlorate - KMCC	KMCC
[REDACTED]	KMCC UIC Reports for Permit # NEV94218 - July 2001 - June 2002	Perchlorate - KMCC	KMCC
[REDACTED]	KMCC UIC Reports for Permit # NEV94218 - July 2002 - June 2003	Perchlorate - KMCC	KMCC
March-83	1982 Hydrogeologic Investigation in Support of the GW Intercept System at Stauffer Chemical Company	Stauffer	Stauffer Chemical Company
April-83	Program Management Assistance for Review of a GW Quality Assesment Program	Stauffer	ERTEC
September-87	TES IV Work Assignment #419 RCRA Facility Assesment	Stauffer	Jacobs Engineering
October-96	Environmental Conditions Investigation Workplan SMC/PCA Environmental Conditions Investigation	Stauffer-Pioneer	Harding Lawson Assoc.
February-97	Work Plan Response to NDEP's Approval with Comments	Stauffer-Pioneer	Stauffer Management Company
August-97	Response to LOU Information Request	Stauffer-Pioneer	Stauffer Management Company Pioneer Chlor Alkali Company, Inc.
November-97	Eight Month Information Report Environmental Conditions Investigation	Stauffer-Pioneer	Harding Lawson Assoc.
August-98	GW Treatment System Evaluation	Stauffer-Pioneer	Harding Lawson Assoc.
November-98	Former Agricultural Chemical Division Plant Remedial Alternatives Study Work Plan Pioneer Chlor Alkali Plant	Stauffer-Pioneer	Harding Lawson Assoc.
November-98	Former Lindane Plant Remedial Alternatives Study Work Plan Pioneer Chlor Alkali Plant	Stauffer-Pioneer	Harding Lawson Assoc.

May

March-03

Date	Title	Site	Author
November-99	Remedial Alternatives Study Former Agricultural Chemical Div Plant	Stauffer-Pioneer	Harding Lawson Assoc.
December-99	Work Plan; Additional Characterization; Former Lindane Plant	Stauffer-Pioneer	Harding Lawson Assoc.
September-99	Site Conceptual Model Stauffer/Pioneer/Montrose Site	Stauffer-Pioneer-Montrose	Harding Lawson Assoc.
June-83	Geology/Hydrogeology Evaluation	TiMet	Kleinfelder
September-85	Report on Moisture Penetration of Soils	TiMet	TiMet
April-93	Final Report of Phase I Environmental Conditions Assesment	TiMet	Law Engineering Inc.
April-93	Response to NDEP Submittal	TiMet	TiMet
June-96	Initial Information Submission Pursuant to the Letter of Understanding dated August 16, 1994 between NDEP and Titanium Metals Corporation	TiMet	Hydro-Search Inc.
November-96	Response to NDEP Final Comments Dated 10/3/96	TiMet	Hydro-Search Inc.
March-97	Project Workplan Titanium Metals Corp. Facility	TiMet	Tetra Tech EM Inc.
February-98	Draft Environmental Conditions Investigation Report Titanium Metals Corp. Facility	TiMet	Tetra Tech EM Inc.
April-98	Bldg P-1 Diesel UST Reg. And Closure	TiMet	Tetra Tech EM Inc.
October-98	Final Environmental Conditions Investigation Report; Environmental Conditions Investigation Workplan Addendum; Draft Environmental Conditions Investigation Report	TiMet	Tetra Tech EM Inc.
April-99	Environmental Conditions Investigation Addendum Radionuclides Background Study Report	TiMet	Tetra Tech EM Inc.
September-99	Environmental Conditions Investigation Addendum Draft Report	TiMet	Tetra Tech EM Inc.
March-00	ECI Addendum Revised Rad Background Report	TiMet	Tetra Tech EM Inc.
July-00	ZDP Application	TiMet	Golder Associates

**Notes:**

ACM = Asbestos Containing Material  
AmPac = American Pacific Corporation  
BMI = Basic Magnesium Inc.  
ECA = Environmental Conditions Assesment (Phase II)  
ECI = Environmental Conditions Investigation (Phase I)  
GW = Groundwater  
ISB= In-Situ Bioremediation  
LOU = Letter of Understanding  
LV= Las Vegas  
NDEP = Nevada Department of Environmental Protection  
TiMet = Titanium Metals Corporation  
UST= Underground Storage Tank

## Meeting Minutes

Project: KMCC - Perchlorate  
Location: KMCC  
Time and Date: 10:30 AM, Tuesday, September 16, 2003  
Meeting Number: ---  
In Attendance: see attached list

1. Introduction of parties.
2. An agenda was distributed (attached).
3. Reviewed current status of remediation project.
  - a. Perchlorate capture is occurring at the on-site collection wells, the Athens Road well field, and the Seep Area well field.
  - b. Perchlorate remediation occurs at the on-site IX system and the Wash IX system.
  - c. These ion-exchange systems are going to be replaced by a biological treatment plant with a peak capacity of 1,000 gpm. This plant will be constructed and operated by U.S. Filter. Engineering and procurement is approximately 50% complete.
  - d. Reviewed construction schedule.
    - i. Mechanical completion by December 2003.
    - ii. Performance demonstration by March or April 2004.
    - iii. 100% complete by April 18, 2004.
  - e. Reviewed construction design details.
    - i. This system is a fluidized bed reactor. The system is two stages due to the high influent concentration.
    - ii. Effluent is projected to be ND (20 ppb).
    - iii. Denatured alcohol will be added to the process to facilitate destruction of perchlorate.
    - iv. Approximately 2 tons of biomass will be removed per day. This will be landfilled.
  - f. KMCC noted that they are not currently requesting a permit modification. They want to get the system up and running before a permit modification is requested.
4. Questions and comments period.
  - a. It was noted that NDEP had not received the stamped engineering plans until yesterday and that they have not been reviewed yet. Also, no specifications have been received. KMCC does not currently have approval to construct. This issue to be discussed after the meeting.
  - b. Where will the biomass be landfilled? Currently, it is anticipated that the biomass will be shipped to the Apex facility. This can not be finalized until the waste has been characterized.

- c. What is the source of the bacteria and has the seed culture been analyzed for pathogens? Currently, this is unknown. The bacteria will be a food-grade quality. It is not anticipated that pathogens will be an issue.
  - d. What is the impact to the construction schedule if a filter is required to be added? KMCC noted that the impacts would be significant.
  - e. Will the existing IX system be run concurrently with the new fluidized bed reactor? It is anticipated that the existing IX system will be run concurrently. The IX system will be phased out as the new system is able to remediate the full load.
  - f. Will the water from the chromium treatment plant be tied directly into the fluidized bed reactor (FBR) system? Eventually. It was also noted that the on-site pond GW-11 is at 80% capacity. Over time this water will be drained off and put through the new system. Eventually pond GW-11 will be used as an equalization chamber for the influent to the FBR.
  - g. It was noted that the process will destroy dissolved oxygen, nitrate, chlorate, then perchlorate.
  - h. Has KMCC considered temperature limitations on the system? Yes. The warmer weather will actually be more of a concern than the cooler weather. Fresh water may need to be added in the warmer months to cool the system down.
  - i. KMCC noted that it is planned to add another well (MW-IZ) on the east side of the intercept line.
  - j. What is the TDS of the effluent? It can be as high as 12,000 ppm but averages 10,000 ppm. This high TDS level affects the detection limit for perchlorate.
5. Discussed NPDES and Temporary Permits.
- a. NDEP noted that the existing NPDES permit may not cover this biological treatment process. In any case the permit will need to be modified to reflect the revised flow rates.
  - b. NDEP noted that the effluent limitations will also need to be revised to a more stringent perchlorate concentration.
  - c. KMCC noted their concerns about not being able to attain permit limitations during start up. NDEP recognizes this and will work with KMCC on this issue.
  - d. SNWA noted that they have observed average concentrations lower at the seep area than in the Wash. It is believed that this is representative of flushing of the Wash gravels.
  - e. NDEP noted that weekly sampling is now occurring at the Northshore Road location. This weekly sampling is typically a duplicate between MWD and KMCC. Once a month it is a triplicate between NDEP, KMCC and MWD.
6. 2003 Plume Maps distributed and discussed.
- a. NDEP noted that it is important that KMCC find a way to demonstrate 95% capture at the Athens Road well field. This is critical for accurate modeling.

- b. KMCC will have the existing model re-run by ENSR with the latest results.
  - c. KMCC to also revise potentiometric surface maps to more accurately reflect the cones of depression at Athens Road.
  - d. It was noted that mapping was not coordinated with Ampac.
7. Discussed Monitoring Data and Reporting
- a. USEPA will be distributing its "Comprehensive Perchlorate Monitoring Report". Eventually this document will be distributed to a wider audience as some parties do not seem to be getting the most current information.
  - b. A mass loading graph was distributed (for data through 8/03). NDEP discussed results since 8/03.
  - c. SNWA noted that dewatering has begun at the Rainbow Gardens erosion control structure. Current dewatering activities have a perchlorate concentration of 300 ppb (which is basically just Wash water).
  - d. USEPA noted that approximately 1,000 tons have been removed thus far. What does this equate to? KMCC noted that this is equal to a single space shuttle launch or 4,000 barrels of product. KMCC could provide other analogies such as millions of gallons of groundwater remediated.
  - e. It was noted that the MWD perchlorate model can be expected sometime after 10/1/03.
  - f. NDEP reviewed the latest submittal for the BRC GW Characterization Plan.
    - i. Reviewed the drilling methods to be used, number of wells to be installed, etc.
    - ii. It was noted that this effort will address some of the data gaps identified in the Hackenberry study.
  - g. NDEP noted that Ampac has completed its latest drilling efforts and NDEP will be meeting with them soon.
8. Discussed Seep Area Well Shut Off Criteria
- a. KMCC noted that there are some problems maintaining the IX system in its current configuration. As the concentration decreases, the efficiency of the system decreases and the costs increase.
  - b. Eventually the % removal outlined in the NPDES permit will be impossible to meet.
9. Discussed the DOD lawsuit status. Currently, this is still in the discovery mode.
10. Discussed other issues.
- a. NDEP reviewed the Parker, Arizona meeting with the tribes.
    - i. Attendees included: NDEP, attorneys, consultants, NRDC, EWG, CRC.
    - ii. It was noted that a number of the parties did not have current information on the perchlorate project.
  - b. Discussed the status of the Federal MCL.
    - i. Projected MCL by 2007.

ii. California public health goal is expected by 11/03. Economic analysis is on-going. Target date for an MCL is January 2004. It will take an additional 12 months to codify this.

11. Interested parties had a site tour of the new FBR facility.

**Todd Croft**

---

**From:** Brian Rakvica  
**Sent:** Thursday, September 25, 2003 8:40 AM  
**To:** Brian Rakvica; Todd Croft; Jim Najima; Terre Maize; Jon Palm; Nadir Sous; Mark Kaminski  
**Subject:** RE: 9/16/03 Perchlorate Mtg Minutes

Attached are revised mtg minutes with the DRAFT removed.

-----Original Message-----

**From:** Brian Rakvica  
**Sent:** Wednesday, September 24, 2003 6:27 AM  
**To:** Todd Croft; Jim Najima; Terre Maize; Jon Palm; Nadir Sous; Mark Kaminski  
**Subject:** 9/16/03 Perchlorate Mtg Minutes

All,

Attached are the finalized meeting minutes from our meeting with KMCC on 9/16/03.

Brian

Brian A. Rakvica, P.E.  
Nevada Division of Environmental Protection  
Bureau of Corrective Actions  
Las Vegas, Nevada  
tele: (702) 486-2870  
fax: (702) 486-2863  
brakvica@ndep.nv.gov



## MEMORANDUM TO FILE

**TO:** KMCC File

**FROM:** Brian A. Rakvica

**DATE:** September 10, 2003

**CC:**

**RE:** Meeting with Susan Crowley of KMCC

1. Met at the KMCC Administration Building at 8:00 AM.
2. Susan provided a general overview of the site and the project development. There is an April 2001 Supplemental Phase II ECA that Brian does not have a complete copy of. Susan to provide a copy to Brian.
3. Discussed documents that still require NDEP action.
  - a. Review of April 2001 Supplemental Phase II ECA
  - b. Update and re-issuance of the Chromium Mitigation Consent Agreement.
  - c. Update and re-issuance of the UIC Permit.
  - d. Possible review of the Vern Vohls Lease Area Phase I ECI. Susan was not sure on this one.
4. Noted that Susan has been submitting documents to Vern. Susan needs notification that documents should be sent to Jon Palm.
5. Discussed the monitoring of GW in the vicinity of the hazardous waste landfill (post-closure requirement). Susan noted that this information has been going to BWPC. Brian to get information from BWPC. Susan noted that a summary document for the GW monitoring in the vicinity of the landfill was submitted to Vern in 2001 or 2002. Brian needs to get a copy of this as well.
6. Brian reminded Susan about the quarterly progress reporting requirements. Susan will start doing this again. Perhaps she will combine this with her quarterly reporting for the perchlorate project. Susan to review with counsel.
7. Susan knows of no outstanding issue with regard to their ZDP.
8. Susan believes there are very few LOU areas that still require action. Brian noted that it is important that NDEP and KMCC are on the same page with this. If KMCC believes that a LOU area has attained No Further Action (NFA) status, NDEP must also concur and issue a written acknowledgement of this. Brian stated that it might be worthwhile for Susan to review her file and verify that all the areas that she believes are NFA have been acknowledged by NDEP.
9. Discussed the Chromium Mitigation Consent Agreement.
  - a. Brian explained that this agreement and the corresponding UIC permit are out of date and do not match the Federal MCL for total chromium of 0.1 ppm.

- b. Susan explained that since they are discharging to an on-site pond this is not an issue. Brian responded that it would become an issue once they begin to discharge from the pond or decide to start using the UIC system again.
  - c. Susan stated that BWPC indicated that they did not want to renew the UIC permit until the federal MCL for perchlorate was developed. Brian to follow up with BWPC.
  - d. Susan also stated that the Consent Agreement was developed by Cathy Poole with BWPC and the justification for the limitations on the chromium were developed by her.
10. Brian and Susan had a brief tour of the site.
- a. The only active process currently is the boron trichloride production process. The manganese dioxide process is on furlough until at least January 2004.
  - b. Susan noted that the processes are currently for sale and there are several interested buyers including the American Pacific Corporation.
  - c. Construction is on going by US filter for the ex-situ bioremediation project. Parts of the site have been fenced and turned over to US Filter.

**Todd Croft**

---

**From:** Crowley, Susan [SCROWLEY@KMG.com]  
**Sent:** Monday, September 08, 2003 8:16 AM  
**To:** Todd Croft  
**Cc:** Bailey, Keith; Stater, Rick; Corbett, Pat; Ganus, Bill; Krish, Ed; Reed, Thomas; Kaplan.Mitch@epamail.epa.gov; Bowerman.Larry@epamail.epa.gov; Salas, Carlos; Cheung, Mary; Boles, Roger  
**Subject:** Perchlorate Removed from the Environment - August 2003

Todd,

Below are the pounds perchlorate removed from the environment over the life of the perchlorate remediation project, with some specific estimated amounts from August 2003. Please keep in mind that information provided for August will be estimated based upon analytical received through the first week in August. The information provided through July 2003 (and previous months) has been confirmed and the totals adjusted as needed.

**From the Seep Area (groundwater and surface water combined): 259.80 tons total.** This includes both surface water capture from initiation of the project plus seep area groundwater extraction since 3-5-02. To determine the August total estimate, the confirmed information **through July 2003 (251.09 tons)** was increased by the **estimated amount for August 2003 (17,415 lbs - 17,415 lbs from wells and <1 lb from the surface flow)**. The estimate for August will be confirmed as the September information is passed to you next month.

**Seep area groundwater collected prior to 3-5-02: 13.22 tons total** (some of which went to the GW-11 pond the remaining treated in the wash IX).

**On-site groundwater well collection field: 563.08 tons total.** To determine the August total, the confirmed information **through July 2003 (548.80 tons)** was increased by the **amount for August 2003 (28,562 lbs)**. August's activity amounted to a under over 1,000 lbs / day. Perchlorate removal in this area continues to be a very effective - primarily because of it's vicinity to the source.

**Athens Rd area groundwater well collection field: 155.01 tons total.** To determine the August total estimate, the confirmed information **through July 2003 (143.00 tons)** was increased by the **estimated amount for August 2003 (24,030 lbs)**. The estimate for August will be confirmed as the September information is passed to you next month. August's activity equates to an estimated removal rate of a little under 1,000 lbs / day.

**Total removed as of 8-31-03: 991.11 tons total** (This number includes confirmed information through July 2003 and estimated information for August 2003)

Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, NV 89009  
(702) 651-2234 office  
(702) 592-7727 cell  
(702) 651-2310 fax

*If you are not the intended recipient of this e-mail message, any use, distribution or copying of the message is prohibited. Please let me know by return e-mail if you*

9/8/2003



**KERR-McGEE CORPORATION**

KERR-McGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73103

2003 SEP -5 PM 3: 01

September 2, 2003

SAFETY & ENVIRONMENTAL AFFAIRS DIVISION

Todd Croft  
Supervisor  
Nevada Division of Environmental Protection  
1771 East Flamingo, Suite 121-A  
Las Vegas, NV 89119

Dear Mr. Croft:

We welcome Jeff Gibson's fresh insights and unique interpretations of the available hydrogeologic data from the Henderson area. However, since our interpretation is quite different from Mr. Gibson's, we and Mr. Gibson will have to agree to disagree on these issues.

If I can be of any further assistance please don't hesitate to call.

Sincerely,

A handwritten signature in cursive script that reads "Edward J. Krish".

Edward J. Krish  
Senior Geologist

cc: Doug Zimmerman  
Mitch Kaplan  
Larry Bowerman  
Marshall Davis  
Terre Maize  
Pat Mulroy  
Brenda Pohlmann  
Greg Walch  
Barry Conaty  
T. L. Cubbage  
Pat Corbett  
Susan Crowley  
Jeff Gibson

**KERR-McGEE CHEMICAL LLC**

POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

August 29, 2003

Mr. John Palm  
Nevada Division of Environmental Protection  
Bureau of Water Pollution Control  
333 West Nye Lane  
Carson City, NV 89706-0851

**RECEIVED**

SEP 04 2003

ENVIRONMENTAL PROTECTION

Dear Mr. Palm:

Subject: Temporary Discharge Permit Application

Kerr-McGee Chemical LLC (Kerr-McGee) has on-going perchlorate remedial efforts in the Henderson, Nevada region. Related to those efforts, Kerr-McGee is seeking a temporary discharge volume increase, above the existing NPDES Permit NV 0023060 allowance for discharge of water treated for perchlorate reduction (please see Attachment 1). Kerr-McGee has committed to increasing the volume of seep area water collected for the perchlorate remedial efforts, to fill out the ion exchange treatment capacity, up to 1100 gpm (please see Attachment 2). In discussion with your office, it was determined that because this was expected to be a temporary need, the route of a temporary discharge permit, to make up the difference between the NPDES permit limit of 847 gpm and the committed 1100 gpm, was appropriate. Granting by Nevada Division of Environmental Protection (NDEP) of this temporary discharge permit for the period September 5, 2003 to March, 2004 will allow Kerr-McGee to treat and then discharge up to 1100 gpm and fully utilize the current treatment capacity.

As NDEP reviews this application, Kerr-McGee has provided additional information related to several topics which have been discussed.

- Attachment 3 provides an analytical summary associated with those constituents, which during the NPDES permit development process warranted attention and in compliance with the NPDES permit Kerr-McGee has been sampling for in the Las Vegas Wash. These are: TDS, boron, chromium, copper, iron, manganese, molybdenum, chloride and fluoride. In this analytical summary, it can be seen that the constituents' concentrations are not consistently higher or lower downgradient from the Kerr-McGee NPDES permit outfall, when compared to upgradient concentrations ("LVW Upgradient" is upgradient of the outfall - "LVW 6.05" is the first downgradient sampling point related to the outfall). As required in the NPDES permit, Kerr-McGee will continue to monitor these constituents to evaluate the increased discharge volume impact on the Las Vegas Wash.
- Attachment 4 provides an analytical summary of a constituent suite for the influent and effluent of the ion exchange process located close to the Las Vegas Wash. Included in this summary is information relating to various types of analytes, including organics. Reviewing the analytical

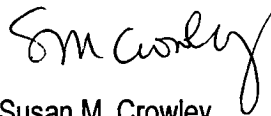
John Palm  
August 29 2003  
Page 2

results, it can be seen that not many organic compound are detected. Those few detected are in the sub ppb concentration. Accordingly, Kerr-McGee does not believe that the delay associated with integrating activated granulated carbon treatment into the processing of the additional collected water would be justified.

Considering the relatively rapid horizontal movement of groundwater in the seep area (where the additional treated water will be drawn) and the proximity of the seep area to the Las Vegas Wash, it is expected that the non-perchlorate constituents listed in both Attachments 3 and 4 would reach the Las Vegas Wash within several days, regardless of the collection of this groundwater for treatment. Because of this, it is not expected that collection of this additional volume for perchlorate treatment with subsequent discharge will place significant additional loads on the Wash.

It is Kerr-McGee's intent to treat the addition committed volume under the authority of this permit in early September. As always, please feel free to call me at (702) 651-2234 if you have any questions of comments. Thank you.

Sincerely,



Susan M. Crowley  
Staff Environmental Specialist

EXPRESS MAIL SERVICE

ATTACHMENTS

cc: Brenda Pohlmann, City of Henderson  
Barry Conaty, City of Henderson  
Todd Croft, NDEP  
Doug Zimmerman, NDEP  
Marshall Davis, Metro Water District of Southern California  
Pat Mulroy, SNWA  
Mitch Kaplan, EPA Region IX

**Attachment 1**

**Application for  
Temporary Discharge  
Permit**



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# LIST OF REQUIREMENTS FOR TEMPORARY PERMIT APPLICATION

A temporary permit may be issued for a maximum of a 180 day (6 month) period of time, pursuant to NRS 445A.485, after which time the discharge shall cease or the discharger shall have applied for and received a Permanent Discharge Permit. A \$250.00 fee is due at the time of application.

## I. Owner Information

Name: Kerr-McGee Chemical LLC  
Address PO Box 55  
City Henderson County Clark  
State Nevada Zip Code 89009  
Telephone Number (702) 651-2200 Fax Number (702) 651-2310  
Contact Person Susan Crowley

## II. Facility/Site Information

Facility Name Kerr-McGee Chemical LLC  
Facility Address 8000 West Lake Mead Drive  
City Henderson County Clark  
State Nevada Zip Code 89015  
Telephone Number (702) 651-2200 Fax Number (702) 651-2310  
Contact Person Susan Crowley  
Latitude 36 deg, 5 min, 15 sec Longitude 114 deg, 59 min, 30 sec  
Township 215 Range 63e  
Section \_\_\_\_\_

III. Receiving Water Name Las Vegas Wash

If the discharge enters a separate storm water drainage or other system, please provide the following information:

- a. the name of the owner of the drainage
- b. The name of the receiving water into which the drainage system discharges; and
- c. A copy of the permit, license, or equivalent written approval granted by the owner of the system for such a discharge or connection to the system

IV. A narrative description of the site & activities which require the discharge permit. Describe any treatment system and/or Best Management Practices to be used at the facility.

V. Water Quality Analysis (must use a Nevada State Certified Lab) to include the potential contaminants/pollutants in the discharge.

VI. Quantity of discharge: Flow (gallons per day) 0.37 mgd - 30 day avg 0.42 mgd - 7 day avg

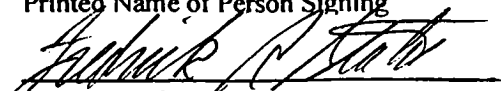
VII. Attach a topographic map and a site map showing the location of the potential discharge and a line drawing showing the general route taken by water in the facility from intake to discharge.

## VIII. Existing Environmental Permits

NPDES Permit (Discharges to Surface Water) NV0023060, NV0000078  
NEV Permit (Discharges to Ground Water) NEV20001516, NEV 20001515

IX. I certify that I am familiar with the information contained in the application and that to the best of my knowledge and belief such information is true, complete, and accurate.

Fredrick R. Stater  
Printed Name of Person Signing

  
Signature of Applicant

Plant Manager  
Title

Sept. 2, 2003  
Date Application Signed



## **Attachment 2**

### **Correspondence Between Kerr-McGee and Senator Feinstein**



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**KERR-McGEE CORPORATION**  
KERR-McGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

LUKE R. CORBETT  
CHAIRMAN AND  
CHIEF EXECUTIVE OFFICER

January 30, 2003

The Honorable Dianne Feinstein  
United States Senator  
Washington, DC 20510-0504

Dear Senator Feinstein:

Thank you for your letter of January 23, 2003. I am pleased members of your staff and a representative of the Metropolitan Water District were able to tour the Henderson facility and visit with Pat Corbett and Dr. John Gibbs regarding our activities at the site. I understand Kerr-McGee personnel have been in contact with your staff to clarify issues related to certain technical aspects of the work mentioned in your letter. George Christiansen, Kerr-McGee's Vice President of Safety & Environmental Affairs, and his staff will continue to keep James Peterson of your staff informed regarding our work at Henderson.

We remain committed to fulfilling our obligations at Henderson under the direction of the Nevada Department of Environmental Protection and in cooperation with Region 9 of the U.S. Environmental Protection Agency. As Dr. Gibbs discussed with your staff, much is known about perchlorate because physicians have used it for decades to treat thyroid disorders. Numerous peer reviewed human health studies indicate that perchlorate levels much higher than those found in the Colorado River are safe. It is critically important that the relevant regulatory agencies take care to ensure that any future drinking water standards reflect the sound scientific work that has been and is being conducted.

I am pleased to know you are committed to helping ensure the federal government meets its responsibilities with regard to the Henderson site. I have asked Pete Frank, Kerr-McGee Vice President of Public Affairs, to follow up with your Washington staff to determine whether we can be of assistance in your efforts to engage the federal government regarding its responsibility for the Henderson site.

Sincerely,

Luke R. Corbett  
Chairman and Chief Executive Officer

*Copies to:*

P. Woodward  
J. Reichenberger  
R. Waters  
J.T. Smith / P. Nickles (fax)

*GP  
1/30/03*

*Perchlorate -  
OEHHA*

DIANNE FEINSTEIN  
CALIFORNIA



COMMITTEE ON APPROPRIATIONS  
COMMITTEE ON ENERGY AND NATURAL RESOURCES  
COMMITTEE ON THE JUDICIARY  
COMMITTEE ON RULES AND ADMINISTRATION  
SELECT COMMITTEE ON INTELLIGENCE

## United States Senate

WASHINGTON, DC 20510-0504

<http://feinstein.senate.gov>

January 23, 2003

Mr. Luke R. Corbett  
Chairman and Chief Executive Officer  
Kerr-McGee Corporation  
Kerr-McGee Center  
P.O. Box 25861  
Oklahoma City, OK 73125

Dear Mr. Corbett:

Thank you for your response to my January 6 letter and for providing my staff the opportunity to visit your facility in Henderson, Nevada. I am pleased to know that you share my concerns over perchlorate contamination in the Colorado River and a genuine desire to see the cleanup effort progress as quickly as possible.

According to the information provided to my staff, I understand that Kerr-McGee has decided to install between three and six additional extraction wells in the area between Athens Road and the Las Vegas Wash. I also understand that this process should be completed in the next four to six weeks. While I know that it is difficult to predict the precise impact these additional wells will have on the reducing the flow of perchlorate, I believe this is an important step in the right direction. I commend you for making this decision and for your ongoing efforts to reduce the amount of perchlorate leaching into Lake Mead.

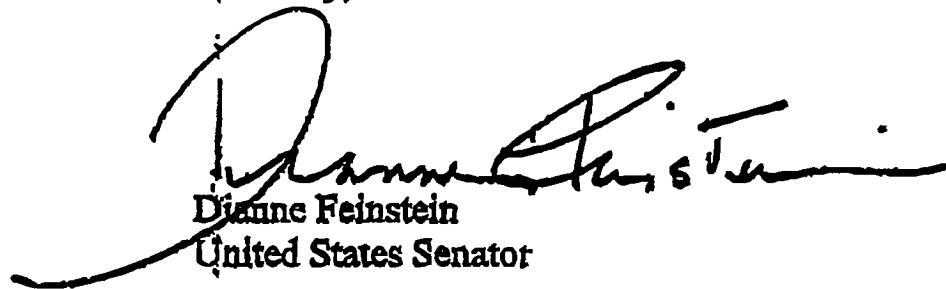
I hope that you will keep me informed about the results of your efforts as new perchlorate monitoring data becomes available. I am particularly interested in the benefits of the slurry wall at Athens Road, which was completed in November 2002. I understand that you will be able to evaluate the efficacy of the wall in May, approximately the same time that the Nevada

Environmental Protection completes a study of additional remediation opportunities in and adjacent to the wash gravel area. I would appreciate being informed of the findings of both of these efforts.

As you know, perchlorate contamination of drinking water supplies is a problem of growing concern nationwide. It is also an issue where I believe the federal government can and should play a leading role. Given that approximately 90% of all perchlorate manufactured in the U.S. was produced for the Department of Defense, I believe they bear a special responsibility to help remedy many of the contaminated sites around the country. I want you to know that I intend to pursue this matter further with the Secretary Rumsfeld and work with Senator Reid to insure that the DOD is meeting its responsibilities with regards to your Henderson facility as well as other perchlorate-related formerly used defense sites.

Thank you again for your cooperation on this matter. I look forward to hearing the results of your cleanup efforts and to working together to insure the safety of the drinking water supplies along the lower Colorado River.

Sincerely,



Dianne Feinstein  
United States Senator

cc: U.S. Senator Harry Reid

Thank you so much for taking  
such prompt & additional action.

02/04/2003 16:15 FAX 405 270 4.

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02/04/2003 16:56 FAX 405 270 3940

KERR-MCGEE

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02/04/2003 15:55 FAX 405 270 2226

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*Corbett, C... of P... W... P... H...*



**KERR-MCGEE CORPORATION**  
KERR-MCGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

LUKE R. CORBETT  
CHAIRMAN AND  
CHIEF EXECUTIVE OFFICER

January 9, 2003

The Honorable Dianne Feinstein  
United States Senator  
Washington, DC 20510-0504

Dear Senator Feinstein:

I received your letter this week, regarding perchlorate and water quality. Safety and environmental responsibility are top priorities at Kerr-McGee. We pride ourselves on being a responsible environmental steward and a good corporate citizen. The safety of our workers and neighbors is paramount, and we work hard to positively impact the communities where we live, work and play.

Upon receiving your letter, I asked George Christiansen, our vice president in charge of Safety and Environmental Affairs, to carefully review and consider your comments, provide a response to you, and arrange for your staff to visit the Henderson site. Mr. Christiansen's response is attached.

As you will see, Kerr-McGee stepped forward and started working with Region 9 of EPA and the Nevada Department of Environmental Protection (NDEP) as soon as perchlorate was found in Lake Mead. As a responsible corporate citizen, we are making every effort to do the right thing, and we are committed to continuing our cleanup efforts at Henderson under the direction of EPA and NDEP.

Mr. Christiansen has arranged for James Peterson and Guillermo Gonzalez of your staff, to tour the Henderson site next week. Two of our environmental experts will meet with Mr. Peterson and Mr. Gonzalez to brief them on the project, answer questions and discuss your comments.

We hope we can count on your help as we continue our work. We look forward to working with you and your staff and will keep you informed of our progress. Thank you for your suggestions.

Sincerely,

*Luke R. Corbett*  
Luke R. Corbett  
Chairman and Chief Executive Officer

Attachment

02/04/2003 TUE 16:43 [TX/RX NO 7421]

02/04/2003 TUE 16:06 [TX/RX NO 8353]



**KERR-MCGEE CO.**  
KERR-MCGEE CENTER • P.O. BOX 22881 • OKLAH

*To: Stephanie Smith*

*X4101*

GEORGE D. CHRISTIANSEN  
VICE PRESIDENT  
SAFETY & ENVIRONMENTAL AFFAIRS

January 9, 2003

The Honorable Dianne Feinstein  
United States Senator  
Washington, DC 20510-0504

Dear Senator Feinstein:

Mr. Corbett asked me to respond to your recent letter regarding perchlorate and water quality. We share your interest in protecting the environment and place top priority on environmental responsibility at all of our locations worldwide.

Consistent with our emphasis on environmental stewardship, we have worked with both Region 9 of EPA and the Nevada Department of Environmental Protection (NDEP) since perchlorate was detected in Lake Mead in 1997. Upon detection, and at our sole expense, we immediately began a thorough review of the groundwater conditions in the vicinity of the former Henderson production facility to identify remediation opportunities.

In 1999, again at our expense, we began treating surface water near the Las Vegas Wash using a state-of-the-art ion exchange system under the supervision of NDEP. In 2000, we began working on an innovative design for a new treatment facility. We then began treating groundwater in addition to surface water - approximately doubling the volume of water being treated. Our remediation strategy is to maximize capture and control of the groundwater. Through various remediation techniques, we have essentially obtained control of the groundwater at the plant site and at a second location between the site and the Las Vegas Wash (the Athens Road well field). As we remediate this site, we will continue to be responsive to the requests of EPA and NDEP.

As you know, the Henderson plant produced perchlorate for United States defense and space programs. The U.S. Navy oversaw the design and operations of the Henderson plant, and in fact, owned the site for more than 10 years. The U.S. government remained the end-user for nearly all of the perchlorate produced at the plant until operations were discontinued in 1998. Although the U.S. government therefore should be principally responsible for perchlorate found in groundwater affected by the plant, the U.S. government so far has refused to accept financial responsibility for the remediation work. We pride ourselves on doing the right thing and have not waited for the U.S. government to accept responsibility for its actions. We hope you will help ensure that the federal government steps forward to accept financial responsibility for the cleanup that we began more than three years ago.

Senator Dianne Feinstein  
Page 2

Regarding health effects, more is known about perchlorate than just about any other chemical of environmental concern because physicians have used perchlorate for over half a century to treat thyroid disorders. Numerous peer-reviewed and published human health studies suggest that perchlorate levels much higher than those found in the Colorado River are safe. We believe the best science should be used in establishing safe drinking water levels and continue to support studies to provide additional scientific data on this matter. Abstracts of recent peer reviewed and published human health studies, including those on children, are attached.

In your letter, you offer comments that are worthy of further discussion. We have scheduled a meeting and a tour with James Peterson and Guillermo Gonzalez of your staff. I understand that Mr. Peterson is inviting a representative of the Metropolitan Water District to join him. This past year, a delegation from the Metropolitan Water District toured our facility. We will continue to work under the direction of EPA and NDEP as we move forward.

We appreciate your interest in our efforts and your suggestions. We look forward to the opportunity to meet with your staff and to work with you in the future.

Sincerely,



George Christiansen  
Vice President  
Safety and Environmental Affairs

Attachment

02/04/2003 16:14 FAX 405 270 41  
JANU 02 09:04 AM '03  
KERR MCGEE CORPORATION  
SAN FRANCISCO, CA 94104

COMMITTEE ON APPROPRIATIONS  
COMMITTEE ON ENERGY AND NATURAL RESOURCES  
COMMITTEE ON THE JUDICIARY  
COMMITTEE ON RULES AND ADMINISTRATION  
SELECT COMMITTEE ON INTELLIGENCE

DIANNE FEINSTEIN  
CALIFORNIA

# United States Senate

WASHINGTON, DC 20510-0504  
<http://feinccoin.senate.gov>

January 6, 2003

Luke R. Corbett  
Chairman and Chief Executive Officer  
Kerr-McGee Corporation  
Kerr-McGee Center  
P.O. Box 25861  
Oklahoma City, Oklahoma 73125

Dear Mr. Corbett:

I am writing to express my deep concerns over the perchlorate contamination in the Colorado River caused by Kerr-McGee's perchlorate production facility near Henderson, Nevada and to seek your cooperation to accelerate your ongoing clean-up effort.

As you well know, Kerr-McGee's perchlorate spill poses a serious threat to drinking water supplies in Southern California, as well as Nevada and Arizona. I know that your company has made a significant effort to prevent further contamination of the Colorado River. However, I believe these efforts are not sufficient to prevent further damage to Southern California's drinking water supply and precious aquifers.

While I understand that Kerr-McGee has committed tens of millions of dollars to clean-up the Henderson facility, every day approximately 450 pounds of perchlorate continue to leech into Lake Mead and the Colorado River via the Las Vegas Wash. As a result, Colorado River water entering California now contains perchlorate at between 4 and 9 parts per billion. This contamination exceeds the safe drinking water standards now under consideration by California officials and poses a health threat to the 17 million water users in Southern California. Furthermore, several water agencies who rely on Colorado River water for recharge have recently

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**SAN DIEGO OFFICE:**  
720 B STREET  
SUITE 1020  
SAN DIEGO, CA 92101  
(619) 521-8712

**SAN FRANCISCO OFFICE:**  
ONE FINE STREET  
SUITE 2400  
SAN FRANCISCO, CA 94104  
(415) 398-0707



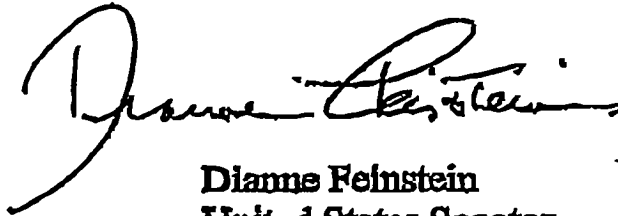
discovered perchlorate contamination in their aquifers, which stands to significantly increase the cost and duration of the clean-up effort.

To address perchlorate contamination from the Colorado River and local sources, I convened a roundtable meeting at the headquarters of the Metropolitan Water District on December 19, 2002. At that meeting, I was briefed on the scope and severity of the contamination from local, state, and federal officials. A number of suggestions were made regarding steps that Kerr-McGee could take to accelerate their clean-up efforts, including:

- Improving extraction of groundwater between Athens Road and the Las Vegas Wash by installing additional remediation wells;
- Extracting high concentration perchlorate contaminated groundwater in the Las Vegas Wash gravel area; and,
- Treating or containing all groundwater now using proven technology through direct ion exchange treatment and additional lined evaporation ponds to contain and concentrate groundwater prior to treatment.

I hope that you will strongly consider these suggestions and do all that you can to prevent further contamination. I appreciate your attention to this matter and would also appreciate hearing from you regarding what additional measures you plan to take to remedy this situation as soon as possible.

Sincerely,



Dianne Feinstein  
United States Senator

## **Attachment 3**

### **Analytical Summary for Las Vegas Wash Constituents**



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# Analyses Summary Report

Site Name: Henderson

8/29/2003 3:26:24 PM

Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	1/15/2003	1/15/2003	1/29/2003	1/29/2003	2/5/2003	2/5/2003
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2301160056	2301160055	2301300019	2301300018	2302060030	2302060029
	Sample Number	z	z	z	z	z	z
	Remarks						
	Superceded						

**Other**

Apparent Color	ACU	15 v	15 v	10 v	10 v	15 v	15 v
Total Dissolved Solids	mg/l	1750 v	1730 v	1860 v	2100 v	1670 v	1730 v

**Metals**

Boron	mg/l	0.5 ud	0.5 ud	0.89 vd	1 vd	0.69 v	0.75 v
Chromium	mg/l	0.003 v	0.0023 v	0.0026 v	0.0018 v	0.003 v	0.0019 v
Copper	mg/l	0.021 v	0.045 v	0.0058 v	0.0057 v	0.0043 v	0.0039 v
Iron	mg/l	1 ud	1 ud	1 ud	1 ud	0.5 ud	0.5 ud
Manganese	mg/l	0.049 v	0.043 v	0.061 v	0.078 v	0.047 v	0.046 v
Molybdenum	mg/l	0.023 v	0.019 v	0.023 v	0.023 v	0.024 v	0.022 v

**Inorganics**

Ammonia (as N)	mg/l	0.067 v	0.068 v	0.05 u	0.057 v	0.05 u	0.067 v
Chloride	mg/l	330 vd	330 vd	390 vd	410 vd	360 vd	360 vd
Fluoride	mg/l	1 v	1 v	1.1 v	1.3 v	1.1 v	1.1 v
Nitrate (as N)	mg/l	16 vd	17 vd	17 vd	20 vd	18 vd	18 vd
Nitrate/Nitrite	mg/l	16.1 v	17.1 v	18.5 v	21.6 v	19 v	19 v
Nitrite	mg/l	0.5 ud	0.5 ud	1.5 vd	1.5 vd	0.95 vd	0.98 vd
Perchlorate	ug/l	310 vd	83 vd	330 vd	210 vd	230 vd	140 vd

**Radiologic**

Gross Alpha	pCi/l	7.2 v	7.8 v	4.7 v	4 v	2.92 u	3.9 v
Ra-226 - soluble	pCi/l	0.3 u	0.4 u	0.3 u	0.7 v	0.4 u	0.4 u
Ra-228 - soluble	pCi/l	0.4 u	0.4 u	0.4 u	0.5 u	0.4 u	0.4 u

See analytical flag codes on last page.

# Analyses Summary Report

Site Name: Henderson

8/29/2003 3:26:24 PM

Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	2/19/2003	2/19/2003	3/5/2003	3/5/2003	3/19/2003	3/19/2003
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2302200049	2302200048	2303060021	2303060020	2303200029	2303200028
	Sample Number	z	z	z	z	z	z
	Remarks	Superceded					

**Other**

Apparent Color	ACU	15 v	15 v	15 v	15 v	15 v	15 v
Total Dissolved Solids	mg/l	1890 v	1940 v	1840 v	1930 v	1840 v	1810 v

**Metals**

Boron	mg/l	0.68 vd	0.73 vd	0.69 vd	0.76 vd	0.62 v	0.61 v
Chromium	mg/l	0.0025 v	0.0023 v	0.0019 v	0.0018 v	0.0045 v	0.0039 v
Copper	mg/l	0.0036 v	0.0037 v	0.0072 v	0.004 v	0.0065 v	0.0055 v
Iron	mg/l	0.5 ud	0.51 vd	0.5 ud	0.5 ud	0.41 v	0.36 v
Manganese	mg/l	0.075 v	0.075 v	0.053 v	0.053 v	0.059 v	0.052 v
Molybdenum	mg/l	0.021 v	0.021 v	0.022 v	0.022 v	0.02 v	0.02 v

**Inorganics**

Ammonia (as N)	mg/l	0.06 v	0.061 v	0.062 v	0.05 v	0.104 v	0.108 v
Chloride	mg/l	360 vd	360 vd	370 vd	360 vd	380 vd	340 vd
Fluoride	mg/l	1 v	1.1 v	0.97 v	1.1 v	0.96 v	1 v
Nitrate (as N)	mg/l	15 vd	16 vd	16 vd	17 vd	16 vd	17 vd
Nitrate/Nitrite	mg/l	16 v	17.1 v	17.5 v	18.6 v	16.9 v	17.9 v
Nitrite	mg/l	0.98 vd	1 vd	1.4 vd	1.5 vd	0.77 vd	0.78 vd
Perchlorate	ug/l	250 vd	4 u	170 vd	93 vd	210 vd	14 v

**Radiologic**

Gross Alpha	pCi/l	3.9 v	6.7 v	3.7 v	3.3 v	5.72 u	6.8 v
Ra-226 - soluble	pCi/l	0.2 u	0.3 u	0.2 v	0 u	0.2 u	0.2 u
Ra-228 - soluble	pCi/l	0.4 u	0.3 u	0 u	0 u	0.4 u	0.4 u

**Analytic Flag Codes:**

* Surrogate outside QC limits	a Not available	b Analyte detected in blank and sample
c Coelute	d Diluted	e Exceeds calibration range
f Calculated from higher dilution	g Concentration > value reported	i Insufficient sample
j Est. value; conc. < quan. limit	l Less than detection limit	m Matrix interference
n Not measured	p > 40% rpd between primary 1 deg and 2 deg column.	q Uncertain value
s Surrogate	t Trace amount	u Not detected
v Detected value	w Btwn CRDL/IDL	x Surrogate diluted but within QC limits
y Calculated Value	z Unknown	

**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	7/16/2001	7/16/2001	7/30/2001	7/30/2001	8/13/2001	8/13/2001
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2107170080	2107170079	2107310088	2107310087	2108140237	2108140236
	Sample Number			WASH 6.05 LW	WASH UP LW		
	Remarks						
	Superceded						
	<b>Other</b>						
Total Dissolved Solids	mg/l	1500 v	1490 v	1450 v	1440 v	1400 v	1410 v
	<b>Metals</b>						
Boron	mg/l	0.57 v	0.58 v	0.57 v	0.6 v	0.51 v	0.57 v
Chromium	mg/l	0.0012 v	0.0014 v	0.0021 v	0.0052 v	0.0014 v	0.0011 v
Copper	mg/l	0.0095 v	0.0058 v	0.0086 v	0.0094 v	0.0043 v	0.0023 v
Iron	mg/l	0.15 v	0.19 v	0.27 v	0.25 v	0.22 v	0.23 v
Manganese	mg/l	0.037 v	0.035 v	0.049 v	0.05 v	0.037 v	0.016 v
Molybdenum	mg/l	0.024 v	0.025 v	0.026 v	0.027 v	0.027 v	0.012 v
	<b>Inorganics</b>						
Chloride	mg/l	298 vd	293 vd	273 vd	275 vd	270 vd	270 vd
Fluoride	mg/l	0.94 v	0.93 v	0.92 v	0.92 v	0.96 v	0.97 v

See analytical flag codes on last page.

**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	8/27/2001	8/27/2001	9/10/2001	9/10/2001	9/24/2001	9/24/2001
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2108280162	2108280153	2109110092	2109110091	2109250201	2109250197
	Sample Number						
	Remarks						
	Superceded						
	<b>Other</b>						
Total Dissolved Solids	mg/l	1420 v	1420 v	1470 v	1520 v	1420 v	1410 v
	<b>Metals</b>						
Boron	mg/l	0.56 v	0.53 v	0.59 v	0.6 v	0.54 v	0.54 v
Chromium	mg/l	0.0015 v	0.0024 v	0.002 v	0.0018 v	0.0035 v	0.003 v
Copper	mg/l	0.0053 v	0.0057 v	0.0054 v	0.0047 v	0.0074 v	0.0081 v
Iron	mg/l	0.1 u	0.16 v	0.24 v	0.22 v	0.14 v	0.19 v
Manganese	mg/l	0.017 v	0.034 v	0.044 v	0.04 v	0.035 v	0.034 v
Molybdenum	mg/l	0.026 v	0.024 v	0.022 v	0.022 v	0.023 v	0.023 v
	<b>Inorganics</b>						
Chloride	mg/l	260 vd	260 vd	280 vd	280 vd	270 vd	280 vd
Fluoride	mg/l	0.89 v	0.97 v	0.87 v	0.9 v	0.92 v	0.94 v

See analytical flag codes on last page.

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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	10/9/2001	10/9/2001	10/22/2001	10/22/2001	11/5/2001	11/5/2001
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2110100007	2110100006	2110230086	2110230085	2111060004	2111060003
	Sample Number						
	Remarks						
	Superseded						
	<b>Other</b>						
Total Dissolved Solids	mg/l	1460 v	1530 v	1480 v	1500 v	1570 v	1540 v
	<b>Metals</b>						
Boron	mg/l	0.57 v	0.61 v	0.6 v	0.63 v	0.66 v	0.62 v
Chromium	mg/l	0.0035 v	0.0028 v	0.0022 v	0.0022 v	0.0023 v	0.0019 v
Copper	mg/l	0.0086 v	0.0091 v	0.0077 v	0.0069 v	0.014 v	0.0083 v
Iron	mg/l	0.16 v	0.16 v	0.32 v	0.24 v	0.42 v	0.41 v
Manganese	mg/l	0.035 v	0.033 v	0.047 v	0.037 v	0.058 v	0.044 v
Molybdenum	mg/l	0.022 v	0.022 v	0.022 v	0.02 v	0.022 v	0.019 v
	<b>Inorganics</b>						
Chloride	mg/l	290 vd	290 vd	290 vd	290 vd	280 vd	270 vd
Fluoride	mg/l	0.93 v	0.96 v	0.96 v	0.97 v	0.88 v	0.89 v

See analytical flag codes on last page.

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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	11/19/2001	11/19/2001	12/3/2001	12/3/2001	12/18/2001	12/18/2001
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2111200039	2111200038	2112040008	2112040007	2112190130	2112190128
	Sample Number						
	Remarks						
	Superseded						
	<b>Other</b>						
Total Dissolved Solids	mg/l	1540 v	1560 v	1590 v	1590 v	1600 v	1680 v
	<b>Metals</b>						
Boron	mg/l	0.67 v	0.68 v	0.69 v	0.7 v	0.66 vd	0.75 vd
Chromium	mg/l	0.0026 v	0.0022 v	0.0016 v	0.0016 v	0.0013 v	0.0014 v
Copper	mg/l	0.0085 v	0.0076 v	0.0071 v	0.0075 v	0.0082 v	0.0088 v
Iron	mg/l	0.32 v	0.3 v	0.31 v	0.32 v	0.37 vd	0.38 vd
Manganese	mg/l	0.059 v	0.042 v	0.044 v	0.044 v	0.048 v	0.057 v
Molybdenum	mg/l	0.02 v	0.018 v	0.017 v	0.017 v	0.02 v	0.019 v
	<b>Inorganics</b>						
Chloride	mg/l	320 vd	310 vd	290 vd	280 vd	320 vd	320 vd
Fluoride	mg/l	0.98 v	1 v	0.93 v	0.97 v	0.97 v	1 v

See analytical flag codes on last page.



# Analyses Summary Report

Site Name: Henderson

2/13/2003 3:52:02 PM

Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	1/2/2002	1/2/2002	1/14/2002	1/14/2002	1/28/2002	1/28/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2201030100	2201030097	2201150049	2201150047	2201290006	2201290004
	Sample Number						
	Remarks						
	Superseded						

	Other						
Total Dissolved Solids	mg/l	1560 v	1590 v	1570 v	1610 v	1530 v	1600 v
	Metals						
Boron	mg/l	0.6 v	0.67 vd	0.66 v	0.67 v	0.64 v	0.67 v
Chromium	mg/l	0.0021 v	0.0011 v	0.0012 v	0.0021 v	0.0058 v	0.0049 v
Copper	mg/l	0.0078 v	0.0063 v	0.0037 v	0.0054 v	0.0061 v	0.0053 v
Iron	mg/l	0.24 v	0.28 vd	0.26 v	0.25 v	0.27 v	0.33 v
Manganese	mg/l	0.043 v	0.042 v	0.021 v	0.042 v	0.044 v	0.044 v
Molybdenum	mg/l	0.015 v	0.015 v	0.0083 v	0.016 v	0.017 v	0.017 v
	Inorganics						
Chloride	mg/l	300 vd	290 vd	310 vd	300 vd	290 vd	310 vd
Fluoride	mg/l	0.85 v	0.9 v	0.89 v	0.94 v	0.91 v	0.96 v

See analytical flag codes on last page.

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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	2/11/2002	2/11/2002	2/25/2002	2/25/2002	3/13/2002	3/13/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2202120008	2202120007	2202260018	2202260017	2203140021	2203140020
	Sample Number						
	Remarks						
	Superseded						

	Other						
Total Dissolved Solids	mg/l	1550 v	1590 v	1550 v	1570 v	1540 v	1600 v
	<b>Metals</b>						
Boron	mg/l	0.65 v	0.67 v	0.57 v	0.59 v	0.62 v	0.66 v
Chromium	mg/l	0.0016 v	0.0014 v	0.0028 v	0.0027 v	0.0077 v	0.0071 v
Copper	mg/l	0.0058 v	0.0056 v	0.0037 v	0.003 v	0.0098 v	0.0048 v
Iron	mg/l	0.4 v	0.41 v	0.22 v	0.23 v	0.24 v	0.19 v
Manganese	mg/l	0.065 v	0.057 v	0.047 v	0.045 v	0.048 v	0.045 v
Molybdenum	mg/l	0.018 v	0.018 v	0.021 v	0.021 v	0.021 v	0.022 v
	<b>Inorganics</b>						
Chloride	mg/l	320 vd	300 vd	260 vd	260 vd	293 vd	303 vd
Fluoride	mg/l	0.9 v	0.96 v	0.91 v	0.96 v	0.89 v	0.94 v

See analytical flag codes on last page.

**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	3/26/2002	3/26/2002	4/10/2002	4/10/2002	4/24/2002	4/24/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2203280080	2203280078	2204110024	2204110023	2204250025	2204250024
	Sample Number						
	Remarks						
	Superceded						
	<b>Other</b>						
Total Dissolved Solids	mg/l	1520 v	1810 v	1640 v	1650 v	1600 v	1700 v
	<b>Metals</b>						
Boron	mg/l	0.64 v	0.93 v	0.65 v	0.65 v	0.62 v	0.6 v
Chromium	mg/l	0.0041 v	0.0036 v	0.0026 v	0.0017 v	0.001 u	0.0089 v
Copper	mg/l	0.0043 v	0.0027 v	0.0027 v	0.002 v	0.0024 v	0.0071 v
Iron	mg/l	0.29 v	0.23 v	0.19 v	0.2 v	0.1 u	0.17 v
Manganese	mg/l	0.041 v	0.038 v	0.049 v	0.049 v	0.047 v	0.048 v
Molybdenum	mg/l	0.019 v	0.02 v	0.021 v	0.022 v	0.023 v	0.022 v
	<b>Inorganics</b>						
Chloride	mg/l	150 vd	400 vd	320 vd	330 vd	330 vd	320 vd
Fluoride	mg/l	0.96 v	1 v	0.93 v	0.98 v	0.91 v	0.96 v

See analytical flag codes on last page.

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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	5/8/2002	5/8/2002	5/22/2002	5/22/2002	6/5/2002	6/5/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2205090014	2205090013	2205230074	2205230073	2206060012	2206060011
	Sample Number						
	Remarks						
	Superseded						
	<b>Other</b>						
Total Dissolved Solids	mg/l	1580 v	1550 v	1400 v	1450 v	1490 v	1490 v
	<b>Metals</b>						
Boron	mg/l	0.59 v	0.59 v	0.52 v	0.59 v	0.56 v	0.54 v
Chromium	mg/l	0.0022 v	0.0025 v	0.0031 v	0.0031 v	0.0023 v	0.0031 v
Copper	mg/l	0.0048 v	0.0044 v	0.0036 v	0.0041 v	0.0043 v	0.0052 v
Iron	mg/l	0.16 v	0.17 v	0.17 v	0.21 v	0.24 v	1.1 v
Manganese	mg/l	0.046 v	0.043 v	0.037 v	0.036 v	0.041 v	0.06 v
Molybdenum	mg/l	0.026 v	0.027 v	0.023 v	0.023 v	0.028 v	0.028 v
	<b>Inorganics</b>						
Chloride	mg/l	330 vd	310 vd	310 vd	310 vd	310 vd	300 vd
Fluoride	mg/l	0.99 v	1 v	1 v	1 v	0.98 v	0.98 v

See analytical flag codes on last page.

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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	6/20/2002	6/20/2002	7/1/2002	7/1/2002	7/17/2002	7/17/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2206210058	2206210057	2207020043	2207020042	2207180037	2207180036
	Sample Number						
	Remarks						
	Superceded						

	Other						
Total Dissolved Solids	mg/l	1600 v	1580 v	1530 v	1520 v	1530 v	1550 v
	<b>Metals</b>						
Boron	mg/l	0.59 v	0.61 v	0.58 v	0.58 v	0.58 v	0.59 v
Chromium	mg/l	0.0062 v	0.0068 v	0.0038 v	0.005 v	0.0022 v	0.0019 v
Copper	mg/l	0.028 v	0.015 v	0.0056 v	0.0061 v	0.004 v	0.0034 v
Iron	mg/l	1.5 v	1.6 v	0.7 v	1.3 v	0.19 v	0.18 v
Manganese	mg/l	0.088 v	0.084 v	0.062 v	0.072 v	0.045 v	0.039 v
Molybdenum	mg/l	0.029 v	0.029 v	0.021 v	0.021 v	0.029 v	0.027 v
	<b>Inorganics</b>						
Chloride	mg/l	310 vd	310 vd	310 vd	300 vd	310 vd	300 vd
Fluoride	mg/l	0.99 v	0.98 v	1 v	1 v	1 v	1 v

See analytical flag codes on last page.

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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	7/31/2002	7/31/2002	8/14/2002	8/14/2002	8/29/2002	8/29/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2208010062	2208010061	2208150071	2208150070	2208300125	2208300124
	Sample Number						
	Remarks						
	Superceded						

	Other						
Total Dissolved Solids	mg/l	1580 v	1650 v	1600 v	1580 v	1510 v	1520 v
	<b>Metals</b>						
Boron	mg/l	0.64 v	0.66 v	0.62 v	0.64 v	0.59 v	0.58 v
Chromium	mg/l	0.0027 v	0.0024 v	0.0051 v	0.004 v	0.0015 v	0.0016 v
Copper	mg/l	0.006 v	0.006 v	0.0058 v	0.005 v	0.006 v	0.0092 v
Iron	mg/l	0.21 v	0.2 v	0.2 v	0.2 v	0.24 v	0.26 v
Manganese	mg/l	0.048 v	0.049 v	0.046 v	0.043 v	0.032 v	0.037 v
Molybdenum	mg/l	0.031 v	0.03 v	0.028 v	0.027 v	0.026 v	0.028 v
	<b>Inorganics</b>						
Chloride	mg/l	330 vd	320 vd	300 vd	310 vd	310 vd	320 vd
Fluoride	mg/l	1 v	1 v	1.1 v	1.1 v	1 v	1.1 v

See analytical flag codes on last page.

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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	9/4/2002	9/4/2002	9/18/2002	9/18/2002	10/3/2002	10/3/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2209050041	2209050040	2209190044	2209190043	2210040068	2210040067
	Sample Number						
	Remarks						
	Superceded						

	Other						
Total Dissolved Solids	mg/l	1560 v	1550 v	1600 v	1530 v	1580 v	1620 v
	<b>Metals</b>						
Boron	mg/l	0.6 v	0.6 v	0.65 v	0.63 v	0.59 v	0.55 v
Chromium	mg/l	0.0042 v	0.001 u	0.0024 v	0.0016 v	0.0058 v	0.0056 v
Copper	mg/l	0.0061 v	0.0032 v	0.0052 v	0.0064 v	0.0065 v	0.0062 v
Iron	mg/l	0.19 v	0.12 v	0.18 v	0.18 v	0.17 v	0.17 v
Manganese	mg/l	0.039 v	0.037 v	0.043 v	0.039 v	0.044 v	0.039 v
Molybdenum	mg/l	0.027 v	0.028 v	0.027 v	0.027 v	0.023 v	0.021 v
	<b>Inorganics</b>						
Chloride	mg/l	150 vd	140 vd	260 vd	240 vd	310 vd	320 vd
Fluoride	mg/l	1.1 v	1.1 v	1 v	1 v	0.94 v	0.94 v

See analytical flag codes on last page.

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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	10/16/2002	10/16/2002	11/6/2002	11/6/2002	11/20/2002	11/20/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2210170021	2210170020	2211070074	2211070073	2211210080	2211210079
	Sample Number						
	Remarks						
	Superseded						
	<b>Other</b>						
Total Dissolved Solids	mg/l	1730 v	1680 v	1610 v	1610 v	1640 v	1700 v
	<b>Metals</b>						
Boron	mg/l	0.7 v	0.73 v	0.66 v	0.66 v	0.55 v	0.6 v
Chromium	mg/l	0.0029 v	0.0025 v	0.0036 v	0.0029 v	0.0051 v	0.0046 v
Copper	mg/l	0.0047 v	0.005 v	0.0046 v	0.0036 v	0.0051 v	0.0044 v
Iron	mg/l	0.15 v	0.2 v	0.28 v	0.21 v	0.11 v	0.11 v
Manganese	mg/l	0.04 v	0.042 v	0.051 v	0.052 v	0.042 v	0.046 v
Molybdenum	mg/l	0.022 v	0.022 v	0.023 v	0.023 v	0.023 v	0.024 v
	<b>Inorganics</b>						
Chloride	mg/l	340 vd	330 vd	360 vd	340 vd	360 vd	340 vd
Fluoride	mg/l	1.1 v	1.1 v	0.97 v	1 v	1 v	1.1 v

See analytical flag codes on last page.



# Analyses Summary Report

Site Name: Henderson

2/13/2003 3:52:02 PM

Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	12/4/2002	12/4/2002	12/18/2002	12/18/2002
	Lab	MWL	MWL	MWL	MWL
	Lab Number	2212050035	2212050034	2212190060	2212190059
	Sample Number				
	Remarks				
	Superseded				

Other					
Total Dissolved Solids	mg/l	1720 v	1750 v	1670 v	1740 v
Metals					
Boron	mg/l	0.51 v	0.54 v	0.71 v	0.77 v
Chromium	mg/l	0.0028 v	0.0024 v	0.0027 v	0.0021 v
Copper	mg/l	0.005 v	0.0044 v	0.0049 v	0.0047 v
Iron	mg/l	0.21 v	0.23 v	0.1 u	0.1 u
Manganese	mg/l	0.049 v	0.05 v	0.042 v	0.047 v
Molybdenum	mg/l	0.022 v	0.022 v	0.023 v	0.022 v
Inorganics					
Chloride	mg/l	340 vd	340 vd	350 vd	360 vd
Fluoride	mg/l	0.98 v	1.1 v	1 v	1.1 v

## Analytic Flag Codes:

* Surrogate outside QC limits	a Not available	b Analyte detected in blank and sample
c Coelute	d Diluted	e Exceeds calibration range
f Calculated from higher dilution	g Concentration > value reported	i Insufficient sample
j Est. value; conc. < quan. limit	l Less than detection limit	m Matrix interference
n Not measured	p > 40% rpd between primary 1 deg and 2 deg column.	q Uncertain value
s Surrogate	t Trace amount	u Not detected
v Detected value	w Btwn CRDL/IDL	x Surrogate diluted but within QC limits
z Unknown		

## **Attachment 4**

### **Ion Exchange Process Influent and Effluent Constituents**



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Settings\zsmc1\My D

# Analyses Summary Report

Site Name: Henderson

8/29/2003 2:42:36 PM

Sample Type:	Station (Site)	IX Effluent	IX Effluent	IX Influent	IX Influent
Water	Sample Date	1/28/2003	1/28/2003	1/28/2003	1/28/2003
	Lab	MWL	MWL	MWL	MWL
	Lab Number	2301290027	2301290034	2301290021	2301290038
	Sample Number	z	z	z	z
	Remarks				
	Superceded				

**Other**

Apparent Color	ACU	3 v		10 v	
Surfactants	mg/l		0.066 v		0.455 v
Total Dissolved Solids	mg/l	5940 v		4260 v	
Total Organic Carbon	mg/l		2.2 v		3.1 v
Total Suspended Solids	mg/l	10 u			10 u
Laboratory pH	s.u.	7.4 v		7.5 v	
1,2-Diphenylhydrazine	ug/l		10 u		10 u
bis(2-ethylhexyl)adipate	ug/l		0.6 u		0.6 u
Butachlor	ug/l		0.05 u		0.05 u
Metribuzin	ug/l		0.05 u		0.05 u
Molinate	ug/l		0.2 u		0.2 u
Prometryn	ug/l		0.5 u		0.5 u
Thiobencarb	ug/l		0.2 u		0.2 u
trans-Nonachlor	ug/l		0.05 u		0.05 u
Trifluralin	ug/l		0.1 u		0.1 u

**Metals**

Antimony	mg/l		0.005 ud		0.005 ud
Arsenic	mg/l		0.14 vd		0.14 vd
Arsenic III	mg/l		0.075 ud		0.075 ud
Barium	mg/l		0.032 vd		0.032 vd
Beryllium	mg/l		0.005 ud		0.005 ud
Boron	mg/l	2.9 v			2.4 vd
Cadmium	mg/l		0.0025 ud		0.0025 ud
Chromium	mg/l	0.046 vd		0.005 ud	
Chromium-hexavalent	mg/l	0.047 v		0.005 u	
Copper	mg/l		0.01 ud		0.01 ud
Iron	mg/l	0.1 u			0.5 vd
Magnesium	mg/l		180 vd		120 vd
Manganese	mg/l	0.01 ud			0.82 vd
Mercury	mg/l		0.0002 u		0.0002 u
Molybdenum	mg/l		0.084 vd		0.078 vd
Nickel	mg/l		0.028 vd		0.029 vd
Potassium	mg/l		27 vd		23 vd
Selenium	mg/l		0.04 ud		0.1 ud
Sodium	mg/l		1400 vd		1000 vd
Strontium	mg/l		9.7 vd		7 vd
Thallium	mg/l		0.005 ud		0.005 ud
Vanadium	mg/l		0.083 vd		0.091 vd
Zinc	mg/l		0.025 ud		0.025 ud
Lead	ug/l		2.5 ud		2.5 ud

**Inorganics**

See analytical flag codes on last page.

# Analyses Summary Report

Site Name: Henderson

8/29/2003 2:42:36 PM

Sample Type:	Station (Site)	IX Effluent	IX Effluent	IX Influent	IX Influent
Water	Sample Date	1/28/2003	1/28/2003	1/28/2003	1/28/2003
	Lab	MWL	MWL	MWL	MWL
	Lab Number	2301290027	2301290034	2301290021	2301290038
	Sample Number	z	z	z	z
	Remarks				
	Superseded				

Percent Unionized Ammonia	%	1.38 v		1.73 v	
25C					
Ammonia (as N)	mg/l	0.05 u		0.05 u	
Biochemical oxygen demand	mg/l	3 u	3 u	3 u	3 u
Chemical oxygen demand	mg/l		100 u		100 u
Chloride	mg/l	2300 vd		1300 vd	
Nitrate (as N)	mg/l	9.4 vd		8 vd	
Nitrate/Nitrite	mg/l	17.9 v		8 v	
Nitrite	mg/l	8.5 vd		4 ud	
Sulfate	mg/l		1600 vd		1300 vd
sulfide	mg/l	0.1 u		0.1 u	
Total Kjeldahl Nitrogen	mg/l	0.2 u		0.44 v	
Total Phosphorus-P	mg/l	0.02 u		0.02 u	
Chlorate	ug/l	140000 vd		80000 vd	
Perchlorate	ug/l	11.3 vd		71000 vd	
<b>Radiologic</b>					
Gross Alpha	pCi/l	10.2 u			23 v
Ra-226 - soluble	pCi/l	0.4 u			0.2 u
Ra-228 - soluble	pCi/l	0.4 u			0.4 u
<b>Dioxins and Furans</b>					
Tetrahydrofuran	ug/l		10 u		10 u
<b>Herbicides</b>					
2,4-Dichlorophenylacetic Acid	%		103 v		110 v
2,4,5-T	ug/l		0.05 u		0.05 u
2,4,5-TP (Silvex)	ug/l		0.1 v		0.05 u
2,4-D	ug/l		0.5 u		0.5 u
2,4-DB	ug/l		0.5 u		0.5 u
Dalapon	ug/l		1 u		1 u
Dicamba	ug/l		0.1 u		0.1 u
Dichlorprop	ug/l		0.5 u		0.5 u
Dinoseb	ug/l		0.1 u		0.1 u
Metolachlor	ug/l		0.05 u		0.05 u
<b>Hydrocarbon</b>					
Oil and grease	mg/l	5 u		5 u	
<b>PCBs</b>					
Aroclor-1016	ug/l		0.5 u		0.5 u
Aroclor-1221	ug/l		0.5 u		0.5 u
Aroclor-1232	ug/l		0.5 u		0.5 u
Aroclor-1242	ug/l		0.5 u		0.5 u
Aroclor-1248	ug/l		0.5 u		0.5 u
Aroclor-1254	ug/l		0.5 u		0.5 u
Aroclor-1260	ug/l		0.5 u		0.5 u
<b>Pesticides</b>					

See analytical flag codes on last page.

# Analyses Summary Report

Site Name: Henderson

8/29/2003 2:42:36 PM

Sample Type:	Station (Site)	LX Effluent	LX Effluent	LX Influent	LX Influent
Water	Sample Date	1/28/2003	1/28/2003	1/28/2003	1/28/2003
	Lab	MWL	MWL	MWL	MWL
	Lab Number	2301290027	2301290034	2301290021	2301290038
	Sample Number	z	z	z	z
	Remarks				
	Superseded				

4,4-DDD	ug/l	0.02 u	0.02 u
4,4-DDE	ug/l	0.02 u	0.02 u
4,4-DDT	ug/l	0.02 u	0.02 u
Aldrin	ug/l	0.02 u	0.02 u
Alpha-BHC	ug/l	0.02 u	0.16 v
Alpha-chlordane	ug/l	0.05 u	0.05 u
Beta-BHC	ug/l	0.02 u	0.12 v
Bromacil	ug/l	0.2 u	0.2 u
Delta-BHC	ug/l	0.02 u	0.02 u
Diazinon	ug/l	0.1 u	0.1 u
Dieldrin	ug/l	0.02 u	0.02 u
Endosulfan I	ug/l	0.02 u	0.02 u
Endosulfan II	ug/l	0.02 u	0.02 u
Endosulfan Sulfate	ug/l	0.02 u	0.02 u
Endrin	ug/l	0.01 u	0.01 u
Endrin Aldehyde	ug/l	0.02 u	0.02 u
Endrin Ketone	ug/l	0.5 u	0.5 u
Gamma-BHC (Lindane)	ug/l	0.02 u	0.02 u
Gamma-Chlordane	ug/l	0.05 u	0.05 u
Heptachlor	ug/l	0.01 u	0.01 u
Heptachlor Epoxide	ug/l	0.01 u	0.01 u
Methoxychlor	ug/l	0.2 u	0.2 u
Mirex	ug/l	0.05 u	0.05 u
Propachlor	ug/l	0.05 u	0.05 u
Simazine	ug/l	0.05 u	0.05 u
Tech-Chlordane	ug/l	0.2 v	0.2 u
Toxaphene	ug/l	0.5 u	0.5 u
<b>SVOAs</b>			
2,4,5-Trichlorophenol	mg/l	0.005 u	0.005 u
2,4,6-Trichlorophenol	mg/l	0.005 u	0.005 u
2,4-Dichlorophenol	mg/l	0.005 u	0.005 u
2,4-Dimethylphenol	mg/l	0.005 u	0.005 u
2,4-Dinitrophenol	mg/l	0.05 u	0.05 u
2,4-Dinitrotoluene	mg/l	0.0001 u	0.0001 u
2,6-Dinitrotoluene	mg/l	0.005 u	0.005 u
2-Chloronaphthalene	mg/l	0.005 u	0.005 u
2-Chlorophenol	mg/l	0.005 u	0.005 u
2-Methylnaphthalene	mg/l	0.005 u	0.005 u
2-Methylphenol	mg/l	0.005 u	0.005 u
2-Nitroaniline	mg/l	0.01 u	0.01 u
2-Nitrophenol	mg/l	0.005 u	0.005 u
3,3-Dichlorobenzidine	mg/l	0.05 u	0.05 u
3-Nitroaniline	mg/l	0.02 u	0.02 u

See analytical flag codes on last page.

# Analyses Summary Report

Site Name: Henderson

8/29/2003 2:42:36 PM

Sample Type:	Station (Site)	IX Effluent	IX Effluent	IX Influent	IX Influent
Water	Sample Date	1/28/2003	1/28/2003	1/28/2003	1/28/2003
	Lab	MWL	MWL	MWL	MWL
	Lab Number	2301290027	2301290034	2301290021	2301290038
	Sample Number	z	z	z	z
	Remarks				
	Superseded				

4,6-Dinitro-2-methylphenol	mg/l	0.05 u	0.05 u
4-Bromophenyl-phenylether	mg/l	0.005 u	0.005 u
4-Chloroaniline	mg/l	0.005 u	0.005 u
4-Chlorophenyl-phenylether	mg/l	0.005 u	0.005 u
4-Methylphenol	mg/l	0.005 u	0.005 u
4-Nitroaniline	mg/l	0.02 u	0.02 u
4-Nitrophenol	mg/l	0.01 u	0.01 u
Acenaphthene	mg/l	0.005 u	0.005 u
Acenaphthylene	mg/l	0.0001 u	0.0001 u
Aniline	mg/l	0.005 u	0.005 u
Anthracene	mg/l	0.00002 u	0.00002 u
Benz(a)anthracene	mg/l	0.00005 u	0.00005 u
Benzidine	mg/l	0.05 u	0.05 u
Benzo(a)pyrene	mg/l	0.00002 u	0.00002 u
Benzo(b)fluoranthene	mg/l	0.00002 u	0.00002 u
Benzo(g,h,i)perylene	mg/l	0.00005 u	0.00005 u
Benzo(k)fluoranthene	mg/l	0.00002 u	0.00002 u
Benzoic acid	mg/l	0.05 u	0.05 u
Benzyl alcohol	mg/l	0.005 u	0.005 u
bis(2-Chloroethoxy)methane	mg/l	0.01 u	0.01 u
bis(2-Chloroethyl)ether	mg/l	0.01 u	0.01 u
bis(2-Chloroisopropyl)ether	mg/l	0.01 u	0.01 u
bis(2-Ethylhexyl)phthalate	mg/l	0.0006 u	0.0006 u
Butyl benzyl phthalate	mg/l	0.0005 u	0.0005 u
Chrysene	mg/l	0.00002 u	0.00002 u
Dibenz(a,h)anthracene	mg/l	0.00005 u	0.00005 u
Dibenzofuran	mg/l	0.005 u	0.005 u
Diethyl phthalate	mg/l	0.0005 u	0.0005 u
Dimethoate	mg/l	0.01 u	0.01 u
Dimethyl phthalate	mg/l	0.0005 u	0.0005 u
Di-N-Butyl phthalate	mg/l	0.0005 u	0.0005 u
Di-N-Octyl phthalate	mg/l	0.01 u	0.01 u
Fluoranthene	mg/l	0.0001 u	0.0001 u
Fluorene	mg/l	0.00005 u	0.00005 u
Hexachlorobenzene	mg/l	0.00005 u	0.00005 u
Hexachlorobutadiene	mg/l	0.01 u	0.01 u
Hexachlorocyclopentadiene	mg/l	0.00005 u	0.00005 u
Hexachloroethane	mg/l	0.005 u	0.005 u
Indeno(1,2,3-cd)pyrene	mg/l	0.00005 u	0.00005 u
Isophorone	mg/l	0.0005 u	0.0005 u
Naphthalene	mg/l	0.005 u	0.005 u
Nitrobenzene	mg/l	0.005 u	0.005 u
N-Nitrosodimethylamine	mg/l	0.005 u	0.005 u

See analytical flag codes on last page.

# Analyses Summary Report

Site Name: Henderson

8/29/2003 2:42:36 PM

Sample Type:	Station (Site)	IX Effluent	IX Effluent	IX Influent	IX Influent
Water	Sample Date	1/28/2003	1/28/2003	1/28/2003	1/28/2003
	Lab	MWL	MWL	MWL	MWL
	Lab Number	2301290027	2301290034	2301290021	2301290038
	Sample Number	z	z	z	z
	Remarks				
	Superceded				

N-Nitroso-di-N-propylamine	mg/l	0.005 u	0.005 u
N-Nitrosodiphenylamine	mg/l	0.005 u	0.005 u
p-Chloro-m-cresol	mg/l	0.005 u	0.005 u
Pentachlorophenol	mg/l	0.001 u	0.001 u
Phenanthrene	mg/l	0.00002 u	0.00002 u
Phenol	mg/l	0.005 u	0.005 u
Pyrene	mg/l	0.00005 u	0.00005 u
Alachlor	ug/l	0.05 u	0.05 u
Atrazine	ug/l	0.05 u	0.05 u
Caffeine	ug/l	0.05 u	0.05 u
<b>VOAs</b>			
1,1,1-Trichloroethane	mg/l	0.0005 u	0.0005 u
1,1,2,2-Tetrachloroethane	mg/l	0.0005 u	0.0005 u
1,1,2-Trichloroethane	mg/l	0.0005 u	0.0005 u
1,1-Dichloroethane	mg/l	0.0059 v	0.0017 v
1,1-Dichloroethene	mg/l	0.0005 u	0.0005 u
1,2,4-Trichlorobenzene	mg/l	0.005 u	0.005 u
1,2-Dichlorobenzene	mg/l	0.005 u	0.005 u
1,2-Dichloroethane	mg/l	0.042 v	0.0005 u
1,2-Dichloropropane	mg/l	0.0005 u	0.0005 u
1,3-Dichlorobenzene	mg/l	0.005 u	0.005 u
1,4-Dichlorobenzene	mg/l	0.005 u	0.005 u
2-Hexanone	mg/l	0.01 u	0.01 u
4-Methyl-2-pentanone	mg/l	0.01 u	0.01 u
Acetone	mg/l	0.01 u	0.01 u
Acrolein	mg/l	0.05 u	0.05 u
Acrylonitrile	mg/l	0.05 u	0.05 u
Bromodichloromethane	mg/l	0.0005 u	0.0005 u
Bromoform	mg/l	0.0005 u	0.0005 u
Bromomethane	mg/l	0.0005 u	0.0005 u
Carbon disulfide	mg/l	0.0005 u	0.0005 u
Carbon tetrachloride	mg/l	0.0006 v	0.0005 u
Chlorobenzene	mg/l	0.0005 u	0.0005 u
Chloroethane	mg/l	0.0005 u	0.0005 u
Chloroform	mg/l	0.04 vd	0.0008 v
Chloromethane	mg/l	0.0005 u	0.0005 u
cis-1,2-Dichloroethene	mg/l	0.0005 u	0.0005 u
cis-1,3-Dichloropropene	mg/l	0.0005 u	0.0005 u
Dibromochloromethane	mg/l	0.0005 u	0.0005 u
Dichlorodifluoromethane	mg/l	0.0005 u	0.0005 u
m,p-Xylene	mg/l	0.0005 u	0.0005 u
Methyl ethyl ketone	mg/l	0.01 u	0.01 u
Methylene chloride	mg/l	0.003 u	0.003 u

See analytical flag codes on last page.

# Analyses Summary Report

Site Name: Henderson

8/29/2003 2:42:36 PM

Sample Type:	Station (Site)	IX Effluent	IX Effluent	IX Influent	IX Influent
Water	Sample Date	1/28/2003	1/28/2003	1/28/2003	1/28/2003
	Lab	MWL	MWL	MWL	MWL
	Lab Number	2301290027	2301290034	2301290021	2301290038
	Sample Number	z	z	z	z
	Remarks				
	Superseded				

o-Xylene	mg/l		0.0005 u		0.0005 u
Styrene	mg/l		0.0005 u		0.0005 u
Tetrachloroethene	mg/l		0.0005 u		0.0005 u
trans-1,2-Dichloroethylene	mg/l		0.0005 u		0.0005 u
trans-1,3-Dichloropropene	mg/l		0.0005 u		0.0005 u
Trichloroethene	mg/l		0.0005 u		0.0005 v
Trichlorofluoromethane	mg/l		0.0005 u		0.0005 u
Vinylacetate	mg/l		0.01 u		0.01 u
Vinylchloride	mg/l		0.0005 u		0.0005 u
Benzene	ug/l		0.5 u		0.5 u
Ethylbenzene	ug/l		0.5 u		0.5 u
Toluene	ug/l		0.5 u		0.5 u

## Analytic Flag Codes:

* Surrogate outside QC limits	a Not available	b Analyte detected in blank and sample
c Coelute	d Diluted	e Exceeds calibration range
f Calculated from higher dilution	g Concentration > value reported	i Insufficient sample
j Est. value; conc. < quan. limit	l Less than detection limit	m Matrix interference
n Not measured	p > 40% rpd between primary 1 deg and 2 deg column.	q Uncertain value
s Surrogate	t Trace amount	u Not detected
v Detected value	w Btwn CRDL/IDL	x Surrogate diluted but within QC limits
y Calculated Value	z Unknown	



**Analyses Summary Report**

Site Name: Henderson

2/24/2003 12:37:18 PM

Sample Type:	Station (Site)	IX Effluent	IX Influent
Water	Sample Date	10/8/2001	10/8/2001
	Lab	MWL	MWL
	Lab Number	2110090083	2110090081
	Sample Number		
	Remarks		
	Superseded		

	Other		
Percent Unionized Ammonia	%	1.38 v	1.73 v
25C			
Apparent Color	ACU	5 v	25 v
sulfide	mg/l	0.1 u	0.1 u
Surfactants	mg/l	0.207 v	1.77 vd
Total Dissolved Solids	mg/l	6680 v	6600 v
Total Suspended Solids	mg/l	10 u	10 u
Laboratory pH	s.u.	7.4 v	7.5 v
1,2-Diphenylhydrazine	ug/l	10 u	10 u
bis(2-ethylhexyl)adipate	ug/l	0.6 u	0.6 u
Bromacil	ug/l	0.2 u	0.2 u
Butachlor	ug/l	0.05 u	0.05 u
Caffeine	ug/l	0.02 u	0.02 u
Chlorate	ug/l	95000 vd	93000 vd
Diazinon	ug/l	0.1 u	0.1 u
Metribuzin	ug/l	0.05 u	0.05 u
Mirex	ug/l	0.05 u	0.05 u
Molinate	ug/l	0.2 u	0.2 u
Prometryn	ug/l	0.5 u	0.5 u
Propachlor	ug/l	0.05 u	0.05 u
Simazine	ug/l	0.05 u	0.05 u
Thiobencarb	ug/l	0.2 u	0.2 u
trans-Nonachlor	ug/l	0.05 u	0.05 u
Trifluralin	ug/l	0.1 u	0.1 u
	<b>Metals</b>		
Antimony	mg/l	0.005 ud	0.005 ud
Arsenic	mg/l	0.11 vd	0.115 vd
Arsenic III	mg/l	0.015 ud	0.0417 vd
Barium	mg/l	0.018 vd	0.019 vd
Beryllium	mg/l	0.005 ud	0.005 ud
Boron	mg/l	2.7 v	2.6 vd
Cadmium	mg/l	0.0025 ud	0.0025 ud
Chromium	mg/l	0.005 ud	0.005 ud
Chromium-hexavalent	mg/l	0.005 u	0.005 u
Copper	mg/l	0.01 ud	0.01 ud
Iron	mg/l	0.1 u	1 ud
Magnesium	mg/l	200 vd	200 vd
Manganese	mg/l	1 vd	1.2 vd
Mercury	mg/l	0.0002 u	0.0002 u
Molybdenum	mg/l	0.089 vd	0.088 vd
Nickel	mg/l	0.035 vd	0.038 vd
Potassium	mg/l	37 vd	38 vd

See analytical flag codes on last page.

**Analyses Summary Report**

Site Name: Henderson

2/24/2003 12:37:18 PM

Sample Type:	Station (Site)	IX Effluent	IX Influent
Water	Sample Date	10/8/2001	10/8/2001
	Lab	MWL	MWL
	Lab Number	2110090083	2110090081
	Sample Number		
	Remarks		
	Superseded		
<b>Inorganics</b>			
Selenium	mg/l	0.1 ud	0.1 ud
Sodium	mg/l	1400 vd	1400 vd
Strontium	mg/l	1.1 vd	1.1 vd
Thallium	mg/l	0.005 ud	0.005 ud
Vanadium	mg/l	0.063 vd	0.065 vd
Zinc	mg/l	0.026 vd	0.026 vd
Lead	ug/l	2.5 ud	2.5 ud
<b>Inorganics</b>			
Biochemical oxygen demand	mg/l	3 u	3 u
Chemical oxygen demand	mg/l	5 v	5 u
Chloride	mg/l	1900 vd	1800 vd
Nitrate (as N)	mg/l	11 vd	11 vd
Nitrate/Nitrite	mg/l	11 v	11 v
Nitrite	mg/l	4 ud	4 ud
Sulfate	mg/l	1500 vd	1600 vd
Total Kjeldahl Nitrogen	mg/l	0.24 v	0.2 u
Total Phosphorus-P	mg/l	0.15 v	0.15 v
Ammonia (as N)	ug/l	50 u	50 u
Perchlorate	ug/l	51 vd	81000 vd
<b>Radiologic</b>			
Gross Alpha	pCi/l	45 v	26 v
Ra-226 - insoluble	pCi/l	0.5 u	0.4 u
Ra-228 - insoluble	pCi/l	0.4 u	0.4 u
<b>Dioxins and Furans</b>			
Tetrahydrofuran	ug/l	10 u	10 u
<b>Herbicides</b>			
Metolachlor	ug/l	0.05 u	0.05 u
<b>Hydrocarbon</b>			
Oil and grease	mg/l	3 u	3 u
<b>PCBs</b>			
Aroclor-1016	ug/l	0.5 u	0.5 u
Aroclor-1221	ug/l	0.5 u	0.5 u
Aroclor-1232	ug/l	0.5 u	0.5 u
Aroclor-1242	ug/l	0.5 u	0.5 u
Aroclor-1248	ug/l	0.5 u	0.5 u
Aroclor-1254	ug/l	0.5 u	0.5 u
Aroclor-1260	ug/l	0.5 u	0.5 u
<b>Pesticides</b>			
4,4-DDD	ug/l	0.02 u	0.02 u
4,4-DDE	ug/l	0.02 u	0.02 u
4,4-DDT	ug/l	0.02 u	0.02 u
Aldrin	ug/l	0.02 u	0.02 u
Alpha-BHC	ug/l	0.2 v	0.48 vd

See analytical flag codes on last page.

# Analyses Summary Report

Site Name: Henderson

2/24/2003 12:37:18 PM

Sample Type:	Station (Site)	IX Effluent	IX Influent
Water	Sample Date	10/8/2001	10/8/2001
	Lab	MWL	MWL
	Lab Number	2110090083	2110090081
	Sample Number		
	Remarks		
	Superceded		

Alpha-chlordane	ug/l	0.05 u	0.05 u
Beta-BHC	ug/l	0.02 u	0.23 vd
Delta-BHC	ug/l	0.04 v	1 vd
Dieldrin	ug/l	0.02 u	0.02 u
Endosulfan I	ug/l	0.02 u	0.02 u
Endosulfan II	ug/l	0.02 u	0.02 u
Endosulfan Sulfate	ug/l	0.02 u	0.02 u
Endrin	ug/l	0.01 u	0.01 u
Endrin Aldehyde	ug/l	0.02 u	0.02 u
Gamma-BHC (Lindane)	ug/l	0.02 u	0.02 u
Gamma-Chlordane	ug/l	0.05 u	0.05 u
Heptachlor	ug/l	0.01 u	0.01 u
Heptachlor Epoxide	ug/l	0.01 u	0.01 u
Methoxychlor	ug/l	0.2 u	0.2 u
Tech-Chlordane	ug/l	0.2 u	0.2 u
Toxaphene	ug/l	0.5 u	0.5 u

### SVOAs

2,4,5-Trichlorophenol	mg/l	0.005 u	0.005 u
2,4,6-Trichlorophenol	mg/l	0.005 u	0.005 u
2,4-Dichlorophenol	mg/l	0.005 u	0.005 u
2,4-Dimethylphenol	mg/l	0.005 u	0.005 u
2,4-Dinitrophenol	mg/l	0.05 u	0.05 u
2,4-Dinitrotoluene	mg/l	0.005 u	0.0001 u
2,6-Dinitrotoluene	mg/l	0.005 u	0.005 u
2-Chloronaphthalene	mg/l	0.005 u	0.005 u
2-Chlorophenol	mg/l	0.005 u	0.005 u
2-Methylnaphthalene	mg/l	0.005 u	0.005 u
2-Methylphenol	mg/l	0.005 u	0.005 u
2-Nitroaniline	mg/l	0.01 u	0.01 u
2-Nitrophenol	mg/l	0.005 u	0.005 u
3,3-Dichlorobenzidine	mg/l	0.05 u	0.05 u
3-Nitroaniline	mg/l	0.02 u	0.02 u
4,6-Dinitro-2-methylphenol	mg/l	0.05 u	0.05 u
4-Bromophenyl-phenylether	mg/l	0.005 u	0.005 u
4-Chloroaniline	mg/l	0.005 u	0.005 u
4-Chlorophenyl-phenylether	mg/l	0.005 u	0.005 u
4-Methylphenol	mg/l	0.005 u	0.005 u
4-Nitroaniline	mg/l	0.02 u	0.02 u
4-Nitrophenol	mg/l	0.01 u	0.01 u
Acenaphthene	mg/l	0.005 u	0.005 u
Acenaphthylene	mg/l	0.005 u	0.005 u
Aniline	mg/l	0.005 u	0.005 u
Anthracene	mg/l	0.00002 u	0.005 u

See analytical flag codes on last page.

# Analyses Summary Report

Site Name: Henderson

2/24/2003 12:37:18 PM

Sample Type:	Station (Site)	IX Effluent	IX Influent
Water	Sample Date	10/8/2001	10/8/2001
	Lab	MWL	MWL
	Lab Number	2110090083	2110090081
	Sample Number		
	Remarks		
	Superceded		

Benz(a)anthracene	mg/l	0.005 u	0.005 u
Benzidine	mg/l	0.05 u	0.05 u
Benzo(a)pyrene	mg/l	0.00002 u	0.00002 u
Benzo(b)fluoranthene	mg/l	0.005 u	0.005 u
Benzo(g,h,i)perylene	mg/l	0.00005 u	0.01 u
Benzo(k)fluoranthene	mg/l	0.00002 u	0.005 u
Benzoic acid	mg/l	0.05 u	0.05 u
Benzyl alcohol	mg/l	0.005 u	0.005 u
bis(2-Chloroethoxy)methane	mg/l	0.01 u	0.01 u
bis(2-Chloroethyl)ether	mg/l	0.01 u	0.01 u
bis(2-Chloroisopropyl)ether	mg/l	0.01 u	0.01 u
bis(2-Ethylhexyl)phthalate	mg/l	0.0006 u	0.004 u
Butyl benzyl phthalate	mg/l	0.0005 u	0.005 u
Chrysene	mg/l	0.005 u	0.005 u
Dibenz(a,h)anthracene	mg/l	0.00005 u	0.01 u
Dibenzofuran	mg/l	0.005 u	0.005 u
Diethyl phthalate	mg/l	0.0005 u	0.005 u
Dimethoate	mg/l	0.01 u	0.01 u
Dimethyl phthalate	mg/l	0.005 u	0.005 u
Di-N-Butyl phthalate	mg/l	0.0005 u	0.01 u
Di-N-Octyl phthalate	mg/l	0.01 u	0.01 u
Fluoranthene	mg/l	0.005 u	0.005 u
Fluorene	mg/l	0.005 u	0.005 u
Hexachlorobenzene	mg/l	0.00005 u	0.00005 u
Hexachlorobutadiene	mg/l	0.01 u	0.01 u
Hexachlorocyclopentadiene	mg/l	0.01 u	0.01 u
Hexachloroethane	mg/l	0.005 u	0.005 u
Indeno(1,2,3-cd)pyrene	mg/l	0.00005 u	0.01 u
Isophorone	mg/l	0.005 u	0.0005 u
Naphthalene	mg/l	0.005 u	0.005 u
Nitrobenzene	mg/l	0.005 u	0.005 u
N-Nitrosodimethylamine	mg/l	0.005 u	0.005 u
N-Nitroso-di-N-propylamine	mg/l	0.005 u	0.005 u
N-Nitrosodiphenylamine	mg/l	0.005 u	0.005 u
p-Chloro-m-cresol	mg/l	0.005 u	0.005 u
Pentachlorophenol	mg/l	0.02 u	0.02 u
Phenanthrene	mg/l	0.00002 u	0.005 u
Phenol	mg/l	0.005 u	0.005 u
Pyrene	mg/l	0.005 u	0.005 u
Alachlor	ug/l	0.05 u	0.05 u
Atrazine	ug/l	0.05 u	0.05 u
VOAs			
1,1,1-Trichloroethane	mg/l	0.0005 u	0.0005 u

See analytical flag codes on last page.

# Analyses Summary Report

Site Name: Henderson

2/24/2003 12:37:18 PM

Sample Type:	Station (Site)	IX Effluent	IX Influent
Water	Sample Date	10/8/2001	10/8/2001
	Lab	MWL	MWL
	Lab Number	2110090083	2110090081
	Sample Number		
	Remarks		
	Superseded		

1,1,2,2-Tetrachloroethane	mg/l	0.0005 u	0.0005 u
1,1,2-Trichloroethane	mg/l	0.0005 u	0.0005 u
1,1-Dichloroethane	mg/l	0.0031 v	0.0031 v
1,1-Dichloroethene	mg/l	0.0005 u	0.0005 u
1,2,4-Trichlorobenzene	mg/l	0.005 u	0.005 u
1,2-Dichlorobenzene	mg/l	0.005 u	0.005 u
1,2-Dichloroethane	mg/l	0.0006 v	0.0005 u
1,2-Dichloropropane	mg/l	0.0005 u	0.0005 u
1,3-Dichlorobenzene	mg/l	0.005 u	0.005 u
1,4-Dichlorobenzene	mg/l	0.005 u	0.005 u
2-Hexanone	mg/l	0.01 u	0.01 u
4-Methyl-2-pentanone	mg/l	0.01 u	0.01 u
Acetone	mg/l	0.01 u	0.01 u
Acrolein	mg/l	0.05 u	0.05 u
Acrylonitrile	mg/l	0.05 u	0.05 u
Benzene	mg/l	0.0005 u	0.0005 u
Bromodichloromethane	mg/l	0.0005 u	0.0005 u
Bromoform	mg/l	0.0005 u	0.0005 u
Bromomethane	mg/l	0.0005 u	0.0005 u
Carbon disulfide	mg/l	0.001 u	0.001 u
Carbon tetrachloride	mg/l	0.0005 u	0.0005 u
Chlorobenzene	mg/l	0.0005 u	0.0005 u
Chloroethane	mg/l	0.0005 u	0.0005 u
Chloroform	mg/l	0.0005 u	0.0006 v
Chloromethane	mg/l	0.0005 u	0.0005 u
cis-1,2-Dichloroethene	mg/l	0.0005 u	0.0005 u
cis-1,3-Dichloropropene	mg/l	0.0005 u	0.0005 u
Dibromochloromethane	mg/l	0.0005 u	0.0005 u
Dichlorodifluoromethane	mg/l	0.0005 u	0.0005 u
Ethylbenzene	mg/l	0.0005 u	0.0005 u
m,p-Xylene	mg/l	0.0005 u	0.0005 u
Methyl ethyl ketone	mg/l	0.01 u	0.01 u
Methylene chloride	mg/l	0.003 u	0.003 u
o-Xylene	mg/l	0.0005 u	0.0005 u
Styrene	mg/l	0.0005 u	0.0005 u
Tetrachloroethene	mg/l	0.0005 v	0.0006 v
Toluene	mg/l	0.0005 u	0.0005 u
trans-1,2-Dichloroethylene	mg/l	0.0005 u	0.0005 u
trans-1,3-Dichloropropene	mg/l	0.0005 u	0.0005 u
Trichloroethene	mg/l	0.0007 v	0.0007 v
Trichlorofluoromethane	mg/l	0.0005 u	0.0005 u
Vinylacetate	mg/l	0.01 u	0.01 u
Vinylchloride	mg/l	0.0005 u	0.0005 u

See analytical flag codes on last page.

**Analytic Flag Codes:**

- |   |                                  |   |  |   |  |
|---|----------------------------------|---|--|---|--|
| • | Surrogate outside QC limits      | a | Not available                                    | b | Analyte detected in blank and sample   |
| c | Coefute                          | d | Diluted  | e | Exceeds calibration range              |
| f | Calculated from higher dilution  | g | Concentration > value reported                   | i | Insufficient sample                    |
| j | Est. value; conc. < quant. limit | l | Less than detection limit                        | m | Matrix interference                    |
| n | Not measured                     | p | > 40% rpd between primary 1deg and 2 deg column. | q | Uncertain value                        |
| s | Surrogate                        | t | Trace amount                                     | u | Not detected                           |
| v | Detected value                   | w | BTW/COR/DL/DL                                    | x | Surrogate diluted but within QC limits |
| z | Unknown                          |   |  |   |  |

## Todd Croft

---

**From:** Todd Croft  
**Sent:** Thursday, August 28, 2003 7:44 AM  
**To:** Jim Najima; Terre Maize; Leo Drozdoff  
**Cc:** Jon Palm; Jeff Johnson; Jennifer Carr; Doug Zimmerman; Brian Rakvica  
**Subject:** Perchlorate Remediation System Update

All:

I spoke w/ Susan Crowley & Keith Bailey yesterday to obtain a perchlorate remediation system update. Kerr-McGee is proceeding with the design, permitting, & installation of the Fluidized Bed Reactor (FBR) Biological Treatment System. A summary follows:

1) in June 2003 Kerr-McGee signed agreements w/ US Filters to:

- \* construct a biological treatment system; &
- \* assume all operations and data collection duties related to the on-going perchlorate remediation system.

2) US Filters has operated the existing remediation system since 08/01/03.

3) FBR Status:

- \* concrete has been poured
- \* major hardware has been purchased and some has arrived on-site
- \* equipment received on-site includes: filter presses, dissolved aeration floatation tanks, thickener, & the first two biological reactors

4) Schedule:

- \* on target for a 12/17/03 completion date (mechanical completion) for the FBR Biological Treatment System
- \* FBR start-up is scheduled for January to February 2004
- \* optimization and performance testing of the FBR Treatment System is scheduled for March 2004
- \* FBR Treatment System completion and full operation should occur by 03/18/03

5) Meetings:

- \* 09/09/03 internal (Kerr-McGee) construction progress meeting
- \* 09/16/03 Project status meeting w/ NDEP, EPA, & SNWA; begins at 10:30 am at Kerr-McGee ... Likely lasts until ~1:00 - 2:00 pm and will include a site visit to observe the FBR construction
- \* 09/02/03 US filters to provide Final P & IDs and other information to Nadir Sous likely the week of 09/02

6) Design:

- \* THE FBR system design includes four (4) primary & four (4) secondary reactors in series. The primary reactors will destroy nitrate, chlorate, and the initial portion of perchlorate down to ~ 80 ppm. The secondary reactor will degrade perchlorate to ND (< 4 ppb).
- \* This design allows for any three of the four sets of reactors to handle the full treatment system load.

6) Seep Area:

- \* The current average perchlorate concentration in Lift Station #1 (combined flows from the 9 Seep Area wells) is ~30 ppm. This is down considerably from typical Seep concentrations of ~80 - 120 ppm prior to full operation of the Athens Road well field (initiated in 10/02).
- \* current pumping rates from the Seep Area well field are ~800 gpm.
- \* The seep is dry and has been for ~ one month.

7) Athens Road:

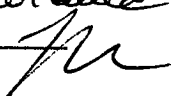
- \* This well field continues to pump at ~ 250 gpm (combined flow from the 8 wells)

8) System Wide:

- \* The current average flow through the IX Treatment System is ~ 1,060 gpm (combined flow from Athens Road Well Field & Seep Area wells).
- \* The elevation of stored perchlorate-bearing water in the on-site pond has not declined much this year. The ~55 gpm inflow from the on-site well field appears to nearly match the evaporation rates.

Todd J. Croft  
Remediation Branch Supervisor  
NDEP Bureau of Corrective Actions - Las Vegas Office  
tcroft@ndep.nv.gov (Please note the Change)  
(702) 486-2871 (Phone)  
(702) 486-2863 (Fax)



09/02/03  
Trev. Crowe  
**Todd Croft**

**From:** Crowley, Susan [SCROWLEY@KMG.com]  
**Sent:** Thursday, August 28, 2003 2:44 PM  
**To:** Bowerman.Larry@epamail.epa.gov  
**Cc:** Kaplan.Mitch@epamail.epa.gov; Todd Croft; Bailey, Keith; Krish, Ed; Stater, Rick; Reed, Thomas; Corbett, Pat  
**Subject:** Updated Information re Perchlorate Remediation

Larry,  
Attached is an updated spreadsheet which provides perchlorate remediation information in the same format as the previous submittal (in April). I researched the availability of information re M-100 and found that the well was sampled to satisfy a quarterly review ... and we've included the info that is available. I will review your other requests and research what is available and/or doable.




I believe our last submittal of this same information was in hard copy and I can forward this in printed format again, if you would like. I expected because you're pulling information from a variety of sources you might like to have it electronically. Please let me know if you would like a printed version ... it is no trouble at all. Please let me know if you have any questions. Thank you

Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, NV 89009  
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(702) 651-2310 fax

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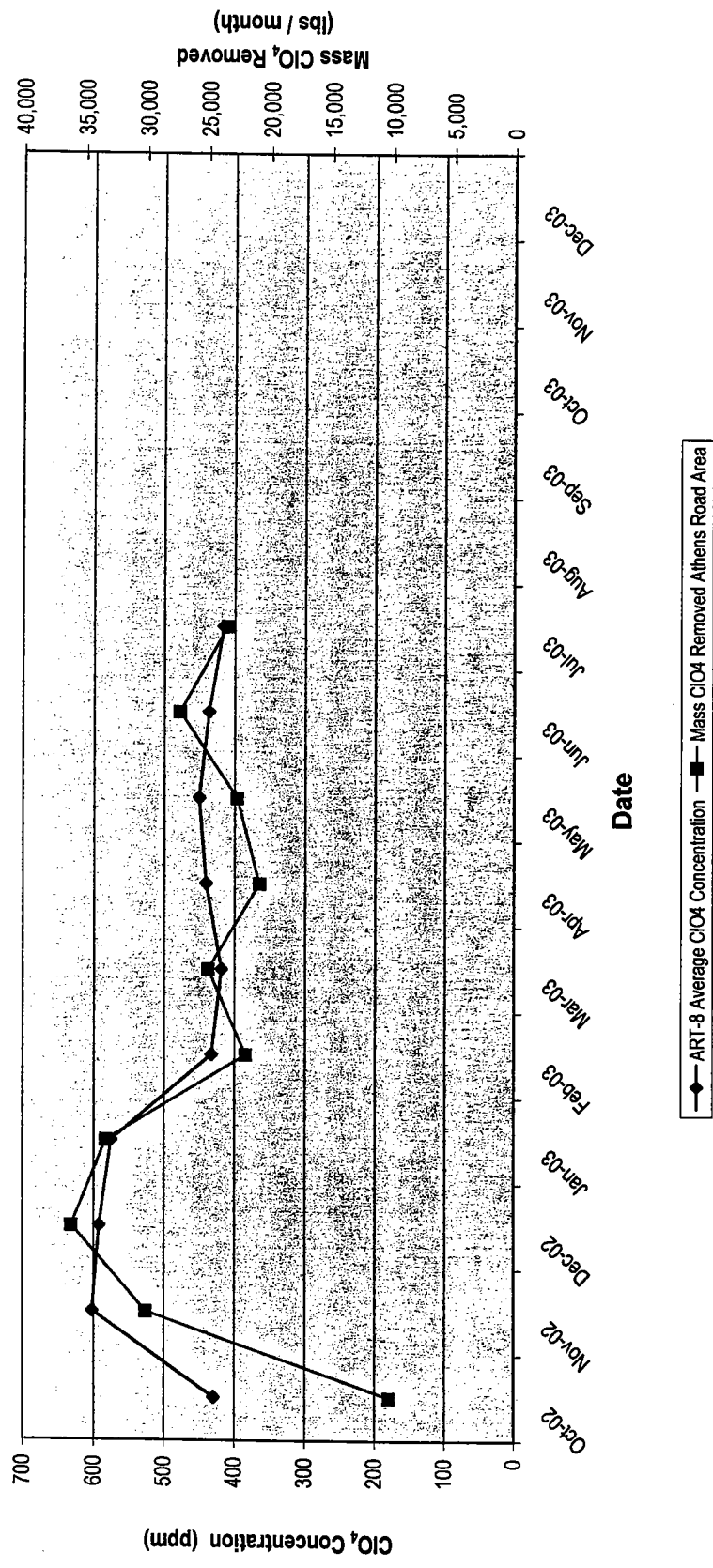
**On-Site Collection Area****Athens Road Collection Area****Collection Wells - Upgradient of Slurry Wall****Monitoring Wells - Downgradient of Slurry Wall****Collection Wells**

Date	Weighted Average ClO <sub>4</sub> Concentration On-Site (ppm)	Average Flow Rate (gpm)	Monthly Mass ClO <sub>4</sub> Removed - On-Site (lbs)	Date	M-100 ClO <sub>4</sub> Concentration (ppm)	Date	ART-8 Average ClO <sub>4</sub> Concentration (ppm)	Average Athens Road Field Flow Rate (gpm)	Monthly Mass ClO <sub>4</sub> Removed - Athens Road Area (lbs)
Oct-02	1,890	60.9	43,459	May-99	1300	Oct-02	429	250.8	10,259
Nov-02	1,758	53.5	34,366	Jun-99	1200	Nov-02	602	266	30,043
Dec-02	1,560	68	40,053	Jul-99	1300	Dec-02	592	250.4	36,071
Jan-03	1,673	72	45,481	Aug-99	1200	Jan-03	575	239.3	33,299
Feb-03	1,618	53.8	29,686	Jan-00	890	Feb-03	432	236.9	21,932
Mar-03	1,593	55	33,060	Feb-00	1000	Mar-03	418	247	24,977
Apr-03	1,564	52.2	29,860	Mar-00	940	Apr-03	440	237	20,816
May-03	1,735	54.5	35,668	Apr-00	990	May-03	450	241	22,633
Jun-03	1,515	59.5	32,955	May-00	1600	Jun-03	436	217	27,253
Jul-03	1,495	56.8	32,064	Jun-00	920	Jul-03	415	225	23,402
Aug-03				Jul-00	830	Aug-03			
Sep-03				Aug-00	850	Sep-03			
Oct-03				Sep-00	1000	Oct-03			
Nov-03				Oct-00	840	Nov-03			
Dec-03				Nov-00	850	Dec-03			
				Dec-00	1100				
				Jan-01	860				
				Feb-01	900				
				Mar-01	880				
				Apr-01	910				
				May-01	1100				
				Jun-01	1000				
				Jul-01	1100				
				Aug-01	1100				
				Sep-01	1200				
				Oct-01	1000				
				Nov-01	1000				
				Dec-01	1000				
				Jan-02	1000				
				Feb-02	910				
				May-02	610				
				Sep-02	350				
				Dec-02	340				
				Jan-03	230				
				Apr-03	220				
				Jul-03	200				

 <b>Monitoring Area - Between Athens Rd and Las Vegas Wash</b>			 <b>Seep Collection Area</b>					 <b>Monitoring Area - Seep</b>	
Monitoring Wells			Collection Wells	Surface Stream				Monitoring Wells	
Date	ARP-3 ClO <sub>4</sub> Concentration (ppm)	MW-K5 ClO <sub>4</sub> Concentration (ppm)	Date	Wells Average Flow Rate (gpm)	Stream Average Flow Rate (gpm)	Combined Average ClO <sub>4</sub> Concentration (ppm)	Monthly Mass ClO <sub>4</sub> Removed - Seep Area (lbs)	Date	PC-97 ClO <sub>4</sub> Concentration (ppm)
Oct-02	500	0.59	Oct-02	191	132	125.9	15,354	Oct-02	77
Nov-02	670	1	Nov-02	203	271	70.7	12,653	Nov-02	110
Dec-02	627	1.43	Dec-02	241	201	38.7	6,459	Dec-02	119
Jan-03	660	160	Jan-03	337	174	53.8	10,380	Jan-03	120
Feb-03	430	10.2	Feb-03	395	156	76.7	15,957	Feb-03	86
Mar-03	440	100	Mar-03	427	164	68.3	19,510	Mar-03	50
Apr-03	410	85	Apr-03	602	107	58.9	20,548	Apr-03	63
May-03	340	82	May-03	656	72	55.6	21,689	May-03	60
Jun-03	200	110	Jun-03	784	5.5	42.5	20,637	Jun-03	51
Jul-03	420	74	Jul-03	806	0.3	33.8	18,396	Jul-03	49
Aug-03			Aug-03					Aug-03	
Sep-03			Sep-03					Sep-03	
Oct-03			Oct-03					Oct-03	
Nov-03			Nov-03					Nov-03	
Dec-03			Dec-03					Dec-03	

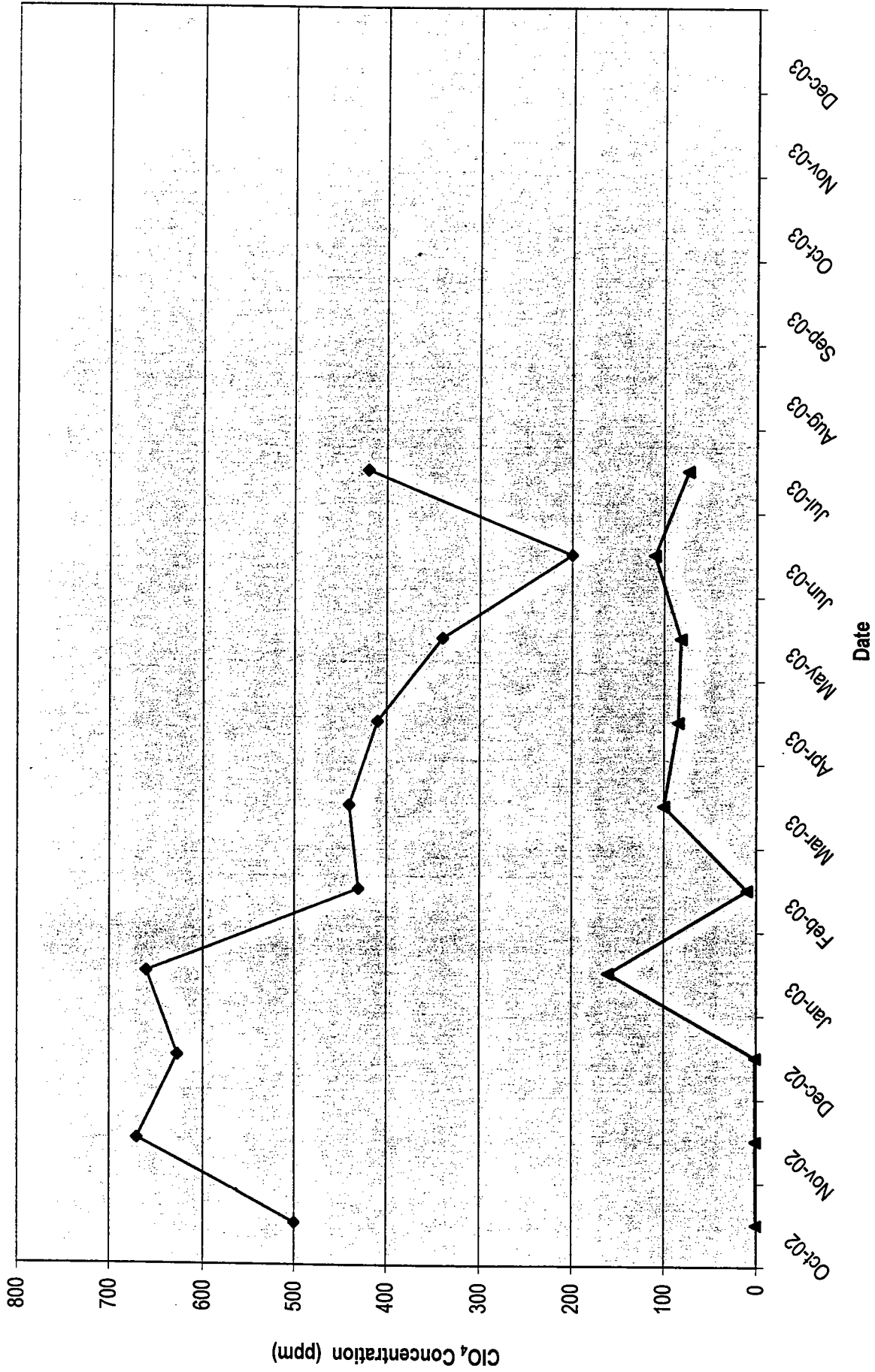


### Athens Road Collection Area





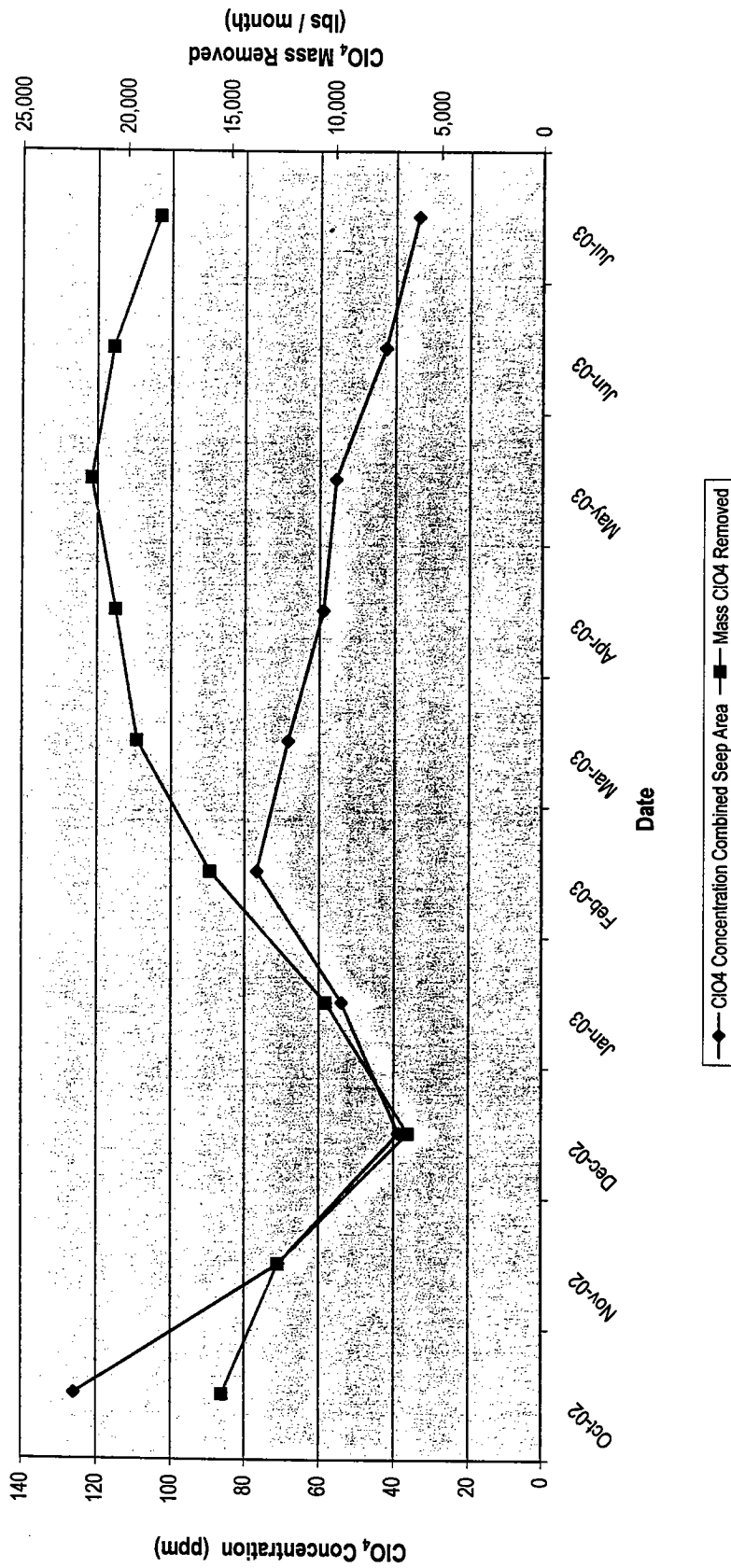
# Groundwater Monitoring - Between Athens Road and the Seep Area



Legend:  
—◆— ARP-3 ClO<sub>4</sub> Concentration  
—▲— MW-K5 ClO<sub>4</sub> Concentration

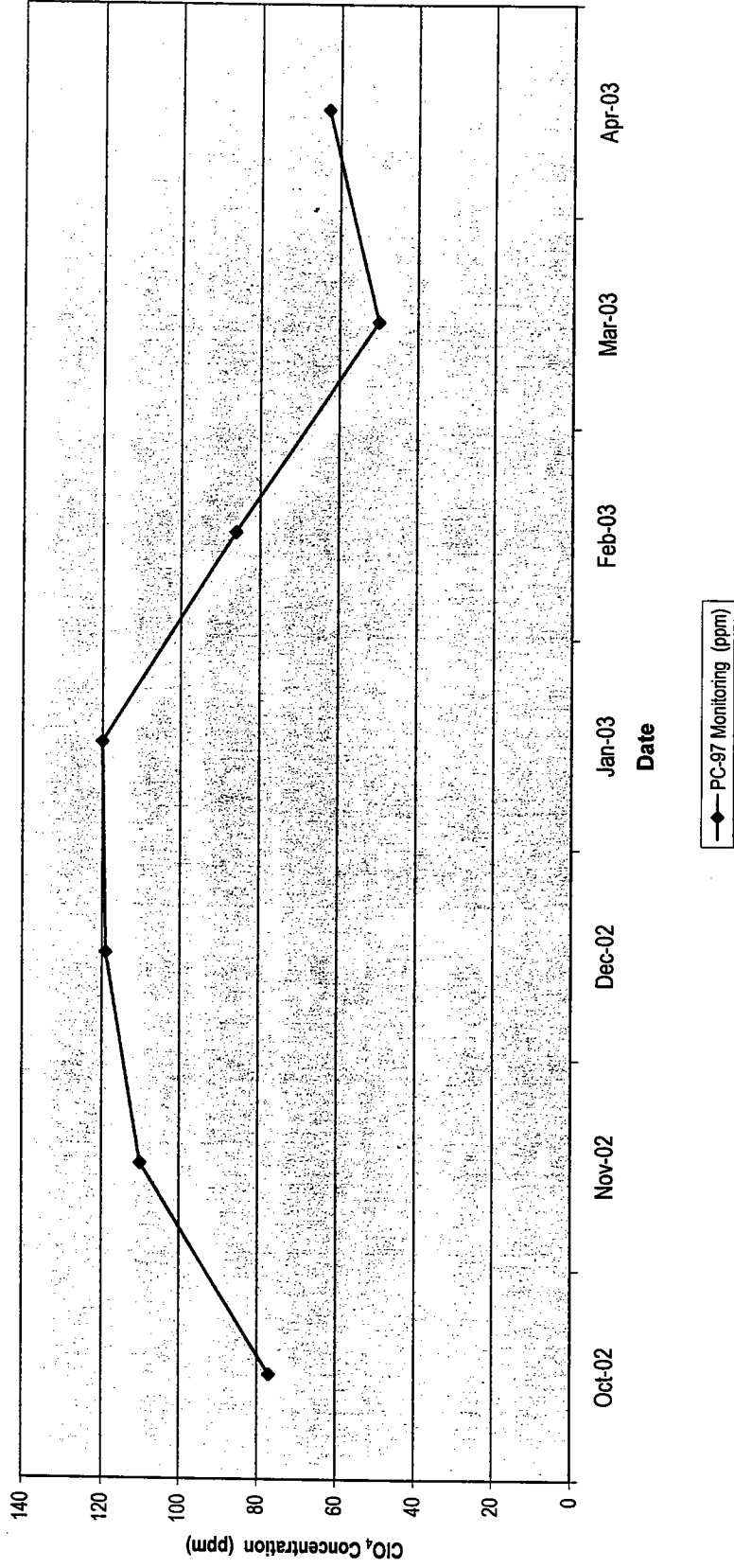


### Seep Area ClO<sub>4</sub> Removal Rate



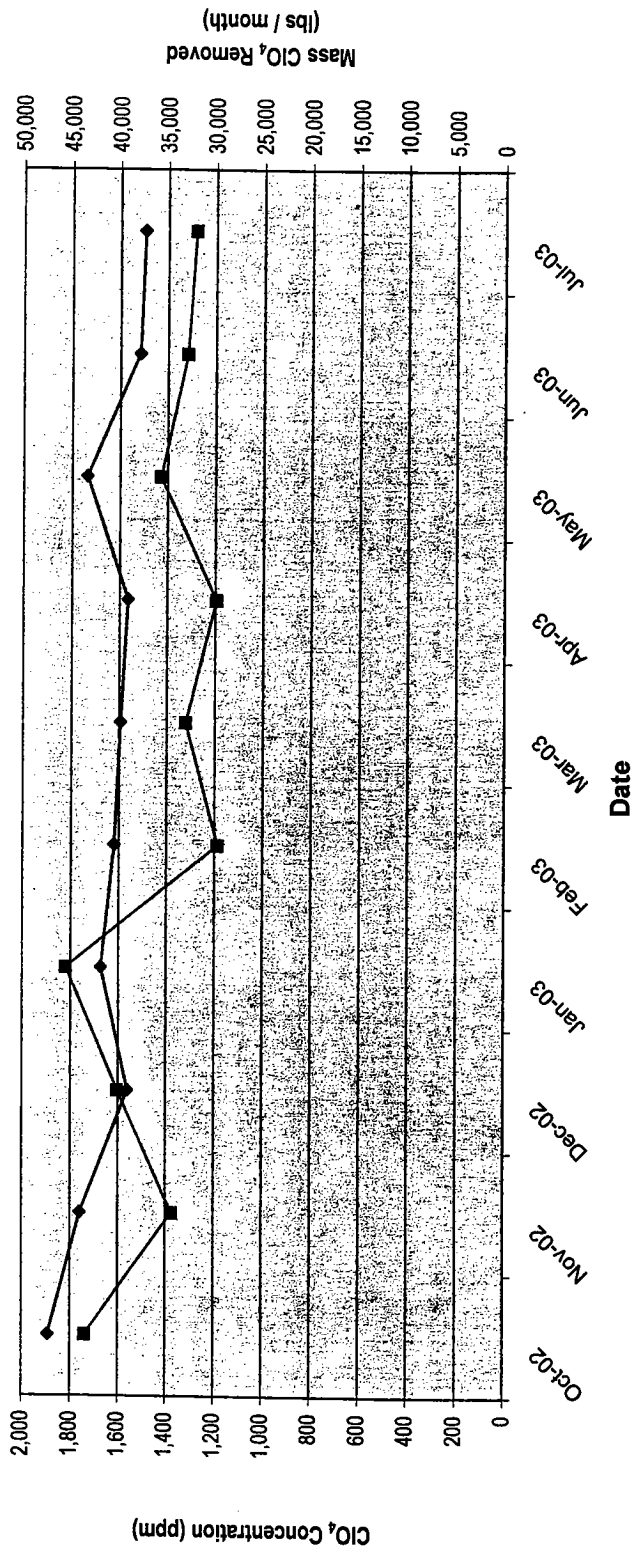


### Seep Area Groundwater Monitoring





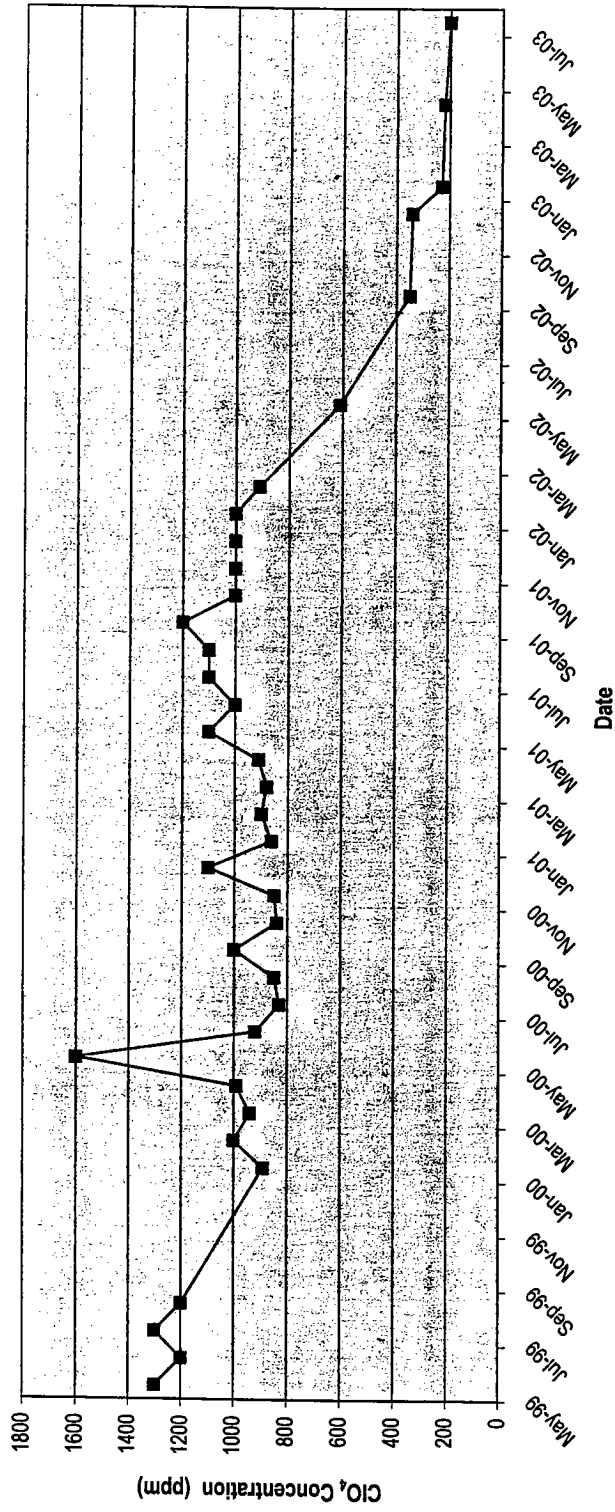
### On-Site Collection Area



◆ ClO<sub>4</sub> Concentration On-Site    ■ Mass ClO<sub>4</sub> Removed On-Site



# On-Site Collection Area Monitoring Wells



■ M-100 ClO<sub>4</sub> Concentration

(775) 687-4670

Administration  
*Facsimile* 687-5856

Water Pollution Control  
*Facsimile* 687-4684

Mining Regulation and  
Reclamation  
*Facsimile* 684-5259



2003 AUG 25 AM 9:52

Waste Management  
Corrective Actions  
Federal Facilities

Air Pollution Control  
Air Quality Planning  
Water Quality Planning

*Facsimile* 687-6396

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

**DIVISION OF ENVIRONMENTAL PROTECTION**

333 W. Nye Lane, Room 138

Carson City, Nevada 89706

August 21, 2003

Ms. Susan Crowley  
Kerr-McGee Chemical LLC  
P.O. Box 55  
Henderson, NV 89009

Re.: Change in Division Project Coordinator for the Kerr-McGee Plant Site.  
NDEP Facility ID #H-000539

Dear Ms. Crowley:

In accordance with Section XXIII of the Kerr-McGee Phase II Consent Agreement, the Nevada Division of Environmental Protection is notifying you of a change in the Division's Project Coordinator. As you are likely aware, the Division acquired a new position for our Las Vegas office in the spring of this year. Mr. Brian Rakvica has filled this position and has been assigned the oversight of the Kerr-McGee Plant Site. Mr. Rakvica and Mr. Jeff Johnson will be closely coordinating their respective efforts on the BMI Complex and BMI Common Areas.

Due to the Division's need to keep both Mr. Rakvica and Mr. Johnson informed on all technical aspects of the BMI Complex and Common Areas, all future documents submitted to the Division that include data or technical information should be sent to Mr. Rakvica in Las Vegas with a copy to Mr. Johnson in Carson City.

Should you have any questions or concerns, please do not hesitate to contact me at 775-687-9373.

Sincerely,

A handwritten signature in cursive script that reads "Jennifer L. Carr".

Jennifer L. Carr, P.E., C.E.M.  
Remediation Branch Supervisor  
Bureau of Corrective Actions

JLC:jc

Cc: Jim Najima, NDEP  
Terre Maize, NDEP  
Todd Croft, NDEP  
Brian Rakvica, NDEP  
Jeff Johnson, NDEP

## MEMORANDUM TO FILE

**TO:** KMCC Correspondence File

**FROM:** Brian A. Rakvica

**DATE:** August 1, 2003

**CC:** Todd Croft and Jeff Johnson

**RE:** Review of Chromium Mitigation Permitting

1. Brian reviewed the KMCC Consent Agreement for chromium mitigation (1986) and noted that the discharge limits exceeded the MCLs. The subsequent UIC permit (1995) reiterated these limitations.
2. Brian reviewed this issue with Russ Land (BWPC – CC) and Russ noted that the year 2000 renewal for this permit had not yet been issued. Brian explained the issue of the discharge limitations and Russ noted that Evan Chambers will address this issue.
3. Brian began to review the various NPDES and GW permits for the KMCC. The chromium mitigation system discharges to an on site pond (GW-11 as noted by BWPC) and is regulated by permit # NV0023060. Discharge limitations are: 0.01 ppm for hexavalent chromium and 0.1 ppm for total chromium (which matches the MCL for total chromium).
4. The DMRs for this permit indicate that concentrations of chromium have been ND typically.
5. ACTION ITEM: BWPC needs to re-issue the UIC permit # NEV94218 to change the discharge limitations to the applicable MCLs. Brian to follow up with BWPC.

## Todd Croft

---

**From:** Crowley, Susan [SCROWLEY@KMG.com]  
**Sent:** Wednesday, July 09, 2003 3:28 PM  
**To:** Todd Croft  
**Cc:** Bailey, Keith; Stater, Rick; Corbett, Pat; Boles, Roger; Ganus, Bill; Krish, Ed; Reed, Thomas  
**Subject:** Pounds Perchlorate Removed from the Environment - June 2003

Todd,

Below are the pounds perchlorate removed from the environment over the life of the perchlorate remediation project, with some specific estimated amounts from June 2003. Please keep in mind that information provided for June will be estimated based upon analytical received through the first week in June. The information provided through May 2003 (and previous months) has been confirmed and the totals adjusted as needed.

- **From the Seep Area (groundwater and surface water combined): 242.6 tons total.** This includes both surface water capture from initiation of the project plus seep area groundwater extraction since 3-5-02. To determine the June total estimate, the confirmed information through May 2003 (231.6 tons) was increased by the estimated amount for June 2003 (22,032 lbs - 21,986 lbs from wells and 46 lbs from the surface flow). The estimate for June will be confirmed as the July information is passed to you next month.
- **Seep area groundwater collected prior to 3-5-02: 13.22 tons total** (some of which went to the GW-11 pond the remaining treated in the wash IX).
- **On-site groundwater well collection field: 532.8 tons total.** To determine the June total estimate, the confirmed information through May 2003 (516.3 tons) was increased by the estimated amount for June 2003 (32,955 lbs). June's activity amounted to a little over 1,000 lbs / day. Perchlorate removal in this area continues to be a very effective - primarily because of it's vicinity to the source.
- **Athens Rd area groundwater well collection field: 130.6 tons total.** To determine the June total estimate, the confirmed information through May 2003 (117.7 tons) was increased by the estimated amount for June 2003 (25,875 lbs). The estimate for June will be confirmed as the July information is passed to you next month. June's activity equates to an estimated removal rate of a little under 1,000 lbs / day.

**Total removed as of 6-30-03: 919.2 tons total** (This number includes confirmed information through May 2003 and estimated information for June 2003)

Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, NV 89009  
(702) 651-2234 office  
(702) 592-7727 cell  
(702) 651-2310 fax

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Administration  
Water Pollution Control  
Air Quality  
(702) 486-2850



Federal Facilities  
Corrective Actions  
Waste Management  
Facsimile 486-2863

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**

(Las Vegas Office)

555 E. Washington Ave., Suite 4300  
Las Vegas, Nevada 89101-1049

July 9, 2003

Mr. Kurt Maddern  
Project Manager  
Engineering & Construction  
US Filter  
115 South Weber Drive

RE: Kerr-McGee Chemicals; Ammonium Perchlorate Remedial Project, Biological Treatment System

Dear Mr. Maddern:

After cursory review of preliminary draft plans and remediation procedures for the above-mentioned project, the Bureau of Water Pollution Control grants the designs concept a conditional approval, pending you providing a complete final set of plans and specifications to this office for review and approval.

The plans and specifications must be wet stamped, signed, and dated by a registered professional engineer in the State of Nevada.

Please be aware that construction, installation, expansion or modification may not begin until you first obtain a permit or modification to an existing permit to discharge, in accordance with NAC 445A.283.

If you have any questions, please feel free to call me at (702) 486-2853.

Sincerely,

Nadir E. Sous, Supervisor  
Staff Engineer/Technical Services  
Bureau of Water Pollution Control

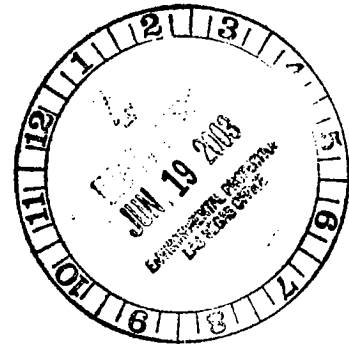
Cc: Darrell Rasner, BWPC/NDEP, Carson City  
Jon Palm, BWPC/NDEP, Carson City  
Diana Silsby, BWPC/NDEP, Carson City  
Jim Najima, BCA/NDEP, Carson City  
Todd Croft, BCA/NDEP, Las Vegas  
Dale Green, US Filter  
Susan Crowley, Kerr-McGee, Henderson  
Keith Bailey, Kerr-McGee, PO Box 25861, Oklahoma City, Oklahoma 73125  
David Moll, Kerr-McGee, PO Box 25861, Oklahoma City, Oklahoma 73125



**KERR-McGEE CHEMICAL LLC**

POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

June 18, 2003



Mr. Todd Croft  
Nevada Division of Environmental protection  
1771 East Flamingo, Suite 121-A  
Las Vegas, NV 89119

Subject: Perchlorate Remediation

Dear Mr. Croft:

This letter is to inform the Nevada Division of Environmental Protection (NDEP), U.S. EPA and the Southern Nevada Water Authority (SNWA), that Kerr-McGee Chemical LLC (Kerr-McGee) has contracted with US Filter Operating Services, Inc. (USFOS) to construct and operate a biological treatment plant on the Henderson plant site. The new two-stage biological treatment facility will replace the 825 gpm Ion-Exchange / Catalytic Destruction system, which failed during start-up last year. The on-site and wash area temporary IX systems will continue to operate while the new plant is constructed. Construction is expected to be complete in early 2004, with full operation to be demonstrated by the end of April 2004.

The biological treatment plant incorporates the same fluidized bed reactor (FBR) technology that has been successfully used at three major perchlorate remediation programs (Aerojet in Sacramento, California; and the Longhorn and McGreggor Superfund sites in Texas). The new system is designed to destroy nitrate, chlorate and perchlorate.

We look forward to continuing our working relationship with the agencies and expect continued success in removing perchlorate from the environment. If you have questions or comments, please contact me at (702) 651-2234 or Keith Bailey at (405) 270-3651.

Sincerely,

Susan M. Crowley  
Staff Environmental Specialist

Certified Mail  
7000 1670 0002 1246 4545

cc: Larry Bowerman, EPA Region IX  
Barry Conaty, City of Henderson  
Marshall Davis, Metro Water District of Southern California  
Mitch Kaplan, EPA Region IX  
Pat Mulroy, Southern Nevada Water Authority  
Brenda Pohlmann, City of Henderson  
Doug Zimmerman, NDEP  
Joe Leising, Southern Nevada Water Authority  
Peggy Roefer, Southern Nevada Water Authority

**CERTIFIED MAIL**



7000 1670 0002 1246 4545

## Todd Croft

---

**From:** Todd Croft  
**Sent:** Wednesday, June 04, 2003 1:54 PM  
**To:** Terre Maize; Jim Najima  
**Cc:** Doug Zimmerman; Jennifer Carr; Jeff Johnson; Brian Rakvica; Sara Arav Piper  
**Subject:** Review of AMPAC Pilot Test Report

All:

We are in receipt of a Pilot Test Report from AMPAC that outlines the success and difficulties they experienced while conducting an In-situ Bioremediation Pilot for perchlorate-impacted groundwater in Henderson, NV. The report is dated May 30, 2003 and was received in the NDEP-LV office on 06/02/03. Doug Zimmerman was cced on this report - Jim, you may wish to locate it and scan through it.

The following are highlights as I see them from review of the referenced report:

**\* "The results of this pilot test clearly indicate that in-situ bioremediation is technically feasible and has the capability to biodegrade perchlorate to environmentally acceptable end products in groundwater at the Site. The installation of a full-scale system using citric acid as the electron donor is recommended."**

\* "The key to successfully implementing in-situ bioremediation of perchlorate appears to be the addition of appropriate carbon substrates (electron donors) in adequate quantities to reduce competing electron acceptors present in the groundwater (e.g. oxygen, nitrate, and chlorate), and to promote the perchlorate reduction reaction. Excess addition of these organic substrates can be problematic due to possible unintended reductions of other candidate electron acceptors (e.g. sulfate, iron, or manganese) that occur after reduction of perchlorate, and thus care must be taken to balance the electron donor addition rate to the electron acceptor demand."

\* "...the calculated perchlorate half-lives are in the range of 2-3 days. This is consistent w/ perchlorate biodegradation half-lives measured for other perchlorate sites..."

\* "... the calculated biodegradation half-lives for chlorate was 5 days."

**\* Perchlorate was biodegraded from:**

**>600 mg/L (ppm) to <2ug/L (ppb) within 50 feet of the injection well in 106 days (DX-161A);**

**~580 mg/L (ppm) to <2ug/L (ppb) within 50 feet of the injection well in 109 days (DX-161B).**

\* Oxygen, nitrate, chlorate, and perchlorate were all biodegraded to low or non detected values within 50 feet of the injection well.

\* Chloride concentrations increased in the local groundwater from pre-pilot test conditions (~1,000 mg/L) to post-pilot test conditions (typical range of 1,200 to 1,300 mg/L) consistent with changes expected from perchlorate and chlorate reduction.

\* Sulfate, iron, and manganese reduction occurred late in the pilot test due to an imbalance in the amount of electron donor present (injected) compared to the electron acceptor demand. For future bioremediation applications, the amount of electron donor should be better matched to the changing amount of electron acceptor demand as a means to minimize or eliminate sulfate reduction and/or metals mobilization. Additionally, the design of the bioremediation project should be revised to allow placement of injection wells downgradient from extraction wells.

\* Fouling (mineral &/or bio) occurred within the injection and extraction wells as the pilot test proceeded. Several methods were employed to reduce or eliminate fouling related problems. Future bioremediation projects should employ citric acid as the electron donor as a means to limit mineral fouling. Additionally, periodic doses of chlorine dioxide should be able to control and limit biofouling.

BYE TJC

**Todd Croft**

---

**From:** Crowley, Susan [SCROWLEY@KMG.com]  
**Sent:** Wednesday, June 04, 2003 9:22 AM  
**To:** Todd Croft  
**Cc:** Bailey, Keith; Stater, Rick; Corbett, Pat; Waters, Richard; Taylor, Bill; Doug Zimmerman; Bowerman.Larry@epamail.epa.gov  
**Subject:** Perchlorate Removed from the Environment - May 2003 Estimate

Todd,

Below are the pounds perchlorate removed from the environment over the life of the perchlorate remediation project, with some specific estimated amounts from May 2003. Please keep in mind that information provided for May will be estimated based upon analytical received through the first week in May. The information provided through April 2003 (and previous months) has been confirmed and the totals adjusted as needed.

- **From the Seep Area (groundwater and surface water combined): 231.0 tons total.** This includes both surface water capture from initiation of the project plus seep area groundwater extraction since 3-5-02. To determine the May total estimate, the confirmed information **through April 2003 (220.7 tons)** was increased by the **estimated amount for April 2003 (20,669 lbs - 19,693 lbs from wells and 976 lbs from the surface flow)**. The estimate for May will be confirmed as the June information is passed to you next month. *may*
- **Seep area groundwater collected prior to 3-5-02: 13.22 tons total** (some of which went to the GW-11 pond the remaining treated in the wash IX).
- **On-site groundwater well collection field: 516.3 tons total.** To determine the May total estimate, the confirmed information **through April 2003 (498.5 tons)** was increased by the **estimated amount for May 2003 (35,668 lbs)**. May's activity amounted to a little over 1,000 lbs / day. Perchlorate removal in this area continues to be a very effective - primarily because of it's vicinity to the source.
- **Athens Rd area groundwater well collection field: 117.5 tons total.** To determine the May total estimate, the confirmed information **through April 2003 (106.4 tons)** was increased by the **estimated amount for May 2003 (21,660 lbs)**. The estimate for May will be confirmed as the June information is passed to you next month. May's activity equates to an estimated removal rate of a little under 1,000 lbs / day.

**Total removed as of 4-30-03: 878.0 tons total** (This number includes confirmed information through April 2003 and estimated information for May 2003)

Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, NV 89009  
(702) 651-2234 office  
(702) 592-7727 cell  
(702) 651-2310 fax

*Seep ~ 32*

*Athens ~ 699*

*Seep Area ~ 635  
wells*

*Seep Area ~ 667*

*onsite ~ 150*

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## Todd Croft

---

**From:** Todd Croft  
**Sent:** Tuesday, May 27, 2003 4:33 PM  
**To:** Terre Maize  
**Cc:** Allen Biaggi; Doug Zimmerman; Jim Najima  
**Subject:** FW: Kerr McGee; CA DHS Contact Re: Perchlorate

All:

Greg Braun from the California Department of Health Services contacted me today for information related to our perchlorate remediation in the Las Vegas Valley. He has contacted Larry Bowerman (US EPA Region IX) and will be obtaining a "Fact Sheet" from him. I also suggested he could obtain select monitoring data from throughout the Colorado River system from Larry.

Greg wanted a basic understanding of what we are doing. I suggested the PowerPoint presentation that Allen provided to the CRC a few months ago. I'll be mailing a CD of that presentation to Greg as the file is too large to send as an e-mail attachment (I tried).

BYE TJC

-----Original Message-----

From: Braun, Greg (DHS-EHIB) [mailto:GBraun@dhs.ca.gov]  
Sent: Tuesday, May 27, 2003 4:17 PM  
To: Todd Croft  
Subject: RE: Kerr McGee

Todd,

I got an error message indicating that the file was too large. Could you try again, or burn a copy and send it via regular mail.

Thanks, Greg

-----Original Message-----

From: Todd Croft [mailto:tcroft@ndep.nv.gov]  
Sent: Tuesday, May 27, 2003 4:15 PM  
To: Braun, Greg (DHS-EHIB)  
Subject: RE: Kerr McGee

Greg:

Attached, please find a PowerPoint presentation prepared for the Colorado River Commission regarding perchlorate remediation in the Las Vegas Valley. Please call me should you need additional information or current status.

Thanks.

Todd J. Croft  
NDEP-Las Vegas Office

-----Original Message-----

From: Braun, Greg (DHS-EHIB) [mailto:GBraun@dhs.ca.gov]  
Sent: Tuesday, May 27, 2003 4:06 PM  
To: Todd Croft  
Subject: Kerr McGee

Hi Scott,

Thanks for giving me the update on activities at Kerr McGee. This information will be helpful to us in future meetings with the public about perchlorate.

Greg

Greg Braun  
Research Scientist  
California Department of Health Services  
Environmental Health Investigations Branch  
1515 Clay Street, 17th Floor  
Oakland, CA 94612  
(510) 622-4493  
gbraun@dhs.ca.gov

## Todd Croft

---

**From:** Crowley, Susan [SCROWLEY@KMG.com]  
**Sent:** Wednesday, May 21, 2003 8:23 AM  
**To:** Todd Croft  
**Cc:** Bailey, Keith; Boles, Roger; Stater, Rick; Corbett, Pat; Waters, Richard  
**Subject:** Perchlorate Removed form the Environment - April 2003

Todd,

Below are the pounds perchlorate removed from the environment over the life of the perchlorate remediation project, with some specific numbers from April 2003. Please keep in mind that information provided for April will be estimated based upon analytical received through the first week in April. The information provided through March 2003 (and previous months) has been confirmed and the totals adjusted as needed.

- **From the Seep Area (groundwater and surface water combined): 221 tons total.** This includes both surface water capture from initiation of the project plus seep area groundwater extraction since 3-5-02. To determine the April total estimate, the confirmed information through March 2003 (210 tons) was increased by the estimated amount for April 2003 (20,548 lbs - 18,840 lbs from wells and 1,708 lbs from the surface flow). The estimate for April will be confirmed as the May information is passed to you next month.
  - **Seep area groundwater collected prior to 3-5-02: 13.22 tons total** (some of which went to the GW-11 pond the remaining treated in the wash IX).
  - **On-site groundwater well collection field: 498 tons total.** To determine the April total estimate, the confirmed information through March 2003 (483) was increased by the estimated amount for April 2003 (29,860 lbs). April's activity amounted to a little under 1,000 lbs / day. Perchlorate removal in this area continues to be a very effective - primarily because of it's vicinity to the source.
  - **Athens Rd area groundwater well collection field: 106 tons total.** To determine the April total estimate, the confirmed information through March 2003 (95.7 tons) was increased by the estimated amount for April 2003 (20,816 lbs). The estimate for April will be confirmed as the May information is passed to you next month. April's activity equates to an estimated removal rate of a little under 1,000 lbs / day.
- Total removed as of 4-30-03: 838 tons total** (This number includes confirmed information through March 2003 and estimated information for April 2003)

Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, NV 89009  
(702) 651-2234 office  
(702) 592-7727 cell  
(702) 651-2310 fax

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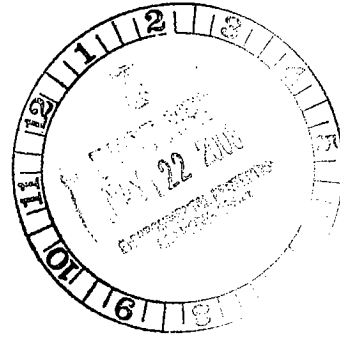
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**KERR-McGEE CORPORATION**  
KERR-McGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

SAFETY & ENVIRONMENTAL AFFAIRS DIVISION

May 19, 2003



Mr. Todd Croft  
Nevada Division of Environmental Protection  
1771 E Flamingo Road  
Suite 121-A  
Las Vegas, NV 89119

Dear Mr. Croft:

As you requested, I have enclosed the lithology logs and well completion forms for the "Buddy" wells which twin the original wells of the Athens Road Well Field.

These new wells are named ART-1A, 2A, 3A, 4A, 6A, 7A and 8A.

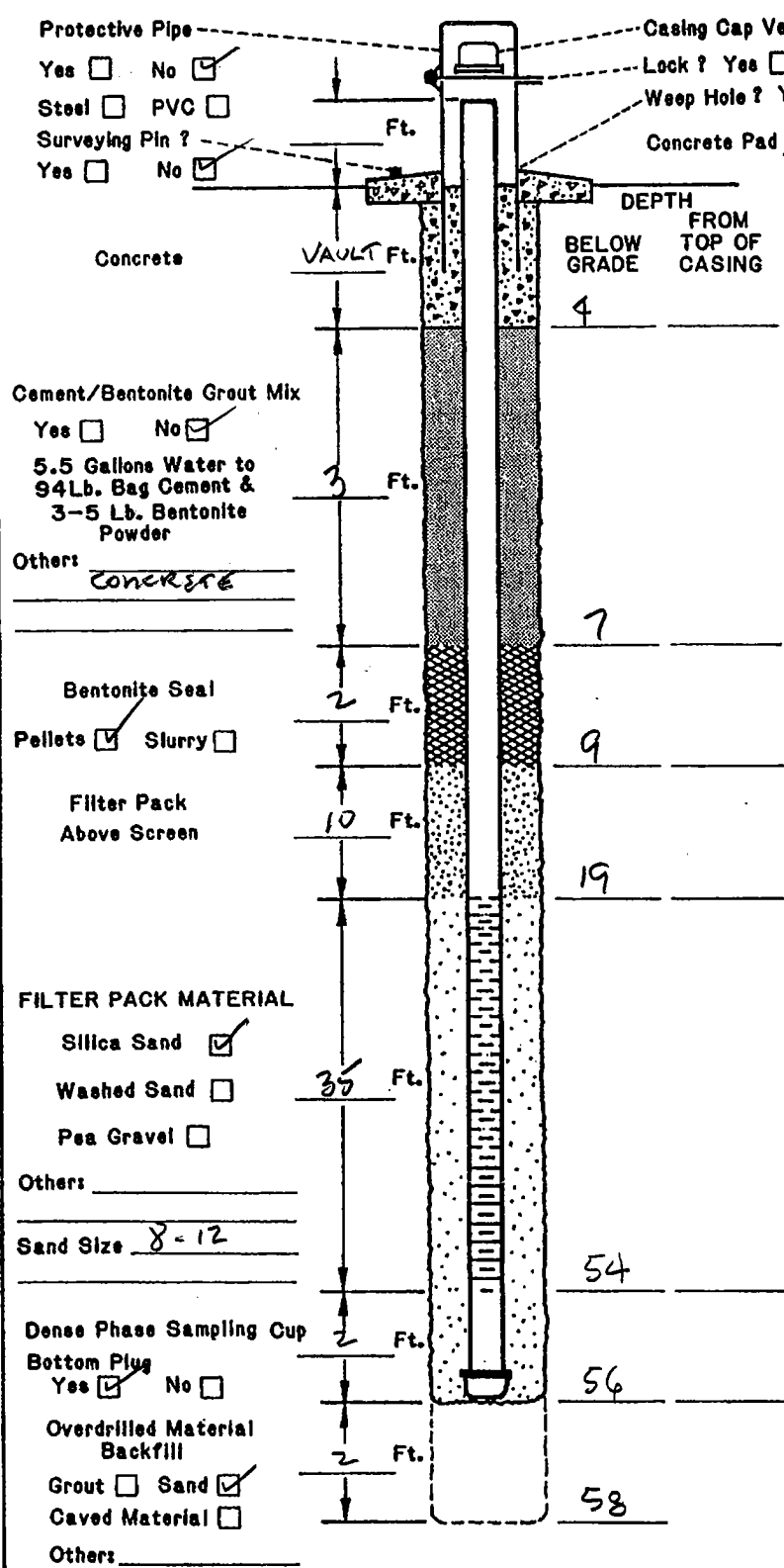
Please call me at 405-270-3752 if you have any questions. Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Ed".

Edward J. Krish

### KERR-McGEE CORPORATION HYDROLOGY DEPARTMENT MONITORING WELL INSTALLATION DIAGRAM



- DRILLING INFORMATION:**
- Borehole Diameter = 13.25 Inches.
  - Were Drilling Additives Used? Yes  No   
 Revert  Bentonite  Water   
 Solid Auger  Hollow Stem Auger
  - Was Outer Steel Casing Used? Yes  No   
 Depth = \_\_\_\_\_ to \_\_\_\_\_ Feet.
  - Borehole Diameter for Outer Casing \_\_\_\_\_ Inches.

- WELL CONSTRUCTION INFORMATION:**
- Type of Casings: PVC  Galvanized  Teflon   
 Stainless  Other \_\_\_\_\_
  - Type of Casing Joints: Screw-Couple  Glue-Couple  Other \_\_\_\_\_
  - Type of Well Screens: PVC  Galvanized   
 Stainless  Teflon  Other \_\_\_\_\_
  - Diameter of Casing and Well Screens:  
 Casing 8 Inches, Screen 8 Inches.
  - Slot Size of Screens: 0.040
  - Type of Screen Perforations: Factory Slotted   
 Hacksaw  Drilled  Other \_\_\_\_\_
  - Installed Protector Pipe w/Locks: Yes  No

- WELL DEVELOPMENT INFORMATION:**
- How was Well Developed? Bailing  Pumping   
 Air Surging (Air or Nitrogen)  Other FURGE BLOCK
  - Time Spent on Well Development? 4 Minutes/Hours
  - Approximate Water Volume Removed? 3000 Gallons
  - Water Clarity Before Development? Clear   
 Turbid  Opaque
  - Water Clarity After Development? Clear   
 Turbid  Opaque
  - Did Water have Odor? Yes  No   
 If Yes, Describe \_\_\_\_\_
  - Did Water have any Color? Yes  No   
 If Yes, Describe \_\_\_\_\_

**WATER LEVEL INFORMATION:**  
 Water Level Summary (From Top of Casing)

During Drilling 23 Ft. Date 3-31-03  
 Before Development \_\_\_\_\_ Ft. Date 4-1-03  
 After Development 22.59 Ft. Date 4-2-03

Driller/Firm HERMANN / LAYNE Drill Rig Type AP-1000 Date Installed 3-31-03  
 Drill Crew BO / MARCO Well No. ART 1A Kerr-McGee Hydrologist ED KRISH

**SOIL BORING LOG** KM-5655-A

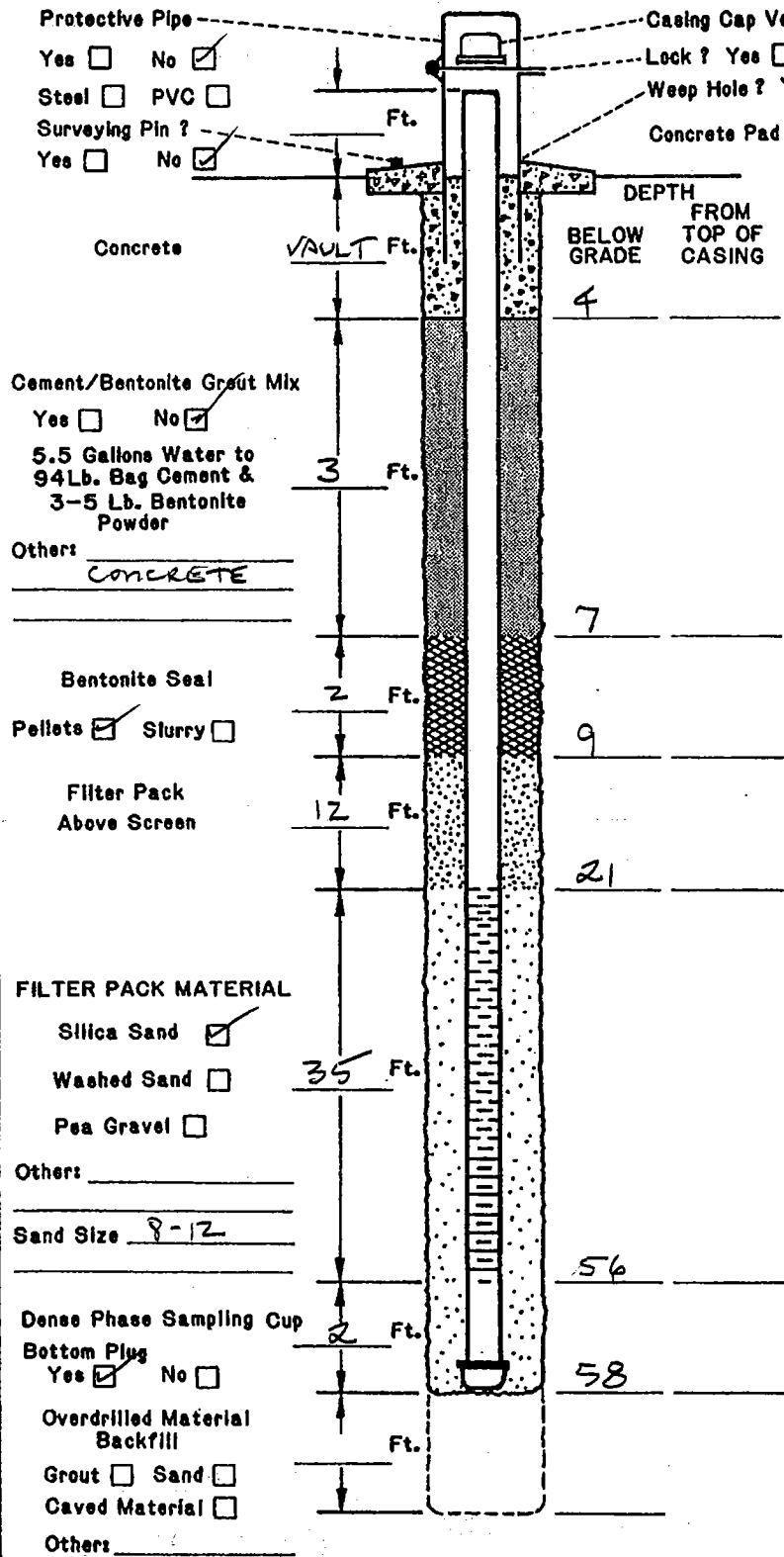
<b>KERR-McGEE CORPORATION</b> Hydrology Dept. Engineering Services	KM SUBSIDIARY <b>KMC LLC</b>	LOCATION <b>HENDERSON, NV</b>	BORING NUMBER <b>ART 1A</b>
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DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER FOOT	PID (ppm)	SOIL SAMPLE				REMARKS OR FIELD OBSERVATIONS
						NO.	TYPE	DEPTH	REC.	
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">ART 1A Loc.</div> <div style="margin-bottom: 10px;">5 FT WEST OF</div> <div style="margin-bottom: 10px;">ART 1 . SEE</div> <div style="margin-bottom: 10px;">ART 1 LITH LOG</div> <div style="margin-bottom: 10px;">FOR LITHOLOGY</div> <div style="margin-bottom: 10px;">MC @ 54</div> <div style="margin-bottom: 10px;">TD @ 58</div> <div style="margin-bottom: 10px;">WTR @ 23</div> </div>										

<b>EXPLANATION</b>		Water Table (24 Hour)	<b>GRAPHIC LOG LEGEND</b>	DATE DRILLED	PAGE
		Water Table (Time of Boring)		4-	1 of 1
		PID Photoionization Detection (ppm) Identifies Sample by Number Sample Collection Method		DEBRIS FILL	DRILLING METHOD
		SPLIT-BARREL		HIGHLY ORGANIC (PEAT)	HAMMER
		AUGER		SANDY CLAY	DRILLED BY
	THIN-WALLED TUBE		CLAYEY SAND	LAYNE	
	CONTINUOUS SAMPLER			LOGGED BY	
	ROCK CORE			ED KRISH	
	NO RECOVERY			EXISTING GRADE ELEVATION (FT. AMSL)	
DEPTH. Depth Top and Bottom of Sample	REC. Actual Length of Recovered Sample in Feet			LOCATION OR GRID COORDINATES	

**KERR-McGEE CORPORATION  
HYDROLOGY DEPARTMENT  
MONITORING WELL INSTALLATION DIAGRAM**

FLUSH MOUNT  
IN VAULT



**DRILLING INFORMATION:**

- Borehole Diameter = 13.25 Inches.
- Were Drilling Additives Used? Yes  No   
 Revert  Bentonite  Water   
 Solid Auger  Hollow Stem Auger
- Was Outer Steel Casing Used? Yes  No   
 Depth = \_\_\_\_\_ to \_\_\_\_\_ Feet.
- Borehole Diameter for Outer Casing \_\_\_\_\_ Inches.

**WELL CONSTRUCTION INFORMATION:**

- Type of Casing: PVC  Galvanized  Teflon   
 Stainless  Other \_\_\_\_\_
- Type of Casing Joints: Screw-Couple  Glue-Couple  Other \_\_\_\_\_
- Type of Well Screen: PVC  Galvanized   
 Stainless  Teflon  Other \_\_\_\_\_
- Diameter of Casing and Well Screen:  
 Casing 8 Inches, Screen 8 Inches.
- Slot Size of Screen: 0.040
- Type of Screen Perforations: Factory Slotted   
 Hackaw  Drilled  Other \_\_\_\_\_
- Installed Protector Pipe w/Locks: Yes  No

**WELL DEVELOPMENT INFORMATION:**

- How was Well Developed? Bailing  Pumping   
 Air Surging (Air or Nitrogen)  Other SURGE BLOCK
- Time Spent on Well Development?  
4 / \_\_\_\_\_ Minutes/Hours
- Approximate Water Volume Removed? 3000 Gallons
- Water Clarity Before Development? Clear   
 Turbid  Opaque
- Water Clarity After Development? Clear   
 Turbid  Opaque
- Did Water have Odor? Yes  No   
 If Yes, Describe \_\_\_\_\_
- Did Water have any Color? Yes  No   
 If Yes, Describe \_\_\_\_\_

**WATER LEVEL INFORMATION:**

Water Level Summary (From Top of Casing)  
 During Drilling 26 Ft. Date 3-30-03  
 Before Development \_\_\_\_\_ Ft. Date 3-31-03  
 After Development 26.09 Ft. Date 4-1-03

Driller/Firm HORMAN/LAYNE Drill Rig Type AP 1000 Date Installed 3-31-03  
 Drill Crew BO/MARCO Well No. ART 2A Kerr-McGee Hydrologist ED KRISH

**SOIL BORING LOG** KM-5655-A

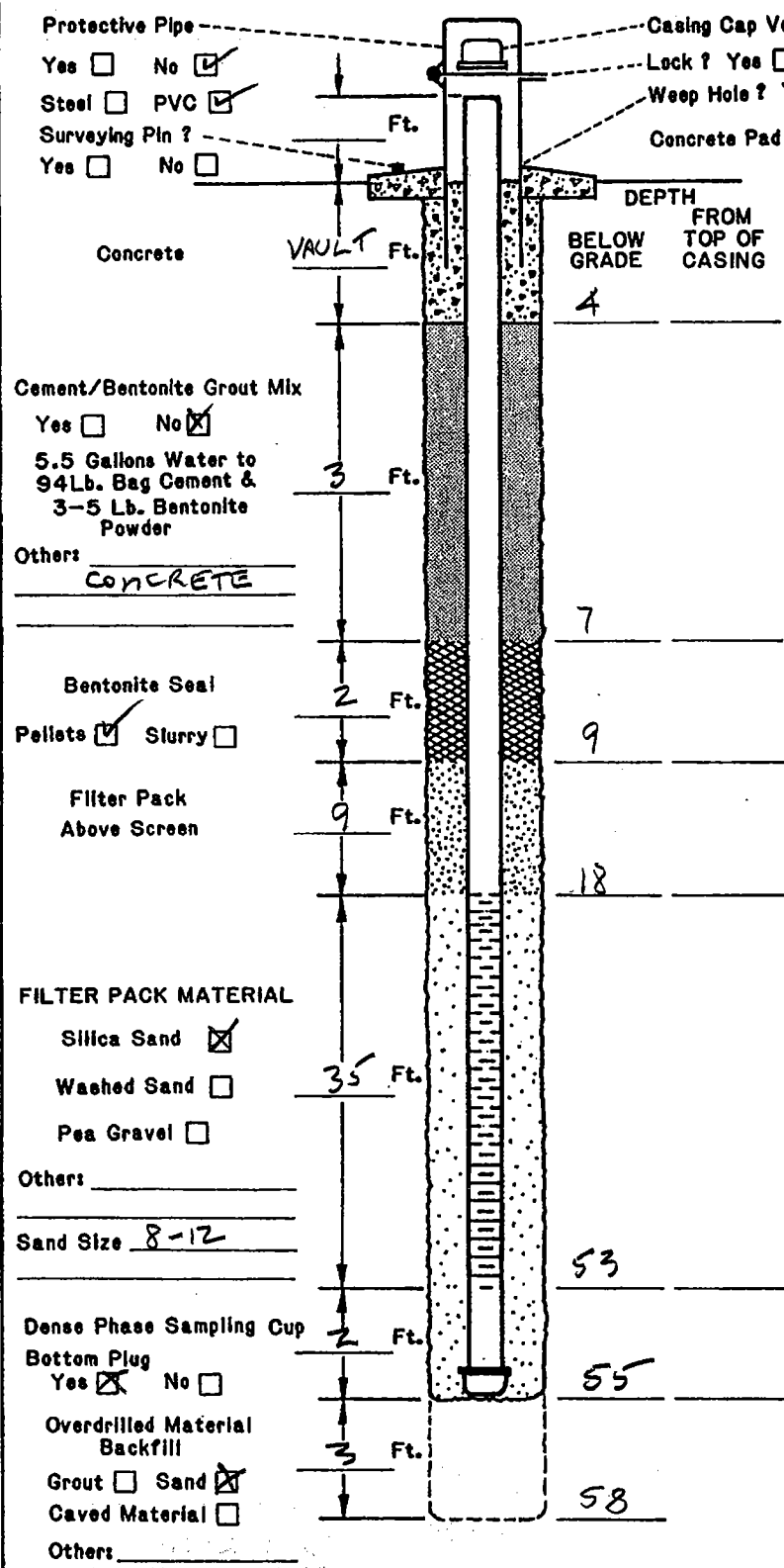
<b>KERR-McGEE CORPORATION</b> Hydrology Dept. Engineering Services	KM SUBSIDIARY <b>KMC LLC</b>	LOCATION <b>HENDERSON, NV</b>	BORING NUMBER <b>ART 2A</b>
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DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER FOOT	PID (ppm)	SOIL SAMPLE				REMARKS OR FIELD OBSERVATIONS
						NO.	TYPE	DEPTH	REC.	
<p>ART 2A LOC 5 FT WEST OF ART 2. SEE ART 2 LITH LOG FOR LITHOLOGY</p> <p>MCC @ 57' TD @ 58' WTR @</p> <p>54'-57' hard calicheified gravel</p>										

<b>EXPLANATION</b>	▼	Water Table (24 Hour)	<b>GRAPHIC LOG LEGEND</b>				DATE DRILLED <b>3-30-03</b>	PAGE <b>1 of 1</b>
	▽	Water Table (Time of Boring)		CLAY		DEBRIS FILL	DRILLING METHOD <b>HAMMER</b>	
	PID	Photoionization Detection (ppm)		SILT		HIGHLY ORGANIC (PEAT)	DRILLED BY <b>LAYNE</b>	
	NO.	Identifies Sample by Number		SAND		SANDY CLAY	LOGGED BY <b>ED KRISH</b>	
	TYPE	Sample Collection Method		GRAVEL		CLAYEY SAND	EXISTING GRADE ELEVATION (FT. AMSL)	
	SPLIT-BARREL		AUGER		ROCK CORE	LOCATION OR GRID COORDINATES		
	THIN-WALLED TUBE		CONTINUOUS SAMPLER		NO RECOVERY			
		DEPTH. Depth Top and Bottom of Sample						
		REC. Actual Length of Recovered Sample in Feet						



### KERR-McGEE CORPORATION HYDROLOGY DEPARTMENT MONITORING WELL INSTALLATION DIAGRAM



**DRILLING INFORMATION:**

- Borehole Diameter = 13.25 Inches.
- Were Drilling Additives Used? Yes  No   
 Revert  Bentonite  Water   
 Solid Auger  Hollow Stem Auger
- Was Outer Steel Casing Used? Yes  No   
 Depth = \_\_\_\_\_ to \_\_\_\_\_ Feet.
- Borehole Diameter for Outer Casing \_\_\_\_\_ Inches.

**WELL CONSTRUCTION INFORMATION:**

- Type of Casing: PVC  Galvanized  Teflon   
 Stainless  Other \_\_\_\_\_
- Type of Casing Joints: Screw-Couple  Glue-Couple  Other \_\_\_\_\_
- Type of Well Screens: PVC  Galvanized   
 Stainless  Teflon  Other \_\_\_\_\_
- Diameter of Casing and Well Screens:  
 Casing 8 Inches, Screen 8 Inches.
- Slot Size of Screens: 0.040
- Type of Screen Perforations: Factory Slotted   
 Hack saw  Drilled  Other \_\_\_\_\_
- Installed Protector Pipe w/Locks: Yes  No

**WELL DEVELOPMENT INFORMATION:**

- How was Well Developed? Balling  Pumping   
 Air Surging (Air or Nitrogen)  Other SURGE BLOCK
- Time Spent on Well Development? 4 / \_\_\_\_\_ Minutes/Hours
- Approximate Water Volume Removed? 3000 Gallons
- Water Clarity Before Development? Clear   
 Turbid  Opaque
- Water Clarity After Development? Clear   
 Turbid  Opaque
- Did Water have Odor? Yes  No   
 If Yes, Describe \_\_\_\_\_
- Did Water have any Color? Yes  No   
 If Yes, Describe \_\_\_\_\_

**WATER LEVEL INFORMATION:**  
 Water Level Summary (From Top of Casing)  
 During Drilling 27 Ft. Date 3-28-03  
 Before Development 27.38 Ft. Date 3-29-03  
 After Development \_\_\_\_\_ Ft. Date \_\_\_\_\_

Driller/Firm HORMANN/LAYNE Drill Rig Type AP 1000 Date Installed 3-29-03  
 Drill Crew BO/MARCO Well No. ART 3A Kerr-McGee Hydrologist ED KRISH

**SOIL BORING LOG** KM-5655-A

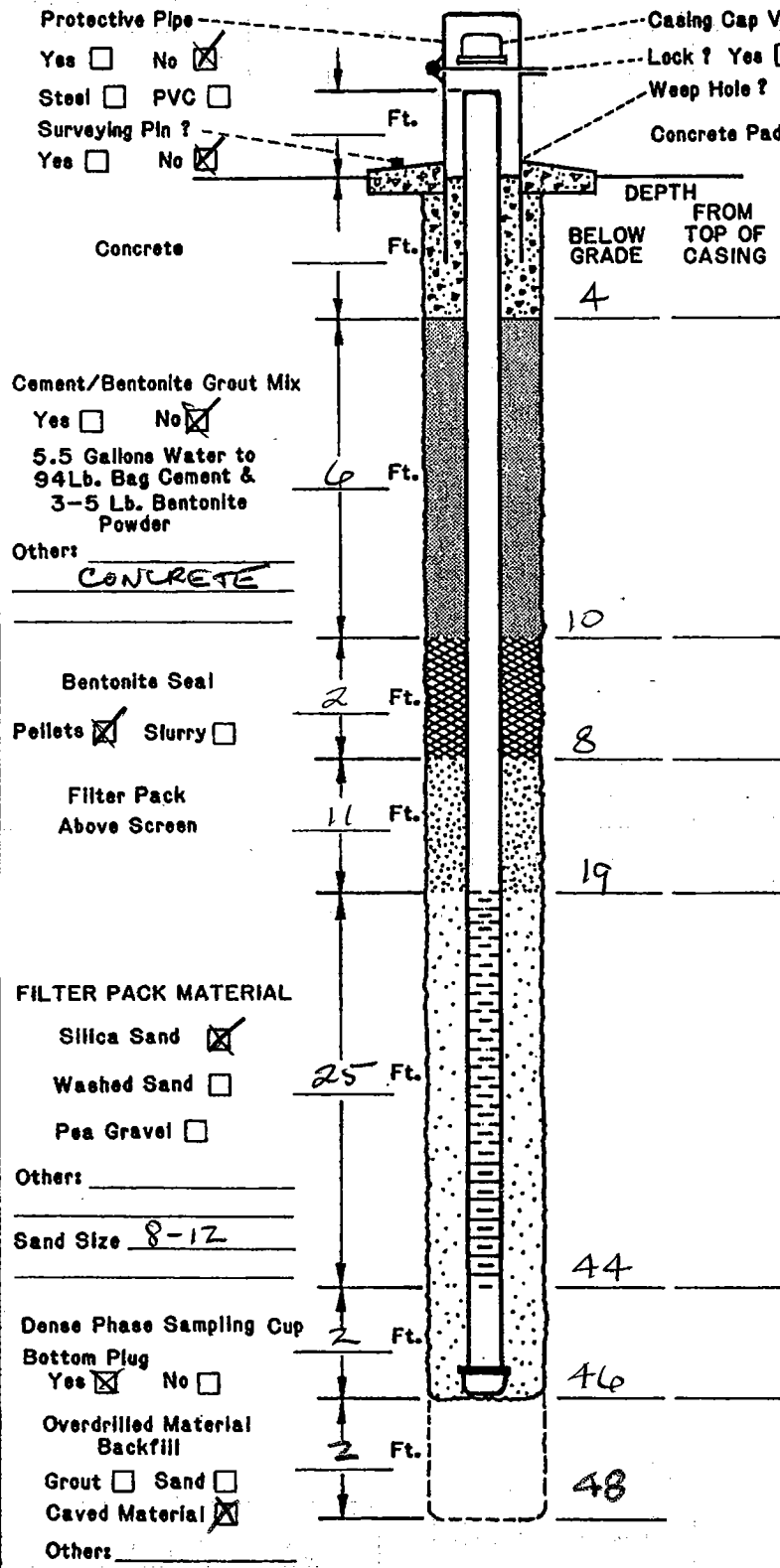
<b>KERR-McGEE CORPORATION</b> Hydrology Dept. Engineering Services	KM SUBSIDIARY <b>KMC LLC</b>	LOCATION <b>HENDERSON, NV</b>	BORING NUMBER <b>ART 3A</b>
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DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER FOOT	PID (ppm)	SOIL SAMPLE				REMARKS OR FIELD OBSERVATIONS
						NO.	TYPE	DEPTH	REC.	
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 20px;">ART 3A LOC. 5 FT WEST OF ART 3. SEE LITH LOG FOR ART 3 FOR LITHOLOGY</div> <div style="margin-bottom: 20px;">MC @ 53' TD @ 58' WTR @ 27'</div> <div>hard caliche gravel 51'-53'</div> </div>										

<b>EXPLANATION</b>	▼	Water Table (24 Hour)	<b>GRAPHIC LOG LEGEND</b>		DATE DRILLED <b>3-28-03</b>	PAGE <b>1 of 1</b>
	▽	Water Table (Time of Boring)		CLAY		DEBRIS FILL
	PID	Photoionization Detection (ppm)		SILT		HIGHLY ORGANIC (PEAT)
	NO.	Identifies Sample by Number		SAND		SANDY CLAY
	TYPE	Sample Collection Method		GRAVEL		CLAYEY SAND
	SPLIT-BARREL		AUGER		NO RECOVERY	DRILLED BY <b>HAMMER</b>
	THIN-WALLED TUBE		CONTINUOUS SAMPLER		LOGGED BY <b>LAYNE</b>	EXISTING GRADE ELEVATION (FT. AMSL)
	ROCK CORE		NO RECOVERY		LOCATION OR GRID COORDINATES	
DEPTH. Depth Top and Bottom of Sample		REC. Actual Length of Recovered Sample in Feet				

**KERR-McGEE CORPORATION  
HYDROLOGY DEPARTMENT  
MONITORING WELL INSTALLATION DIAGRAM**

FLUSH MOUNT  
IN  
VAULT



**DRILLING INFORMATION:**

- Borehole Diameter = 13 inches.
- Were Drilling Additives Used? Yes  No   
 Revert  Bentonite  Water   
 Solid Auger  Hollow Stem Auger
- Was Outer Steel Casing Used? Yes  No   
 Depth = \_\_\_\_\_ to \_\_\_\_\_ Feet.
- Borehole Diameter for Outer Casing \_\_\_\_\_ inches.

**WELL CONSTRUCTION INFORMATION:**

- Type of Casings: PVC  Galvanized  Teflon   
 Stainless  Other \_\_\_\_\_
- Type of Casing Joints: Screw-Couple  Glue-Couple  Other \_\_\_\_\_
- Type of Well Screens: PVC  Galvanized   
 Stainless  Teflon  Other \_\_\_\_\_
- Diameter of Casing and Well Screens:  
 Casing 8 inches, Screen 8 inches.
- Slot Size of Screens: 0.040"
- Type of Screen Perforations: Factory Slotted   
 Hacksaw  Drilled  Other \_\_\_\_\_
- Installed Protector Pipe w/Locks: Yes  No

**WELL DEVELOPMENT INFORMATION:**

- How was Well Developed? Bailing  Pumping   
 Air Surging (Air or Nitrogen)  Other JET
- Time Spent on Well Development? 3 / \_\_\_\_\_ Minutes/Hours
- Approximate Water Volume Removed? 2000 Gallons
- Water Clarity Before Development? Clear   
 Turbid  Opaque
- Water Clarity After Development? Clear   
 Turbid  Opaque
- Did Water have Odor? Yes  No   
 If Yes, Describe \_\_\_\_\_
- Did Water have any Color? Yes  No   
 If Yes, Describe \_\_\_\_\_

**WATER LEVEL INFORMATION:**

Water Level Summary (From Top of Casing)  
 During Drilling 25 Ft. Date 2-14-03  
 Before Development 26.5 Ft. Date 2-15-03  
 After Development 26.90 Ft. Date 2-16-03

Driller/Firm HORMANN / LAYNE Drill Rig Type AP-1000 Date Installed 2-15-03  
 Drill Crew BO / MARCO Well No. ART 4A Kerr-McGee Hydrologist ED KRISH

**SOIL BORING LOG** KM-5655-A

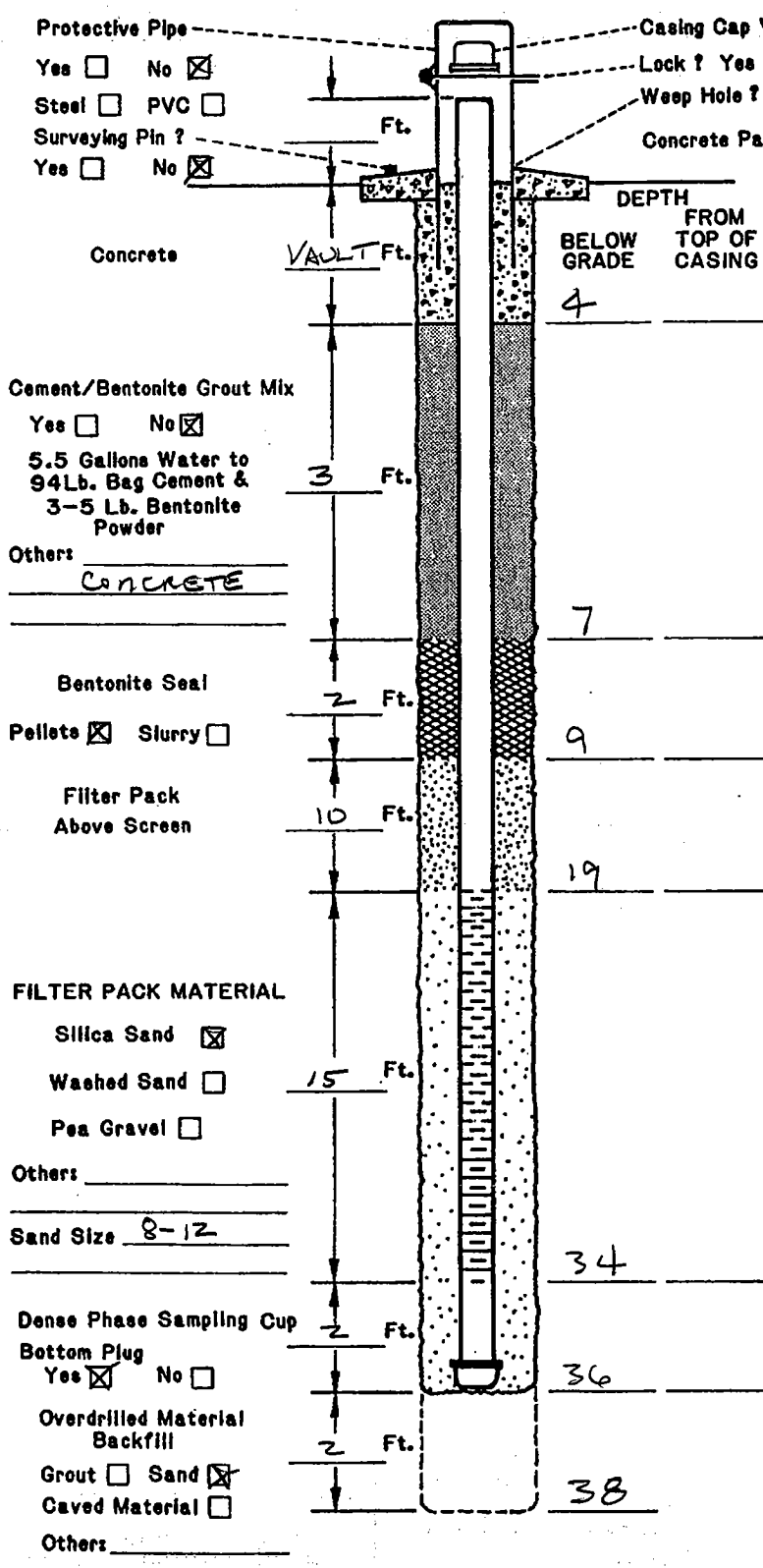
<b>KERR-McGEE CORPORATION</b> Hydrology Dept. Engineering Services	KM SUBSIDIARY <b>KMCLLC</b>	LOCATION <b>HENDERSON NV</b>	BORING NUMBER <b>ART 4A</b>
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DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER FOOT	PID (ppm)	SOIL SAMPLE				REMARKS OR FIELD OBSERVATIONS
						NO.	TYPE	DEPTH	REC.	
<p>ART 4A LOC. 5 FT WEST OF ART 4. SEE ART 4 LITH LOG FOR LITHOLOGY</p> <p>MC @ 44' TD 48' H<sub>2</sub>O @ 25'</p>										

<b>EXPLANATION</b>	▼	Water Table (24 Hour)	<b>GRAPHIC LOG LEGEND</b>		DATE DRILLED <b>2-14-03</b>	PAGE <b>1 of 1</b>	
	▽	Water Table (Time of Boring)		CLAY		DEBRIS FILL	
	PID NO. TYPE	Photoionization Detection (ppm) Identifies Sample by Number Sample Collection Method		SILT		HIGHLY ORGANIC (PEAT)	
		SPLIT-BARREL		AUGER		SANDY CLAY	
	THIN-WALLED TUBE		CONTINUOUS SAMPLER		GRAVEL		CLAYEY SAND
	ROCK CORE		NO RECOVERY		SAND		SANDY CLAY
					SILTY CLAY		CLAYEY SAND
					CLAYEY SILT		
DEPTH. Depth Top and Bottom of Sample						LOGGED BY <b>ED KRISH</b>	
REC. Actual Length of Recovered Sample in Feet						EXISTING GRADE ELEVATION (FT. AMSL)	
						LOCATION OR GRID COORDINATES	

# KERR-McGEE CORPORATION HYDROLOGY DEPARTMENT MONITORING WELL INSTALLATION DIAGRAM

FLUSH MOUNT  
IN  
VAULT



- DRILLING INFORMATION:**
- Borehole Diameter = 1 3/4 inches.
  - Were Drilling Additives Used? Yes  No   
Revert  Bentonite  Water   
Solid Auger  Hollow Stem Auger
  - Was Outer Steel Casing Used? Yes  No   
Depth = \_\_\_\_\_ to \_\_\_\_\_ Feet.
  - Borehole Diameter for Outer Casing \_\_\_\_\_ inches.
- WELL CONSTRUCTION INFORMATION:**
- Type of Casing: PVC  Galvanized  Teflon   
Stainless  Other \_\_\_\_\_
  - Type of Casing Joints: Screw-Couple  Glue-Couple  Other \_\_\_\_\_
  - Type of Well Screen: PVC  Galvanized   
Stainless  Teflon  Other \_\_\_\_\_
  - Diameter of Casing and Well Screens:  
Casing 8 inches, Screen 8 inches.
  - Slot Size of Screens: 0.040
  - Type of Screen Perforations: Factory Slotted   
Hackaw  Drilled  Other \_\_\_\_\_
  - Installed Protector Pipe w/Locks: Yes  No
- WELL DEVELOPMENT INFORMATION:**
- How was Well Developed? Bailing  Pumping   
Air Surging (Air or Nitrogen)  Other SURGE BLOCK
  - Time Spent on Well Development? 4 / \_\_\_\_\_ Minutes/Hours
  - Approximate Water Volume Removed? 3000 Gallons
  - Water Clarity Before Development? Clear   
Turbid  Opaque
  - Water Clarity After Development? Clear   
Turbid  Opaque
  - Did Water have Odor? Yes  No   
If Yes, Describe \_\_\_\_\_
  - Did Water have any Color? Yes  No   
If Yes, Describe \_\_\_\_\_
- WATER LEVEL INFORMATION:**  
Water Level Summary (From Top of Casing)
- |                    |              |          |                |
|--------------------|--------------|----------|----------------|
| During Drilling    | <u>26</u>    | Ft. Date | <u>3-26-03</u> |
| Before Development | <u>26.47</u> | Ft. Date | <u>3-27-03</u> |
| After Development  | <u>25.57</u> | Ft. Date | <u>3-28-03</u> |

Driller/Firm HORMANN/LAYNE Drill Rig Type AP 1000 Date Installed \_\_\_\_\_  
 Drill Crew Bo / MARCO Well No. ART-6A Kerr-McGee Hydrologist ED KRISH

**SOIL BORING LOG** KM-5655-A

<b>KERR-McGEE CORPORATION</b> Hydrology Dept. Engineering Services	KM SUBSIDIARY <b>KMC LLC</b>	LOCATION <b>HENDERSON, NV</b>	BORING NUMBER <b>ART-6A</b>
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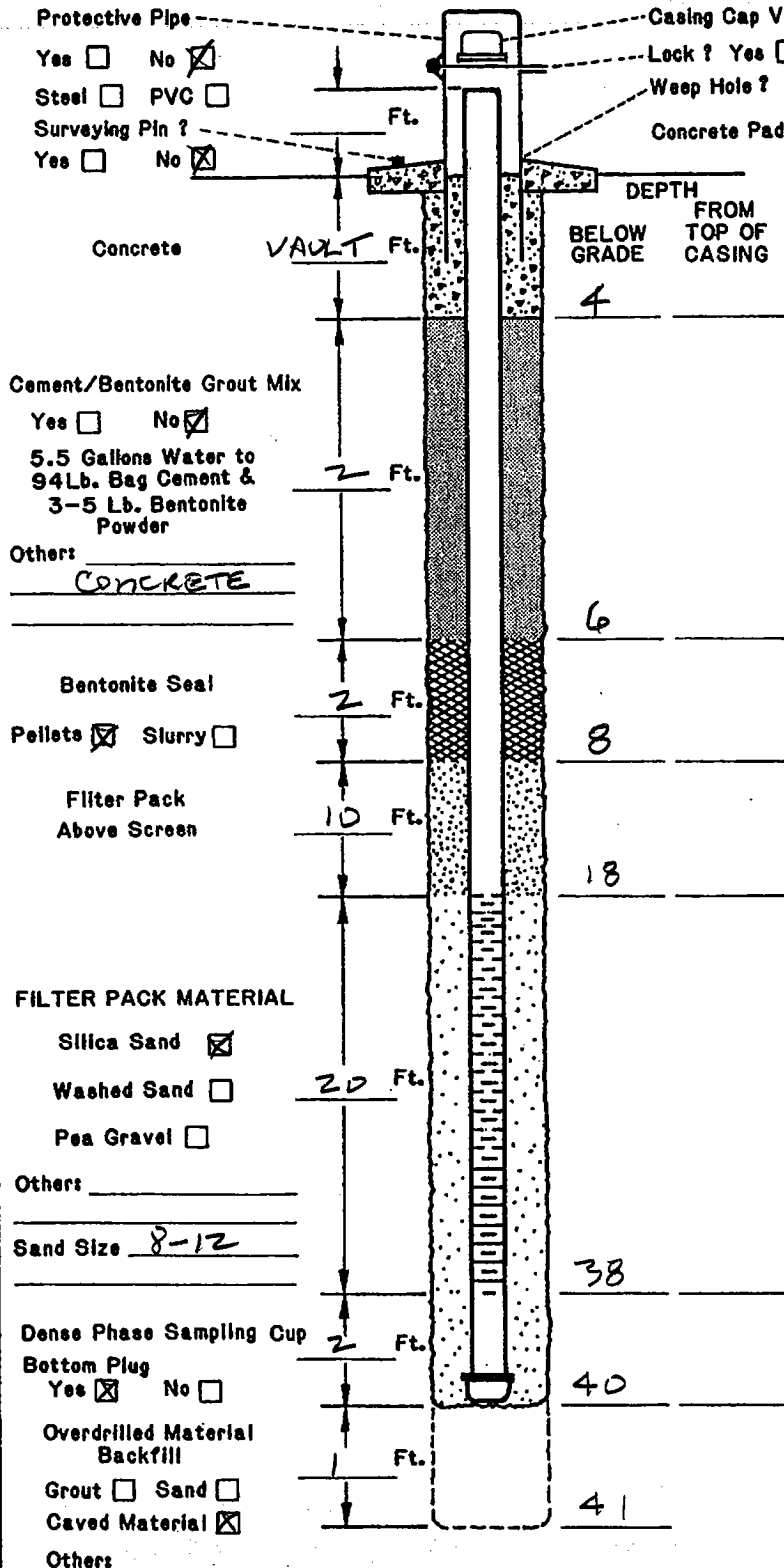
DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER FOOT	PID (ppm)	SOIL SAMPLE				REMARKS OR FIELD OBSERVATIONS
						NO.	TYPE	DEPTH	REC.	
ART 6A LOC 5 FT WEST OF ART 6 SEE LITH LOG OF ART 6 FOR LITHOLOGY  MC@34' TD@38  WTR@26										

<b>EXPLANATION</b>	▼	Water Table (24 Hour)	<b>GRAPHIC LOG LEGEND</b>		DATE DRILLED <b>3-26-03</b>	PAGE <b>1 of 1</b>
	▽	Water Table (Time of Boring)	▨	CLAY	▩	DEBRIS FILL
	PID NO. TYPE	Photoionization Detection (ppm) Identifies Sample by Number Sample Collection Method	▧	SILT	▤	HIGHLY ORGANIC (PEAT)
	▨	SPLIT-BARREL	▩	AUGER	▧	SANDY CLAY
▩	THIN-WALLED TUBE	▧	ROCK CORE	▩	CLAYEY SAND	DRILLED BY <b>HAMMER</b>
▧	CONTINUOUS SAMPLER	▤	NO RECOVERY	▧	SAND	LOGGED BY <b>LAYNE</b>
▤		▩		▧	GRAVEL	ED KRISH
▩		▧		▩	SILTY CLAY	EXISTING GRADE ELEVATION (FT. AMSL)
▧		▩		▧	CLAYEY SILT	LOCATION OR GRID COORDINATES
▤		▧		▩		

DEPTH. Depth Top and Bottom of Sample  
REC. Actual Length of Recovered Sample in Feet

**KERR-McGEE CORPORATION  
HYDROLOGY DEPARTMENT  
MONITORING WELL INSTALLATION DIAGRAM**

FLUSH MOUNT  
IN  
VAULT



- DRILLING INFORMATION:**
- Borehole Diameter = 13.25 inches.
  - Were Drilling Additives Used? Yes  No   
Revert  Bentonite  Water   
Solid Auger  Hollow Stem Auger
  - Was Outer Steel Casing Used? Yes  No   
Depth = \_\_\_\_\_ to \_\_\_\_\_ Feet.
  - Borehole Diameter for Outer Casing \_\_\_\_\_ inches.
- WELL CONSTRUCTION INFORMATION:**
- Type of Casing: PVC  Galvanized  Teflon   
Stainless  Other \_\_\_\_\_
  - Type of Casing Joints: Screw-Couple  Glue-Couple  Other \_\_\_\_\_
  - Type of Well Screen: PVC  Galvanized   
Stainless  Teflon  Other \_\_\_\_\_
  - Diameter of Casing and Well Screens:  
Casing 8 inches, Screen 8 inches.
  - Slot Size of Screen 0.040
  - Type of Screen Perforations: Factory Slotted   
Hackaw  Drilled  Other \_\_\_\_\_
  - Installed Protector Pipe w/Locks: Yes  No
- WELL DEVELOPMENT INFORMATION:**
- How was Well Developed? Bailing  Pumping   
SURGE BLOCK Other \_\_\_\_\_
  - Time Spent on Well Development? 4 / \_\_\_\_\_ Minutes/Hours
  - Approximate Water Volume Removed? 3000 Gallons
  - Water Clarity Before Development? Clear   
Turbid  Opaque
  - Water Clarity After Development? Clear   
Turbid  Opaque
  - Did Water have Odor? Yes  No   
If Yes, Describe \_\_\_\_\_
  - Did Water have any Color? Yes  No   
If Yes, Describe \_\_\_\_\_
- WATER LEVEL INFORMATION:**  
Water Level Summary (From Top of Casing)
- During Drilling 26 Ft. Date 3-27-03  
Before Development 26.4 Ft. Date 3-28-03  
After Development \_\_\_\_\_ Ft. Date \_\_\_\_\_

Driller/Firm HORMANN / LAYNE Drill Rig Type AP 1000 Date Installed 3-28-03  
Drill Crew Bo / MARCO Well No. ART 7A Kerr-McGee Hydrologist ED KRISH

**SOIL BORING LOG** KM-5655-A

<b>KERR-McGEE CORPORATION</b> Hydrology Dept. Engineering Services	KM SUBSIDIARY <b>KMC LLC</b>	LOCATION <b>HENDERSON, NV</b>	BORING NUMBER <b>ART 7A</b>
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DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER FOOT	PID (ppm)	SOIL SAMPLE				REMARKS OR FIELD OBSERVATIONS
						NO.	TYPE	DEPTH	REC.	
<p style="text-align: center;">ART 7A LOC. 5 FT EAST OF ART 7. SEE ART 7 LITH LOG FOR LITHOLOGY</p> <p style="text-align: center;">MC @ NOT REACHED TD @ 41' WTR @ 26'</p> <p style="text-align: center;">36-41' v. hard calicheified gravel. Refusal @ 41'</p>										

<b>EXPLANATION</b>		Water Table (24 Hour)	<b>GRAPHIC LOG LEGEND</b>	DATE DRILLED	PAGE	
		Water Table (Time of Boring) Photoionization Detection (ppm) Identifies Sample by Number Sample Collection Method			<b>3-27-03</b>	<b>1 of 1</b>
		SPLIT-BARREL			DRILLING METHOD	
		AUGER			<b>HAMMER</b>	
	THIN-WALLED TUBE			DRILLED BY		
	CONTINUOUS SAMPLER			<b>LAYNE</b>		
	ROCK CORE			LOGGED BY		
	NO RECOVERY			<b>ED KRISH</b>		
DEPTH. Depth Top and Bottom of Sample	REC. Actual Length of Recovered Sample in Feet			EXISTING GRADE ELEVATION (FT. AMSL)		
				LOCATION OR GRID COORDINATES		





**KERR-McGEE CORPORATION**

KERR-McGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

RECEIVED  
ENVIRONMENTAL  
PROTECTION

03 MAY 12 PM 12:00

SAFETY & ENVIRONMENTAL AFFAIRS DIVISION

May 5, 2003

Mr. Larry Bowerman, Manager  
RCRA Corrective Action Office  
Waste Management Office  
US EPA, Region IX  
75 Hawthorne Street  
San Francisco, CA 94105-3901

Dear Mr. Bowerman,

During our meeting in Henderson, NV last week, you requested information supporting our conclusion that the ion-exchange resin being shipped for incineration, after being loaded with perchlorate, is not a hazardous waste.

Attached are two test reports, supplied by Calgon Carbon Corporation, covering:

- a) DOT Oxidizer tests, and
- b) BOE Sensitivity Impact testing on loaded resin samples.

The test results indicate that the resin samples were "not considered to be Division 5.1 Oxidizers" and were "not too sensitive for transport".

If you have other questions, please call me at (405) 270-3651 or Susan Crowley at (702) 651-2234.

Sincerely,

L. Keith Bailey  
Director, Waste Minimization

cc: Pat Corbett (w/o attachments)  
Susan Crowley  
John Mickler (w/o attachments)



**CALGON CARBON CORPORATION**  
**P.O. Box 717**  
**Pittsburgh, PA 15230-0717**

**FAX**

**To: Keith Bailey**

**Fax: (405) 270-3504**

**From: Dana L. Farmer**

**Date: November 18, 2002**

**Re: Oxidizer Test Results**

**Pages: 6 (incl. cover)**

Keith,

Attached are the results for the DOT Oxidizer test of the two (2) resin samples. Both samples passed the test. We will begin having the spent resin removed from the site ASAP.

If you have any questions, please let me know.

Regards,

*Dana L. Farmer*  
Dana L. Farmer  
Project Manager

**If all pages are not received, please contact me at:**

**Phone: (412) 787-6181**  
**Fax: (412) 787-6319**

**STRESAU LABORATORY INC.**

N8265 Medley Road, Spooner, WI 54801-7819, Tel. 715-635-2777, FAX 715-635-7979

November 15, 2002

Mr. Peter Ritchey  
Calgon Carbon Corporation  
500 Calgon Carbon Drive  
Pittsburgh, PA 15205

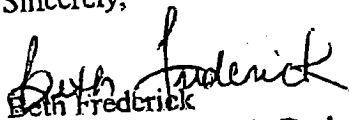
Dear Mr. Ritchey:

Enclosed please find Stresau Laboratory Reports # 02187-02188 for DOT Oxidizer testing of your samples. Both of your samples are not considered to be Division 5.1 Oxidizers. Detailed information is found in the enclosed report.

As usual, an invoice to cover the cost of the laboratory examination will be sent to your accounting department under separate cover.

We appreciate your business. If we can be of further service or if you have any questions, please call Tom Basham or myself at (715) 635 - 2777.

Sincerely,

  
Beth Fredrick  
Hazardous Materials Technician

bf (02187-02188)

# STRESAU LABORATORY INC.

N8265 Medley Road, Spooner, WI 54801-7819, Tel. 715-635-2777, FAX 715-635-7979

## LABORATORY REPORTS NO. 02187-02188

DOT OXIDIZER  
On solid materials

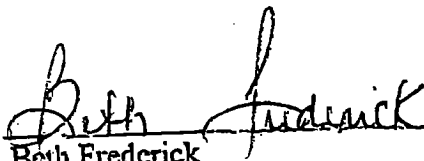
November 15, 2002

for

Calgon Carbon Corporation  
500 Calgon Carbon Drive  
Pittsburgh, PA 15205  
USA

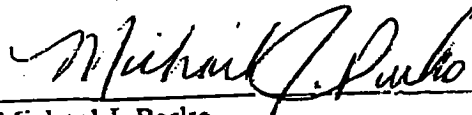
Attn: Mr. Peter Ritchey

Prepared by:



Beth Frederick  
Hazardous Materials Technician

Review by:



Michael J. Pcsko  
Chief Operating Officer

Since 1961  Development  Evaluation  Production of Energetic Devices  
 Classification  Packaging  Testing of Hazardous Materials  
Visit our web site: [www.stresau.com](http://www.stresau.com)

STRESAU LABORATORY, INC.  
November 15, 2002

LABORATORY REPORTS NO. 02187-02188  
Page 1 of 3

Prepared for: Calgon Carbon Corporation  
500 Calgon Carbon Drive  
Pittsburgh, PA 15205

Subject: DOT OXIDIZER TESTING

1.0 **OBJECT**

Two samples were received and subjected to a DOT Oxidizer test (solid substance), as requested by Peter Ritchey of Calgon Carbon Corporation, purchase order #4500059841.

2.0 **SAMPLE IDENTIFICATION**

Two samples were received, and identified as follows:

**Calgon Carbon Corp. ID**  
Pond Water Resin Rinse Sat. TK West  
Pond Water Resin Sat. TK West

**Stresau ID**  
02187  
02188

Both samples consisted of wetted white to amber spherical beads contained in a plastic bottle. The samples arrived at Stresau at ambient temperature, and were tested in the form received.

3.1 **UN Oxidizer Test UN test 0.1**

3.1.1 Procedure

Thirty gram mixtures of sample to cellulose (Whatman grade CFR11), containing 1 to 1 ratios by mass, were prepared, placed in conical piles, and ignited by means of a wire heated to 1000°C until the first signs of combustion were noticed. This was repeated four times for each mixing ratio, for a total of five trials per ratio. Similar tests were performed using Potassium Bromate instead of sample, in varying ratios, as Packing Group reference materials. Each ratio was tested five times, and a mean time established.

The room conditions at the start of the test were 70°F and 44% relative humidity.

STRESAU LABORATORY, INC.  
November 15, 2002

LABORATORY REPORTS NO. 02187-02188  
Page 2 of 3

3.1.2 TEST RESULTS

3.1.2.1 REFERENCE TRIALS

3:7 ratio of Potassium Bromate/Cellulose, Packing Group III standard. All trials burned with approx. 10-12" flame. The burn times were as follows:

- 1) Burn time 82 seconds
  - 2) Burn time 83 seconds
  - 3) Burn time 82 seconds
  - 4) Burn time 85 seconds
  - 5) Burn time 79 seconds
- average burn time: 82.2 seconds

SAMPLE TRIALS

02187: Pond Water Resin Rinse

1:1 ratio of Test Sample/Cellulose. All trials burned with intermittent flame.

- 1) Burn time 266 seconds
  - 2) Burn time 273 seconds
  - 3) Burn time 268 seconds
  - 4) Burn time 257 seconds
  - 5) Burn time 269 seconds
- average burn time: 266.6 seconds

4:1 ratio of Test Sample/Cellulose. All trials burned with intermittent flame.

- 1) Burn time 371 seconds
  - 2) Burn time 364 seconds
  - 3) Burn time 351 seconds
  - 4) Burn time 352 seconds
  - 5) Burn time 368 seconds
- average burn time: 361.2 seconds

STRESAU LABORATORY, INC.  
November 15, 2002

LABORATORY REPORTS NO. 02187-02188  
Page 3 of 3

**02188: Pond Water Resin**

1:1 ratio of Test Sample/Cellulose. All trials burned with approx. 6-8" flame.

- 1) Burn time 244 seconds
  - 2) Burn time 248 seconds
  - 3) Burn time 251 seconds
  - 4) Burn time 239 seconds
  - 5) Burn time 257 seconds
- average burn time: 247.8 seconds

4:1 ratio of Test Sample/Cellulose. All trials burned with approx. 10-12" flame.

- 1) Burn time 114 seconds
  - 2) Burn time 117 seconds
  - 3) Burn time 120 seconds
  - 4) Burn time 117 seconds
  - 5) Burn time 114 seconds
- average burn time: 116.4 seconds

#### 4.0 CONCLUSIONS

Based on the test results, the following conclusion was made:

Both of your samples are not considered to be Division 5.1 Oxidizers. This is because the average sample burn times on the samples was longer than the Packing Group III standard.

The above conclusion represents our interpretations of the test data, as defined by the above listed test specifications. The conclusions contained in this report are for the customer's information purposes only.

#### 5.0 DATA STORAGE

The field data for this report is contained in data book SLF # 2002-2, and filed with Stresau Laboratory's Document Control. No videotape or photographic documentation was made.



CALGON CARBON CORPORATION

P.O. Box 717 Pittsburgh, PA 15230-0717 412.787.6700

Phone: (412) 787-6181

Fax: (412) 787-6319

Email: farmerd@calgoncarbon.com

October 30, 2002

Mr. Keith Bailey  
Kerr-McGee Chemical LLC  
123 Robert S. Kerr Avenue  
Oklahoma City, OK 73102

Re: Resin Testing Report

Dear Mr. Bailey,

Attached is the report from Stresau Laboratory for BOE Sensitivity Impact testing on the resin samples.

If you have any questions, please give me a call.

Regards,

CALGON CARBON CORPORATION

*Dana L. Farmer*

Dana L. Farmer  
Project Manager

Enclosure.



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# STRESAU LABORATORY INC.

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N8265 Medley Road, Spooner, WI 54801-7819, Tel. 715-635-2777, FAX 715-635-7979

October 16, 2002

Mr. Peter Ritchey  
Calgon Carbon Corporation  
500 Calgon Carbon Drive  
Pittsburgh, PA 15205


Dear Mr. Ritchey:

Enclosed please find our Laboratory Reports # 02167-02168 for BOE Impact testing of your samples. Your samples do not appear to be sensitive to impact stimulus, as defined by the US Department of Transportation.

As usual, an invoice to cover the cost of the laboratory examinations will be sent to your accounting department under separate cover. Your sample remnants will be returned to you in your original packaging. The return freight cost will be added to the invoice.

We appreciate your business and look forward to working with you in the future. If we can be of further service or if you have any questions, please call me at (715) 635 - 2777.

Sincerely,

  
Thomas E. Basham  
Hazardous Materials Manager

tb ( 02167-02168)

---

# STRESAU LABORATORY INC.

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N8265 Medley Road, Spooner, WI 54801-7819, Tel. 715-635-2777, FAX 715-635-7979

**LABORATORY REPORT NO: 02167-02168**

“BOE Impact Sensitivity Tests”

October 16, 2002

for

Calgon Carbon Corporation  
500 Calgon Carbon Drive  
Pittsburgh, PA 15205  
USA

Attn: Mr. Peter Ritchey

Prepared by: Thomas E. Basham  
Thomas E. Basham  
Hazardous Materials Manager

Review by: Michael J. Pesko  
Michael J. Pesko  
Chief Operating Officer

Prepared for: Calgon Carbon Corporation  
500 Calgon Carbon Drive.  
Pittsburgh, PA 15205

Subject: BOE IMPACT SENSITIVITY TESTING

### 1.0 OBJECT

Two samples were received and subjected to BOE Impact Sensitivity tests, as requested by Keith Nicholson of Calgon Carbon Corporation, purchase order #4500058892.

### 2.0 PHYSICAL APPEARANCE

Two samples were received, and identified as follows:

<u>Calgon Carbon Corp. ID</u>	<u>Stresau ID</u>
CalRes 2101 Rinsed	02167
CalRes 2101 No rinse	02168

Both samples consisted of wetted white to amber spherical beads contained in a plastic bottle. The samples arrived at Stresau at ambient temperature, and were tested in the form received.

### 3.0 TESTS CONDUCTED

#### 3.1 BOE Impact Test: UN test 3 (a) (i)

The tests were performed using the Bureau of Explosive Impact Apparatus, with solid sample tooling. Each sample was subjected to ten trials at a drop height of 10 cm, with results as follows:

Sample #02167 produced 10 negative results in 10 trials.

Sample #02168 produced 10 negative results in 10 trials.

A "positive" reaction is defined as a report or visible spark. Smoke without other evidence is not in itself considered a positive.

As defined by DOT regulations, a solid material is considered too sensitive for transport if it exhibits a positive result in at least 5 out of 10 trials at a height of 10 cm.

#### 4.0 CONCLUSION

Based on the above test results, it is seen that:

Neither of the tested samples were found to be not too sensitive for transport as defined by the above DOT criteria.

This conclusion is based on our interpretation of the listed specification, and is presented for the customer's information purposes only.

#### 5.0 DATA STORAGE

The field data for this report is contained in Data Book # SLF 2002-1, and filed with Stresau Laboratory's Document Control. No photographic or video documentation was made.

05/02/03

Friday

Top of

Meeting w/ Kost-McGee

- 1) Discussed MWS modeling
- 2) Discussed NTEP controls work & schedule
- 3) He provided a discussion on Athens & Seep Area Performance

\* Todd Request from COH The

\* Better wells have been installed  
~ 5' away typically to the west

4) Remedial System Status

- on-site IX ~ 750 gpm
- current total system  $\leq$  1100 gpm
- Trying to refine/optimize the IX system to reduce cost
- Resin supply has smoothed out
- evaluating alternatives to decrease pump volume
- No decision yet to the ISEP-PDM vs Ex-site T&O
- Have obtained proposals from Calgon & US Filters for:
  - Re-start of ISEP-PDM
  - $\Delta$  to Ex-site T&O

05/02/03

Friday

o If they go w/ re-start of ISBT - then ~ 6 months other start up

o If ISIO ~ 9 months other 12 month start up

\* Case of ISMC TO keep savings well

5) Discussed Ampac Progress & status

\* call Times and request access TO Times wells

John Sandersee - Plant mgr  
Candy Wilkenson - Enviro

564-2544 general #

6) Basic wells update

o phase I done (end of April)

o phase II projects TO start end of May & run for ~ 30 days if at all

30' deep ~ 5 mu (max)

05/02/03

Friday

### Inclusion Emission

pp 3

- construction TO START IN ~ 45 days
- Dewatering TO LAST ~ 6 months

### Power line

- start June 2004
- Dewatering ~ 6 months

### Demonstration

- start Fall 2004
- Dewatering ~ 6 months

### Land Fill

- start OCTOBER 2004
- Dewatering 3 ~ 4 months

silver bawb  
4 upper

} outside the plume

send TO :

The DRAFT

Geophysics x-sections

Send KATH

JOE EB EPA

John Wilson => USGS

(405)

834, 9143

cell phone EB Krish

E-mail  
TO  
DZ

04/23/03  
René



**KERR-McGEE CHEMICAL LLC**

POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

April 22, 2003

Mr. Larry Bowerman  
RCRA Corrective Action Office  
Waste Management Division  
U.S. EPA – Region IX  
75 Hawthorne Street  
San Francisco, CA 94105-3901

23

Dear Mr. Bowerman,

In your March 12, 2003, letter which we received on March 19, 2003, you requested that Kerr-McGee Chemical LLC (Kerr-McGee) provide monthly updates and graphs of groundwater perchlorate concentrations at five specific locations. Attached are printed copies of spreadsheet data and graphs showing the perchlorate concentrations at various locations for at least the last six months. An e-mail with electronic copies of the data is also being forwarded to you.

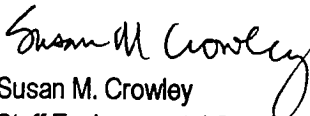
The well chosen for following on-site conditions was M-100 rather than M-79 and M-87. M-100 is in the heart of the perchlorate contours and should respond well to changes in the environment relating to the interception of perchlorate containing water and recharge of Lake Mead water. Wells ARP-3 and MW-K5 were chosen to follow perchlorate concentrations in the Athens Road vicinity. Again ARP-3 and MW-K5 are in the heart of the perchlorate contours and should respond well to conditions in that area. All other recommended wells were included in the data tables.

The sample graphs included with your request letter, included predictions of future perchlorate concentrations. Kerr-McGee will provide data on measured perchlorate concentrations, but projections of future changes are difficult due to a number of complexities in the area geology. Accordingly, the graphs we are providing do not extrapolate into the future.

Kerr-McGee looks forward to maintaining our working relationships with NDEP and USEPA and to receiving the compiled summary of data from all 12 of the monitoring locations proposed in your letter.

If you have questions or comments, please contact me at (702) 651-2234.

Sincerely,

  
Susan M. Crowley  
Staff Environmental Specialist

cc: Todd Croft – NDEP  
Keith Bailey  
Pat Corbett  
Rick Stater  
Richard Waters

Attachments



**On-Site Collection Area****Collection Wells - Upgradient of Slurry Wall**

Date	Weighted Average CIO <sub>4</sub> Concentration On-Site (ppm)	Average Flow Rate (gpm)	Monthly Mass CIO <sub>4</sub> Removed On-Site (lbs)
Oct-02	1,880	60.9	43,459
Nov-02	1,758	53.5	34,366
Dec-02	1,560	68	40,053
Jan-03	1,673	72	45,481
Feb-03	1,618	53.8	29,686
Mar-03	1,593	55	33,081
Apr-03			
May-03			
Jun-03			
Jul-03			
Aug-03			
Sep-03			
Oct-03			
Nov-03			
Dec-03			

**Monitoring Wells - Downgradient of Slurry Wall**

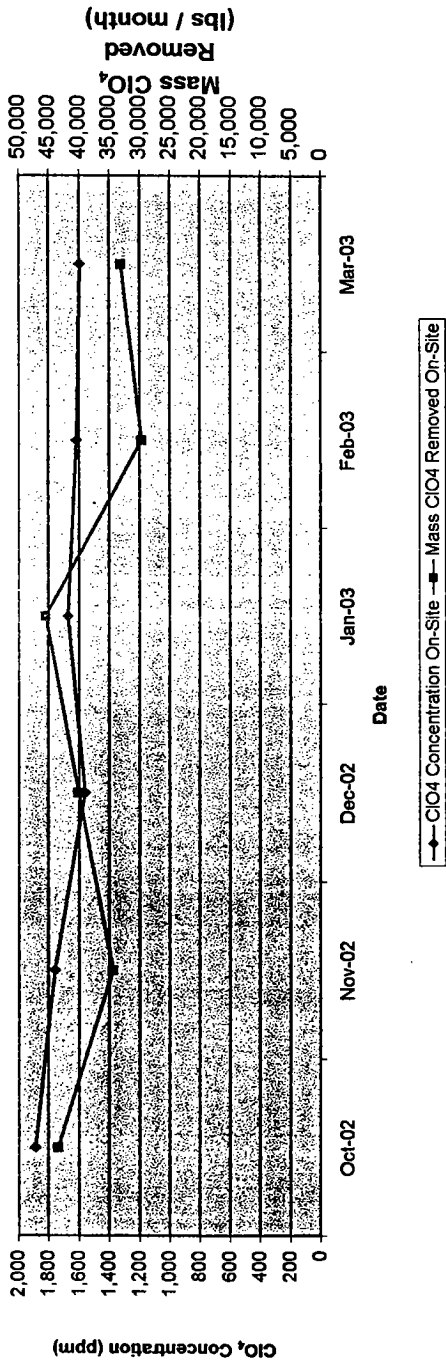
Date	M-100 CIO <sub>4</sub> Concentration (ppm)
May-99	1300
Jun-99	1200
Jul-99	1300
Aug-99	1200
Sep-99	
Oct-99	
Nov-99	
Dec-99	
Jan-00	890
Feb-00	1000
Mar-00	840
Apr-00	980
May-00	1600
Jun-00	920
Jul-00	830
Aug-00	850
Sep-00	1000
Oct-00	840
Nov-00	850
Dec-00	1100
Jan-01	860
Feb-01	900
Mar-01	880
Apr-01	910
May-01	1100
Jun-01	1000
Jul-01	1100
Aug-01	1100
Sep-01	1200
Oct-01	1000
Nov-01	1000
Dec-01	1000
Jan-02	1000
Feb-02	910
Mar-02	
Apr-02	
May-02	610
Jun-02	
Jul-02	
Aug-02	
Sep-02	350
Oct-02	
Nov-02	
Dec-02	340
Jan-03	230
Feb-03	
Mar-03	
Apr-03	
May-03	

**Athens Road Collection Area****Collection Wells**

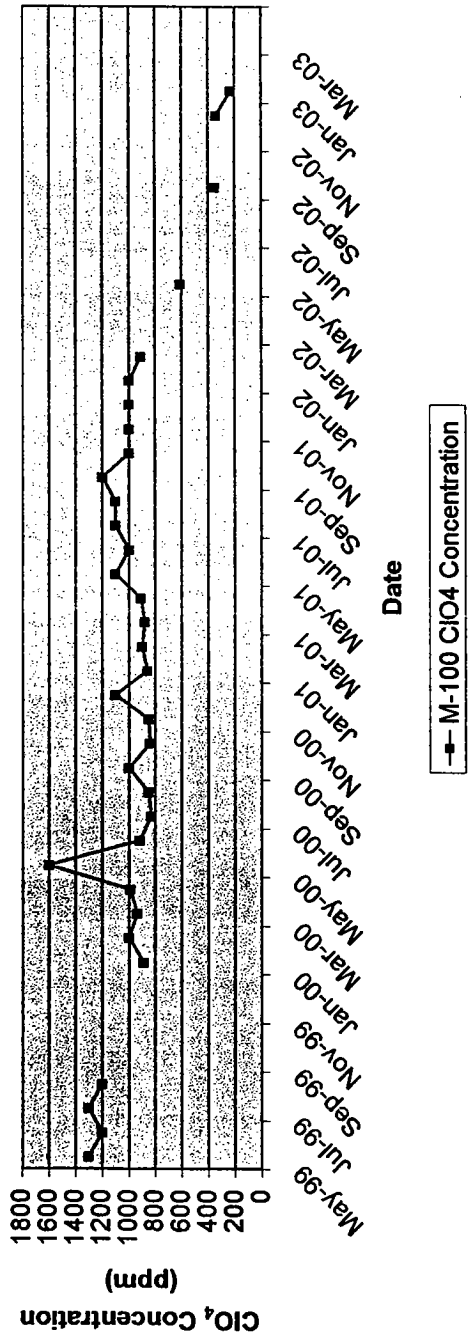
Date	ART-8 Average CIO <sub>4</sub> Concentration (ppm)	Average Athens Road Field Flow Rate (gpm)	Monthly Mass CIO <sub>4</sub> Removed Athens Road Area (lbs)
Oct-02	429	250.8	10,259
Nov-02	602	266	30,043
Dec-02	592	250.4	36,071
Jan-03	575	238.3	33,299
Feb-03	432	238.9	21,932
Mar-03	415	245.6	24,981
Apr-03			
May-03			
Jun-03			
Jul-03			
Aug-03			
Sep-03			
Oct-03			
Nov-03			
Dec-03			

Monitoring Wells		Seep Collection Area				Monitoring Area - Seep	
Date	ARP-3 ClO4 Concentration (ppm)	MW-K5 ClO4 Concentration (ppm)	Collection Wells	Surface Stream	Monitoring Wells	Date	PC-97 ClO4 Concentration (ppm)
			Wells Average Flow Rate (gpm)	Stream Average Flow Rate (gpm)	Combined Average ClO4 Concentration (ppm)	Monthly Mass Seep Area (lbs)	
Oct-02	500	0.59	191	132	125.9	15,354	77
Nov-02	670	1	203	271	70.7	12,653	110
Dec-02	627	1.43	241	201	36.7	6,459	119
Jan-03	660	160	337	174	53.8	10,380	120
Feb-03	430	10.2	395	156	76.7	15,957	88
Mar-03	440	100	427	156	68.3	15,034	50
Apr-03							
May-03							
Jun-03							
Jul-03							
Aug-03							
Sep-03							
Oct-03							
Nov-03							
Dec-03							

### On-Site Collection Area

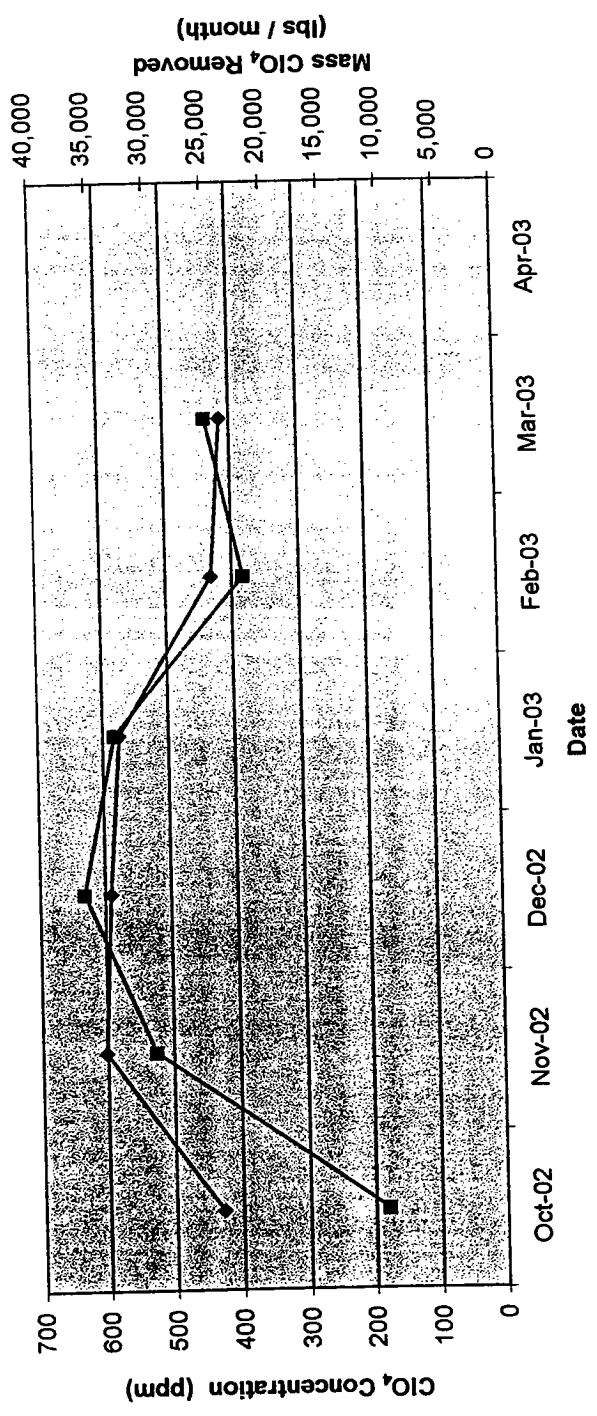


### On-Site Collection Area Monitoring Wells



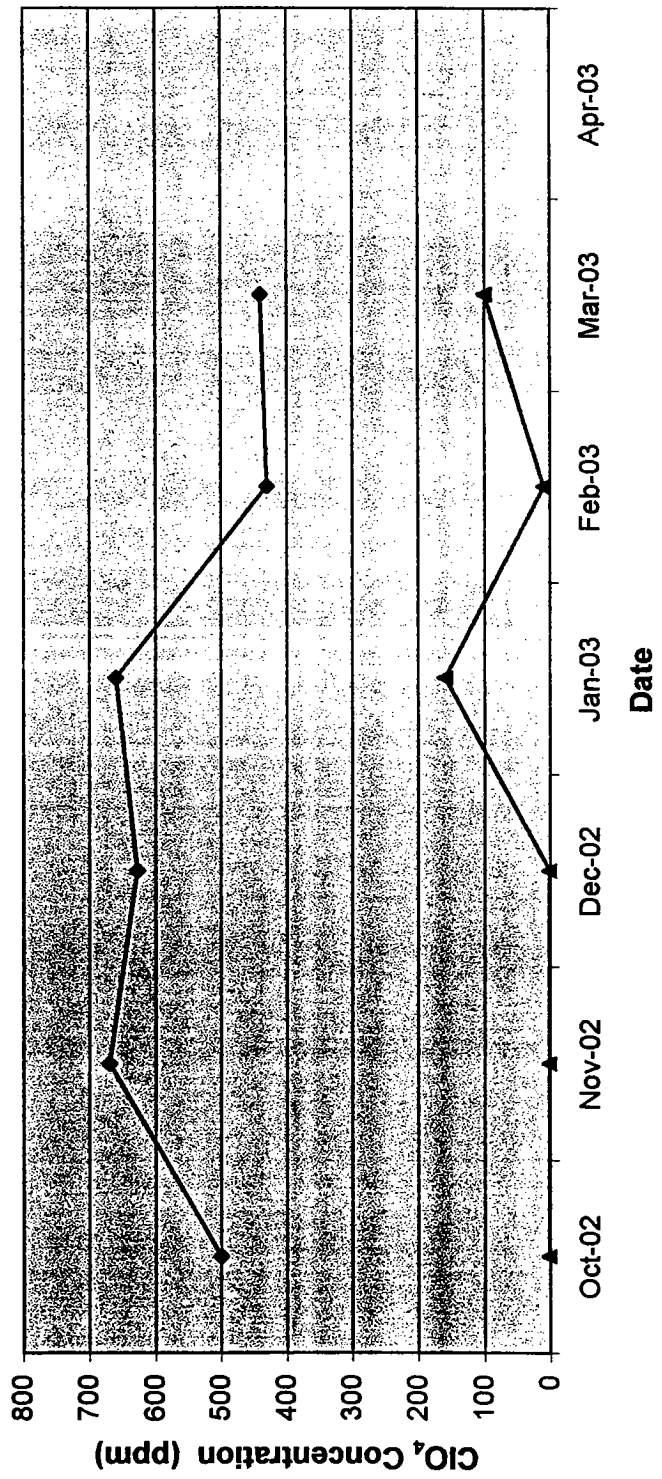


### Athens Road Collection Area



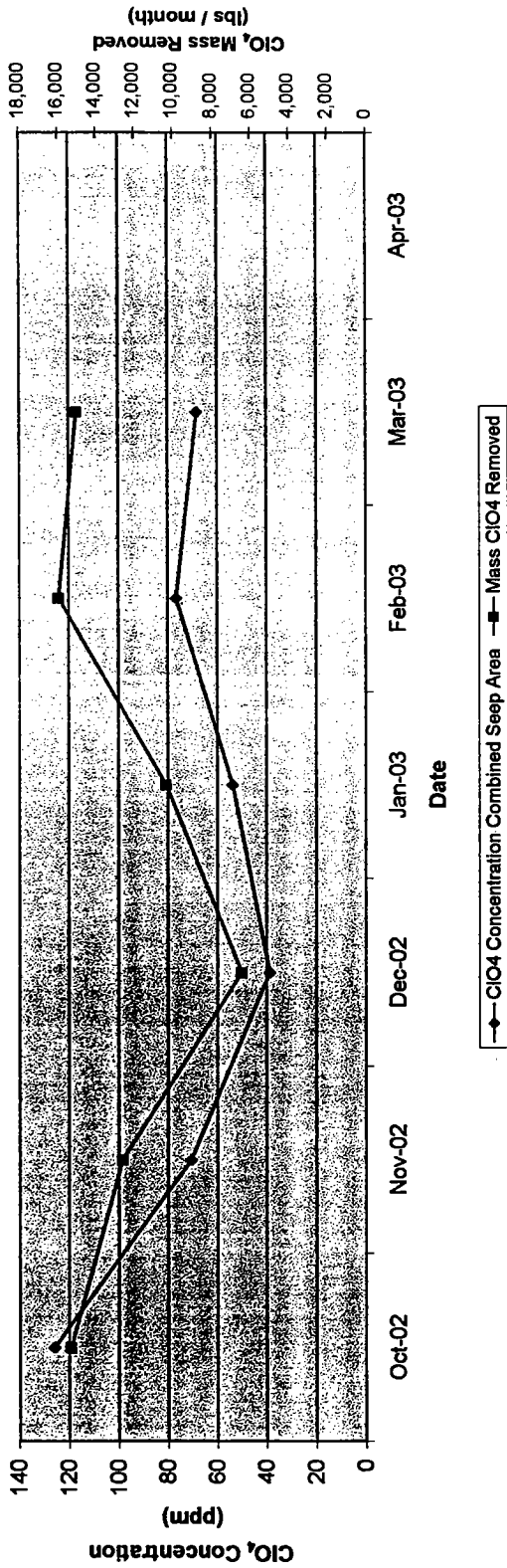
—◆— ART-8 Average ClO4 Concentration    —■— Mass ClO4 Removed Athens Road Area

# Groundwater Monitoring - Between Athens Road and the Seep Area

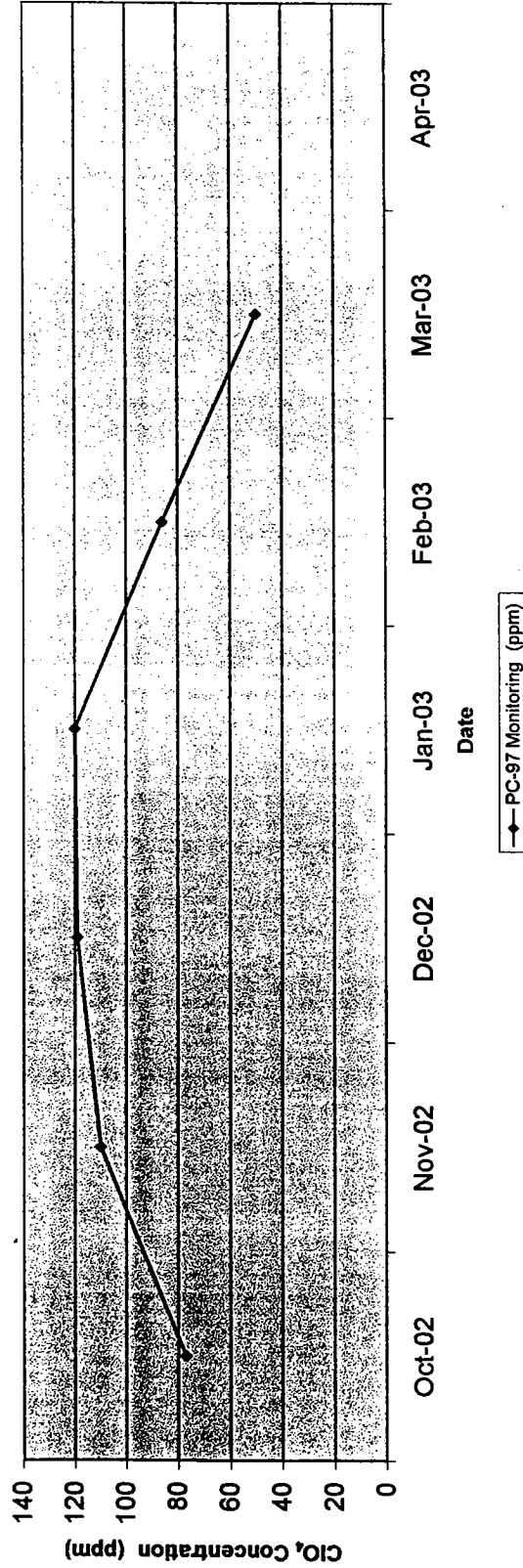


—◆— ARP-3 ClO<sub>4</sub> Concentration —▲— MW-K5 ClO<sub>4</sub> Concentration

### Seep Area ClO<sub>4</sub> Removal Rate



### Seep Area Groundwater Monitoring



04/11/03



# FAX REQUEST FORM

U.S. Environmental Protection Agency - Region 9  
 Waste Management Division  
 75 Hawthorne Street - San Francisco, CA 94105

TO	FROM
Name: TODD CROFT	Name: MITCH KAPLAN
Organization: NDEP	Branch/Section: WST-5
Fax #: 702-486-2863	Fax #: (415) 744-1044 <del>421</del> 3530
Verification #:	Verification #: (415) 744-2083 744-2133 744-2113
Phone #: 702-486-2871	Phone #: (415) <del>744</del> 972-3359
Date: 4/11/03	Pages Including Cover: 3
Subject: C104 SCHEDULE OF ACTIVITIES	

**Comments:**

TODD - HERE IS A DRAFT OF THE  
 TENTATIVE SCHEDULE OF C104 REMEDIATION  
 ACTIVITIES R9 WILL USE INTERNALLY.  
 PLEASE LET ME KNOW IF CHANGES SHOULD  
 BE MADE.

THANKS - Mitch



Printed on 30% postconsumer recycled paper

4/11/03

## KERR MCGEE AND PERCHLORATE SCHEDULE OF SIGNIFICANT ACTIVITIES

Purpose: The following schedule has been prepared to briefly capture the most significant activities related to the remediation of the perchlorate plumes in Henderson, Nevada. Dates in bold indicate that the milestone has been completed. If you want more information on any of these subjects, please contact Larry Bowerman or Mitch Kaplan.

ACTIVITY	WHO	WHEN
<b>1. NDEP Investigation of LVW Gravels and Possible Additional Sources of Perchlorate (NDEP)</b>		
-Workplan received	Larry/Mitch	<b>2/14/03</b>
-EPA Comments	Larry/Mitch	<b>2/28/03</b>
-Phase 1 (Feb → April 2003) (Geophysical)	Doug/Todd	2/03 to 4/03
-Phase 1 Report	Doug/Todd	4/30/03
-Review Phase 1 Report	Larry/Mitch	5/30/03
-Phase 2 (May → June 2003) (MW, S&A)	Doug/Todd	5/03 to 6/03
<b>2. Kerr McGee's Five New Seep Area Wells (KMCC)</b>		
-KMCC Investigations	KMCC	<b>2/03</b>
- <del>Agency Approval of Locations</del>	Larry/Mitch	5/15/03
-Well Installation Completed	KMCC	3/7/03
-Well Operation*	KMCC	3/24/03
-NPDES Permit/Variance Issued	NDEP	3/6/03
-KMCC Well Location Justification Report	KMCC	3/7/03
<b>3. Monitoring Location Plan (EPA)</b>		
-Develop Location List	Larry	~2/20/03
-Letter to Agencies	Larry	3/12/03
-Final Plan/Letter to Agencies	Larry	5/15/03
-Compile Notebook	Larry	~2/10/03
-Draft Management Report Template	Larry/Mitch	4/15/03
-First Report with Real Data	Larry/Mitch	6/15/03 ?
<b>4. MWD Flushing Study (MWD)</b>		
-Meeting with MWD, NDEP & SNWA	Larry /Mitch	3/5/03
-Contractor's Report	MWD	6/03
-Refined flushing graphs	EPA/MWD	7/03
<b>5. In Situ Bioremediation Opportunities (NDEP)</b>		
-1-2 page screening criteria	Todd Croft	4/30/03
-"Screen" possible KMCC opportunities	Todd Croft	4/30/03



**KERR MCGEE AND PERCHLORATE  
SCHEDULE OF SIGNIFICANT ACTIVITIES**

**6. Pepcon Plume (NDEP)**

-Bioremediation pilot		12/02 to 3/03
-Final report		5/15/03
-Strategy (3 locations?)		8/1/03?
-Install remedy at 2 locations		12/31/03?
-Install remedy at third location		?

**7. Is Spent Resin A Hazardous Waste? (EPA)**

-Meeting (WMD, Superfund and ORC)	EPA	2/12/03
-Aerojet data**		3/13/03
-NDEP Email Describing KMCC's Resin Evaluation	Todd Croft	3/7/03
-KMCC data		4/30/03 ?

**8. Peer Review of Athens Road and Seep Area Wells,  
and Investigation Workplan by Kathy Baylor and  
Matt Small (EPA)**

-Schedule Meeting to brief KB and MS	Larry	4/7/03
-Receive Feedback from KB and MS	Larry	4/15/03

**9. Next Visit to Henderson to Discuss**

-LVW Investigation by NDEP	Larry/Mitch	5/2/03
----------------------------	-------------	--------

-Regional Monitoring Plan

-Pepcon In-Situ Bioremediation

-Spent Resin - Data from KMCC

-Monitoring Results Below Athens Road

-Seep Area well performance

-New Bio Treatment Plant (KMCC)

-SNWA Erosion Control Structure

**10. Bostic Weir Erosion Control Structure**

-Obtain Dewatering Dates from SNWA	Mitch	5/15/03
------------------------------------	-------	---------

-Estimated Completion of Dewatering	Mitch	5/2/03
-------------------------------------	-------	--------

\* Well operation delayed two weeks due to delay in issuance of Appropriations Permit by City of Henderson. DWT

\*\* Cheryl Nelson's evaluation: Aerojet spent resin is not a hazardous waste.

## Todd Croft

---

**From:** Todd Croft  
**Sent:** Tuesday, April 08, 2003 2:48 PM  
**To:** 'Bowerman.Larry@epamail.epa.gov'  
**Cc:** 'Kaplan.Mitch@epamail.epa.gov'; Doug Zimmerman  
**Subject:** RE: KMCC Perchlorate Removal Numbers for March 2003

Larry:

1) I haven't heard Kerr-McGee reference any new/remaining well problems at Athens Road. I suspect that the lower removal rates reflect conditions after development of the cones of depression. Susan was posting recent data to her spread sheet when we spoke shortly after she provided the Mass Removal e-mail this morning. We should be able to discuss these issues more in depth when we meet w/ them in early May.

2) It appears that AMPAC (Jeff Gibson) will not be available to meet w/ us in early May. Consequently, he desires to meet this Friday (04/11/03). I'm not sure if Doug Z. will attend. I'll keep you posted w/ results from that meeting.

3) I'd like to firm up the date for the May meeting. Lets plan on May 2, 2003 unless that date no longer works for you and Mitch. May 2nd works for Doug, Todd, Keith Bailey, & Susan Crowley.

4) Susan indicated the following during our call this a.m.:

\*Current system wide removal is at ~1,060 gpm. It has varied between ~980 & 1,060 gpm since adding in the 5 new seep area wells on 03/24/03. They continue to strive to operate as close to the 1,100 gpm permit limitation as possible which means they continue to balance the removal from various wells.

\*They have observed the decreasing flows at the seep and increasing flows from the seep area wells. I would think that the seep flow is decreasing as a result of additional groundwater withdrawals. The seep flow in mid-March was ~150-160 gpm; current seep flow is ~120 gpm.

\*Data from the local Kerr-McGee lab (not confirmed yet by Montgomery Watson) suggests that perchlorate concentrations (combined water from the seep and seep area wells) were beginning to rise from ~65-75 ppm to the high 70s/low 80s until the new wells went on line. Concentrations then dropped to ~mid 50s and are now at the low 60s.

\* Athens Road continues to pump at ~260 gpm @ ~275 ppm (combined flow from the 8 ART Wells). No substantial changes noted in the data.

\*Susan is working on the graphics and tabular information you requested in your March 12, 2003 letter Re: Indicator Monitoring.

BYE TJC

-----Original Message-----

From: Bowerman.Larry@epamail.epa.gov  
[mailto:Bowerman.Larry@epamail.epa.gov]  
Sent: Tuesday, April 08, 2003 1:16 PM  
To: Todd Croft  
Cc: Kaplan.Mitch@epamail.epa.gov; Jones.DavidB@epamail.epa.gov; Doug Zimmerman  
Subject: KMCC Perchlorate Removal Numbers for March 2003

Todd,

Thanks for sending us the March 2003 perchlorate removal numbers from Kerr McGee so promptly. We really appreciate it. The numbers from the

On Site OIL wells continue to be consistent. The increase in the seep area removal is encouraging; its probably too early to see these numbers begin to decrease due to Athens Road well effects. Perhaps the decreases will be evident in the data for May 2003. The Athens Road wells removal increased somewhat. Any thoughts from Kerr McCre on why they havent continued in the 1000 - 1150 lbs/day range? Are they still having problems with 1 or 2 of the wells? Have the cones of depression fully formed, thus resulting in lower removal rates?

Overall, the results continue to be encouraging. Thanks again.

Larry

**Todd Croft**

---

**From:** Crowley, Susan [SCROWLEY@KMG.com]  
**Sent:** Tuesday, April 08, 2003 10:13 AM  
**To:** Todd Croft  
**Cc:** Bailey, Keith; Stater, Rick; Corbett, Pat; Waters, Richard  
**Subject:** Perchlorate Removed from the Environment - March 2003

Todd,

Below are the pounds perchlorate removed from the environment over the life of the perchlorate remediation project, with some specific numbers from March 2003. Please keep in mind that information provided for March will be estimated based upon analytical received through the first week in March. The information provided for February 2003 (and previous months) has been confirmed and the totals adjusted as needed.

- o **From the Seep Area (groundwater and surface water combined): 209.22 tons total.** This includes both surface water capture from initiation of the project plus seep area groundwater extraction since 3-5-02. To determine the March total estimate, the confirmed information **through February 2003 (200.36 tons)** was increased by the **estimated amount for March 2003 (17,727 lbs - 14,918 lbs from wells and 2,809 lbs from the surface flow)**. The estimate for March will be confirmed as the April information is passed to you next month.
- o **Seep area groundwater collected prior to 3-5-02: 13.22 tons total** (some of which went to the GW-11 pond the remaining treated in the wash IX).
- o **On-site groundwater well collection field: 483.53 tons total.** To determine the March total estimate, the confirmed information **through February 2003 (467.0 tons)** was increased by the **estimated amount for March 2003 (33,060 lbs)**. March's activity amounted to a little over 1,000 lbs / day. Perchlorate removal in this area continues to be a very effective - primarily because of it's vicinity to the source.
- o **Athens Rd area groundwater well collection field: 95.8 tons total.** To determine the March total estimate, the confirmed information **through February 2003 (83.25 tons)** was increased by the **estimated amount for March 2003 (25,098 lbs)**. The estimate for March will be confirmed as the April information is passed to you next month. March's activity equates to an estimated removal rate of just under 1,000 lbs / day.

**Total removed as of 3-31-03: 801.77 tons total** (This number includes confirmed information through February 2003 and estimated information for March 2003)

Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, NV 89009  
(702) 651-2234 office  
(702) 592-7727 cell  
(702) 651-2310 fax

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4/8/2003

**Todd Croft**

---

**From:** Crowley, Susan [SCROWLEY@KMG.com]  
**Sent:** Thursday, April 03, 2003 8:57 AM  
**To:** Todd Croft  
**Subject:** RE: Operation of Newly Installed Groundwater collection Wells in the Seep Area

Todd,  
Thanks for the note. I passed this along to others within KM. They really did put out considerable effort.

Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, NV 89009  
(702) 651-2234 office  
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(702) 651-2310 fax

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## -----Original Message-----

**From:** Todd Croft [mailto:tcroft@ndep.nv.gov]  
**Sent:** Monday, March 31, 2003 12:00 PM  
**To:** Crowley, Susan  
**Subject:** RE: Operation of Newly Installed Groundwater collection Wells in the Seep Area

Susan:

Thanks for this update. This is very good news! Thank you for your diligence in pushing this forward. Please thank others involved as I recognize what an effort you all put forth to make this happen in such a short period of time.

THX BYE TJC

## -----Original Message-----

**From:** Crowley, Susan [mailto:SCROWLEY@KMG.com]  
**Sent:** Monday, March 24, 2003 3:07 PM  
**To:** Todd Croft; Leo Drozdoff; Doug Zimmerman  
**Cc:** Bailey, Keith; Krish, Ed; Corbett, Pat  
**Subject:** Operation of Newly Installed Groundwater collection Wells in the Seep Area

Todd / Doug,  
Just an update ... we have now received all the necessary permits (both discharge and water appropriation) for the newly installed groundwater collection wells in the seep area. This morning, we began pumping additional groundwater with the intent that we would fill out our treatment capacity. Over the next several days, we will be adjusting the groundwater collection flows to ensure we are capturing the most productive water for perchlorate removal. Please call or e-mail if you have any questions. Thanks.

Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55

Henderson, NV 89009  
(702) 651-2234 office  
(702) 592-7727 cell  
(702) 651-2310 fax

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**Todd Croft**

---

**From:** Todd Croft  
**Sent:** Thursday, April 03, 2003 9:21 AM  
**To:** Doug Zimmerman  
**Cc:** 'Bowerman.Larry@epamail.epa.gov'; 'Kaplan.Mitch@epamail.epa.gov'  
**Subject:** FW: Sampling for Perchlorate in Henderson

Doug, Mitch, & Larry:

Please note the information below. Both Kerr-McGee and AMPAC are gearing up for groundwater sampling in late April & early May 2003. These data will be used to generate Henderson wide plume maps similar to the 2002 plume maps.

BYE TJC

-----Original Message-----

**From:** Crowley, Susan [mailto:SCROWLEY@KMG.com]  
**Sent:** Thursday, April 03, 2003 8:38 AM  
**To:** 'Jeff Gibson'  
**Cc:** Todd Croft  
**Subject:** RE: Sampling for Perchlorate in Henderson

Jeff,

Thanks for the notice of your sampling. We'll be in the field the weeks of 4/28 (on-site) and 5/5 (off-site), so the timing is not far off. Let me know if you need anything from us during your sampling effort.

Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, NV 89009  
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-----Original Message-----

**From:** Jeff Gibson [mailto:jegibson@apfc.com]  
**Sent:** Wednesday, April 02, 2003 8:23 AM  
**To:** Crowley, Susan  
**Subject:** RE: Sampling for Perchlorate in Henderson

Susan:

We have told Todd Croft that it is our intention to sample most all of the wells in our system the week of April 21, similar to the work done in May, 2002. He recently indicated that he wanted another concerted sampling event, so your team might want to sample in that same time frame, if possible. Thank you.

Regards,  
Jeff Gibson

-----Original Message-----

4/3/2003

**From:** Crowley, Susan [mailto:SCROWLEY@KMG.com]  
**Sent:** Wednesday, October 09, 2002 2:38 PM  
**To:** Jeff Gibson  
**Subject:** Perchlorate Contour Maps

Jeff,

Just a note ... we (both Ed Krish and I) did receive the AmPac perchlorate contours from the May 2002 sampling. Thanks for passing these along.

Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, NV 89009  
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04/01/03

Tuesday

70 100

Tele conf. Notes

of Leo Prozdoff, Jon Palm;

Vern Rosse, & Doug Zimmerman

& EPA: John Kemmerer Water Division

Mitch Kaplan RCRA

John Tupper Permit

Larry Bowman RCRA

Kevin Mayer

Terry

we discussed where things are going  
& how to get there w/ regard to  
A change in clay remediation technology  
at Kell-McGee (Henderson). we discussed  
A goal to:

1) modify the existing AOC

2) modify the existing NPDES Permit

\* Shoot for better effluent quality  
& apply a permit limitation of  
~4 ppb for clay

UCMR - unregulated contaminants monitoring  
rule => 2001-2003 large water suppliers  
sample & report to EPA by late 2004  
then EPA decides if these contaminants  
occur enough to propose a national MCL

## Todd Croft

---

**From:** Todd Croft  
**Sent:** Friday, March 21, 2003 10:02 AM  
**To:** Doug Zimmerman  
**Cc:** Terre Maize  
**Subject:** Status of new Seep Wells; Kerr-McGee; Appropriations permit

Doug:

I just called Susan Crowley (~0935 hrs) to check on the status of the appropriations permit and Seep Area Well Field Operation. Susan has had a number of conversations w/ various DWR personnel since Tuesday of this week. Richard Davis & Jayson King (sp?) have assured her that a permit will be prepared and signed by sometime today. Susan has provided her phone # and fax # and requested to be informed as soon as the permit is ready. She is willing to turn on the well field based upon oral information that the permit is signed. The well field is ready as soon as the permit is issued.

Susan paid the fee to DWR in Las Vegas on Tuesday (03/18/03). The receipt was cut out of the Carson City office yesterday (03/20/03) after the DWR LV office assured the DWR CC office the check was in hand.

Susan indicated that Richard Davis and Jayson King understand that this permit is related to increasing the remediation of perchlorate. She indicated they understand the urgency of this permit.

Susan will contact me around 2:00 p.m. today to provide a status. If she has not heard from DWR by then, I'll get involved again and call Jayson King or others.

BYE TJC

KENNY C. GUINN  
Governor

## STATE OF NEVADA

R. MICHAEL TURNIPSEED, P.E.  
Director



HUGH RICCI, P.E.  
State Engineer

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
DIVISION OF WATER RESOURCES

123 W. Nye Lane, Suite 246  
Carson City, Nevada 89706-0818  
(775) 687-4380 • Fax (775) 687-6972  
<http://ndwr.state.nv.us>

March 18, 2003

Re: 69589E

Frederick R. Stater  
Kerr-McGee Chemical, LLC  
P.O. Box 55  
Henderson, Nevada 89009

Dear Mr. Stater:

You are hereby advised that your application to appropriate the public waters of the State of Nevada, under our Serial Number 69589E for the waters of an underground source is now ready to be approved by this office.

You are further advised that in accordance with NRS 533.435 it will be necessary that you forward to this office, within sixty (60) days from the date hereof, the sum of \$874.00 for the issuing of your permit under the application.

In the event that this office does not receive the amount within sixty (60) days from this date, your application will be subject to denial.

Sincerely, \_\_\_\_\_

A handwritten signature in cursive script that reads "Hugh Ricci, P.E.".  
Hugh Ricci, P.E.  
State Engineer

HR/sam  
cc. Southern Nevada Branch Office

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To Protect  
Human Health  
and the  
Environment


# State of Nevada

## Division of Environmental Protection

**Las Vegas Office**  
1771 E Flamingo Road Suite 121-A  
Las Vegas, Nevada 89119  
702-486-2850

<b>Date:</b>	03/17/03	<b>Pages:</b>	Total of 2
<b>To:</b>	SUSAN Crowley	<b>From:</b>	Todd Croft
<b>Attn:</b>	KEITH-McGee	<b>Fax:</b>	702-486-2863
<b>Fax:</b>	651-2310	<b>Voice:</b>	702-486-2871
<b>Subject:</b>	DWR Appropriations Permit Application # 69589 E		
<b>Notes:</b>			
SUSAN:			
I contacted SWIZ per Doug Zimmerman's request to check on the status of your application. I spoke w/ Robert Thayer. He forwarded your file. The letter requesting the fee was placed in the outgoing mail.			
Attached, please find a copy of the fee letter.			
Please complete the permitting process and inform me once the permit is issued.			

Sincerely  
Todd Croft



Information contained in this fax is confidential. If it inadvertently reached the wrong party, please inform the sender and destroy the document.



**Todd Croft**

---

**From:** Todd Croft  
**Sent:** Monday, March 17, 2003 4:22 PM  
**To:** 'Crowley, Susan'  
**Cc:** Doug Zimmerman  
**Subject:** RE: Seep Well Field Planned Start Up

Susan:

My undersatanding is that the draft permit was not provided to EPA to comment. NDEP-BoWPC issued the permit. The teleconference set for April 1, 2003 between Leo, EPA Region 9, Doug Z., Myself, & others is to discuss the process. I believe you are "good to go" now w/ regard to the Temp. Discharge Permit. If you desire additional information Re: the Temp. Discharge Permit, you will need to call Leo Drozdoff or Jon Palm.

Please keep me informed as you obtain the DWR Appropriations Permit and start up the well field.

THX BYE TJC

-----Original Message-----

**From:** Crowley, Susan [mailto:SCROWLEY@KMG.com]  
**Sent:** Monday, March 17, 2003 4:10 PM  
**To:** Todd Croft  
**Cc:** Doug Zimmerman; Bailey, Keith  
**Subject:** RE: Seep Well Field Planned Start Up

Todd,

I did receive the fax you forwarded re the water appropriation permit approval letter. Thanks.

I've not made contact with Leo Drozdoff yet ... do you happen to know if EPA's comments has been received?

Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, NV 89009  
(702) 651-2234 office  
(702) 592-7727 cell  
(702) 651-2310 fax

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-----Original Message-----

**From:** Todd Croft [mailto:tcroft@ndep.nv.gov]  
**Sent:** Monday, March 17, 2003 1:38 PM  
**To:** kbailey@kmg.com  
**Cc:** scrowley@kmg.com; Doug Zimmerman  
**Subject:** Seep Well Field Planned Start Up

Keith:

I received your v-mail indicating that you have not yet received the DWR Appropriations permit. Other than waiting for that permit, you are ready to commission the new wells.

3/17/2003

Thank you for the update. Please have Susan or yourself call or e-mail upon receipt of the permit.

THX BYE TJC

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**Todd Croft**

---

**From:** Todd Croft  
**Sent:** Monday, March 17, 2003 4:04 PM  
**To:** 'Peterson, James (Feinstein)'  
**Cc:** Doug Zimmerman  
**Subject:** RE: Kerr McGee permit

Mr. Peterson:

The Temporary Discharge Permit for Kerr-McGee was issued with an effective date of March 10, 2003. Kerr-McGee also filed for an appropriations permit with the Division of Water Resources to allow for the planned extraction of groundwater. I understand that Kerr-McGee expects this permit should be issued some time this week (03/17-21/03).

A total of 5 new seep area wells were drilled and constructed between February 15 & 20, 2003. Much of the piping and electrical connections were installed by the end of February 2003. Remaining connections, placement of protective well vaults, and installation of pumps occurred the first week in March 2003.

The current Seep Well Field is now comprised of 9 wells (4 existing and 5 new) spanning a distance of approximately 700 feet across the perchlorate plume. Current (December 2002) perchlorate concentrations throughout the Seep Well Field range between approximately 20 to 85 parts per million (PPM). These concentrations vary seasonally and are expected to rebound from winter lows.

Based upon the above, NDEP anticipates that all needed elements will be in place to allow Kerr-McGee to begin operating the new seep area wells some time the week of 03/17-21/03. Kerr-McGee will operate the Seep Well Field in such a way as to maximize perchlorate mass removal. That effort will likely entail continuous adjustment of the pumps and which wells are pumped. As such, select wells may be pumped more vigorously than other wells and select wells may not be pumped at specific points in time. The overall goal for operation of this well field is to focus on optimizing mass removal while pumping water volumes up to the capacity of the IX treatment system (~1100 gallons per minute).

I trust this information meets your needs at this time. Please contact me by e-mail or phone [(702) 486-2871] should you require additional information.

Sincerely,

Todd J. Croft, Supervisor  
Remediation Branch  
NDEP-LV

-----Original Message-----

**From:** Peterson, James (Feinstein) [mailto:James\_Peterson@feinstein.senate.gov]  
**Sent:** Saturday, February 01, 2003 4:55 AM  
**To:** Todd Croft  
**Subject:** Kerr McGee permit

Hi Todd,

Just checking back to see if Kerr McGee was issued the permit it needed for the 3-6 additional wells discussed at our meeting. I believe you and Doug said it would take about two weeks, which would have been Jan. 28. Thanks.

James Peterson  
District Director  
U.S. Senator Dianne Feinstein  
750 B Street, Suite 1030  
San Diego, CA 92101  
Tel (619) 231-9712  
Fax (619) 231-1108

3/17/2003

## Todd Croft

---

**From:** Peterson, James (Feinstein) [James\_Peterson@feinstein.senate.gov]  
**Sent:** Monday, March 17, 2003 4:04 PM  
**To:** Todd Croft  
**Subject:** Out of Office AutoReply: Kerr McGee permit

James Peterson  
District Director  
Office of U.S. Senator Dianne Feinstein  
750 B Street, Suite 1030  
San Diego, CA 92101  
Tel (619) 231-9712  
Fax (619) 231-1108



ALLEN BIAGGI, *Administrator*

STATE OF NEVADA  
KENNY C. GUINN  
*Governor*

R. MICHAEL TURNIPSEED, *Director*

(775) 687-4670

Administration  
*Facsimile* 687-5856

Water Pollution Control  
*Facsimile* 687-4684

Mining Regulation and  
Reclamation  
*Facsimile* 684-5259



Waste Management  
Corrective Actions  
Federal Facilities  
  
Air Pollution Control  
Air Quality Planning  
Water Quality Planning  
  
*Facsimile* 687-6396

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**

333 W. Nye Lane, Room 138  
Carson City, Nevada 89706

March 12, 2003

Mr. Patrick Corbett  
Kerr-McGee Chemical LLC  
Kerr-McGee Center  
Oklahoma City, OK 73125

RE: Perchlorate Remediation – Henderson, Nevada

Dear Mr. Corbett:

I am sending you this letter to document our previous instructions requiring Kerr-McGee to extract and treat for perchlorate removal a total of 1,100 gallons per minute by any means currently available. It is recognized that water treated beyond the current NPDES permit limit will be managed under a temporary permit.

If you have any questions on these matters, please contact me at (775) 687-9366.

Sincerely,

A handwritten signature in black ink that reads "Doug Zimmerman". The signature is fluid and cursive, with a long horizontal line extending to the right.

Doug Zimmerman  
Bureau Chief



**KERR-McGEE CHEMICAL LLC**  
POST OFFICE BOX 55 · HENDERSON, NEVADA 89009

February 25, 2003

Mr. Leo Drozdoff  
Nevada Division of Environmental Protection  
Bureau of Water Pollution Control  
333 West Nye Lane  
Carson City, NV 89706-0851

RECEIVED  
ENVIRONMENTAL  
PROTECTION  
03 MAR - 3 PM 2:33

Subject: Temporary Discharge Permit Application

Dear Mr. Drozdoff:

Kerr-McGee Chemical LLC (Kerr-McGee) has on-going perchlorate remedial efforts in the Henderson, Nevada region. Related to those efforts, Kerr-McGee is seeking a temporary discharge volume increase above the existing NPDES Permit NV 0023060 allowance for discharge of water treated for perchlorate reduction (please see Attachment 1). Kerr-McGee has recently committed to increasing the volume of seep area water collected for the perchlorate remedial efforts, eventually filling out the ion exchange treatment capacity, up to 1100 gpm (please see Attachment 2). Several permits will be required before the treated volume can be increased, one of which is related to increased discharge of the treated water. In discussion with your office, it was determined that because this was expected to be a temporary need, the route of a temporary discharge permit to make up the difference between the NPDES permit limit of 847 gpm and the committed 1100 gpm was appropriate. Prompt granting by Nevada Division of Environmental Protection (NDEP) of this temporary discharge permit for the period March 10<sup>th</sup> to September 7<sup>th</sup> will allow Kerr-McGee to increase its treated discharge volume to 1100 gpm and fully utilize the current treatment capacity.

As NDEP reviews this application, Kerr-McGee has provided additional information related to several topics which have been discussed.

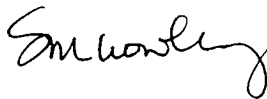
- Attachment 3 provides an analytical summary associated with those constituents, which during the NPDES permit development process warranted attention and in compliance with the NPDES permit Kerr-McGee has been sampling for in the Las Vegas Wash. These are: TDS, boron, chromium, copper, iron, manganese, molybdenum, chloride and fluoride. In this analytical summary, it can be seen that the constituents' concentrations are not consistently higher or lower downgradient from the Kerr-McGee NPDES permit outfall, when compared to upgradient concentrations ("LVW Upgradient" is upgradient of the outfall – "LVW 6.05" is the first downgradient sampling point related to the outfall). As required in the NPDES permit, Kerr-McGee will continue to monitor these constituents to evaluate the increased discharge volume impact on the Las Vegas Wash.

- Attachment 4 provides an analytical summary of a constituent suite for the influent and effluent of the ion exchange process located close to the Las Vegas Wash. Included in this summary is information relating to various types of analytes, including organics. Reviewing the analytical results, it can be seen that not many organic compound are detected. Those few detected are in the sub ppb concentration. Accordingly, Kerr-McGee does not believe that the delay associated with integrating activated granulated carbon treatment into the processing of the additional collected water would be justified.

Considering the relatively rapid horizontal movement of groundwater in the seep area (where the additional treated water will be drawn) and the proximity of the seep area to the Las Vegas Wash, it is expected that the non-perchlorate constituents listed in both Attachments 3 and 4 would reach the Las Vegas Wash within several days, regardless of the collection of this groundwater for treatment. Because of this, it is not expected that collection of this additional volume for perchlorate treatment with subsequent discharge will place significant additional loads on the Wash.

It is Kerr-McGee's intent to begin treatment of the addition committed volume in mid-March. As always, please feel free to call me at (702) 651-2234 if you have any questions or comments. Thank you.

Sincerely,



Susan M. Crowley  
Staff Environmental Specialist

AIRBORNE EXPRESS

ATTACHMENTS

cc: Brenda Pohlmann, City of Henderson  
Barry Conaty, City of Henderson  
Todd Croft, NDEP  
Doug Zimmerman, NDEP  
Marshall Davis, Metro Water District of Southern California  
Pat Mulroy, SNWA  
Mitch Kaplan, EPA Region IX

Leo Drozdoff  
February 25, 2003  
Page 3

bcc: LKBailey  
PSCorbett  
WOGreen  
E Krish  
JTSmith, Covington and Burling  
FRStater  
WKTaylor  
R Waters

C:\DOCUMENTS AND SETTINGS\ZSMC1\MY DOCUMENTS\WORD DOCS\1PERCHLORATE\NPDES PERMIT 0023060 AND TEMP PERMIT\TEMP PERMIT FOR ADDED  
SEEP WELLS\TEMP APPLICATION - CVR LTR.DOC

**KERR-McG CHEMICAL LLC**  
**HENDERSON, NEVADA**

No. 8159

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TO  
THE  
ORDER  
OF

Nevada Div. of Environmental  
 Protection

**KERR-McGEE CHEMICAL LLC**

By

By

⑈008159⑈ ⑆321270742⑆0832402358⑈

**KERR-McGEE CHEMICAL LLC**

REMITTANCE ADVICE  
 DETACH BEFORE DEPOSITING

THE ENDORSEMENT BY THE PAYEE OF THE DETACHED CHECK CONSTITUTES RECEIPT IN FULL FOR ITEMS LISTED BELOW.

DATE	DESCRIPTION	AMOUNT
02/13/03	temp discharge permit	250.00

## **Attachment 1**

### **Application for Temporary Discharge Permit**



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Settings\zsmc1\My Dc

# LIST OF REQUIREMENTS FOR TEMPORARY PERMIT APPLICATION

A temporary permit may be issued for a maximum of a 180 day (6 month) period of time, pursuant to NRS 445A.485, after which time the discharge shall cease or the discharger shall have applied for and received a Permanent Discharge Permit. A \$250.00 fee is due at the time of application.

## I. Owner Information

Name: Kerr-McGee Chemical LLC  
Address PO Box 55  
City Henderson County Clark  
State Nevada Zip Code 89009  
Telephone Number (702) 651-2200 Fax Number (702) 651-2310  
Contact Person Susan Crowley

## II. Facility/Site Information

Facility Name Kerr-McGee Chemical LLC  
Facility Address 8000 West Lake Mead Drive  
City Henderson County Clark  
State Nevada Zip Code 89015  
Telephone Number (702) 651-2200 Fax Number (702) 651-2310  
Contact Person Susan Crowley  
Latitude 36 deg, 5 min, 15 sec Longitude 114 deg, 59 min, 30 sec  
Township 215 Range 63e  
Section \_\_\_\_\_

## III. Receiving Water Name Las Vegas Wash

If the discharge enters a separate storm water drainage or other system, please provide the following information:

- the name of the owner of the drainage
- The name of the receiving water into which the drainage system discharges; and
- A copy of the permit, license, or equivalent written approval granted by the owner of the system for such a discharge or connection to the system

## IV. A narrative description of the site & activities which require the discharge permit. Describe any treatment system and/or Best Management Practices to be used at the facility.

## V. Water Quality Analysis (must use a Nevada State Certified Lab) to include the potential contaminants/pollutants in the discharge.

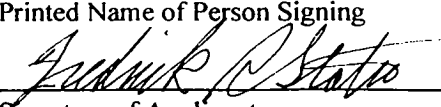
## VI. Quantity of discharge: Flow (gallons per day) 0.37 mgd - 30 day avg 0.42 mgd - 7 day avg

## VII. Attach a topographic map and a site map showing the location of the potential discharge and a line drawing showing the general route taken by water in the facility from intake to discharge.

## VIII. Existing Environmental Permits

NPDES Permit (Discharges to Surface Water) NV0023060, NV0000078  
NEV Permit (Discharges to Ground Water) NEV20001516, NEV 20001515

## IX. I certify that I am familiar with the information contained in the application and that to the best of my knowledge and belief such information is true, complete, and accurate.

Fredrick R. Stater  
Printed Name of Person Signing  
  
Signature of Applicant

Plant Manager  
Title  
Feb 25, 2003  
Date Application Signed

## **Attachment 2**

### **Correspondence Between Kerr-McGee and Senator Feinstein**



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Settings\zsmc1\My Dc





**KERR-McGEE CORPORATION**  
KERR-McGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

LUKE R. CORBETT  
CHAIRMAN AND  
CHIEF EXECUTIVE OFFICER

January 30, 2003

*Copies to:*

P. Woodward  
J. Reichenberger  
R. Waters  
J.T. Smith/P. Nickles (fax)  
GFP  
1/30/03

The Honorable Dianne Feinstein  
United States Senator  
Washington, DC 20510-0504

*Perchlorate -  
OEHHA*

Dear Senator Feinstein:

Thank you for your letter of January 23, 2003. I am pleased members of your staff and a representative of the Metropolitan Water District were able to tour the Henderson facility and visit with Pat Corbett and Dr. John Gibbs regarding our activities at the site. I understand Kerr-McGee personnel have been in contact with your staff to clarify issues related to certain technical aspects of the work mentioned in your letter. George Christiansen, Kerr-McGee's Vice President of Safety & Environmental Affairs, and his staff will continue to keep James Peterson of your staff informed regarding our work at Henderson.

We remain committed to fulfilling our obligations at Henderson under the direction of the Nevada Department of Environmental Protection and in cooperation with Region 9 of the U.S. Environmental Protection Agency. As Dr. Gibbs discussed with your staff, much is known about perchlorate because physicians have used it for decades to treat thyroid disorders. Numerous peer reviewed human health studies indicate that perchlorate levels much higher than those found in the Colorado River are safe. It is critically important that the relevant regulatory agencies take care to ensure that any future drinking water standards reflect the sound scientific work that has been and is being conducted.

I am pleased to know you are committed to helping ensure the federal government meets its responsibilities with regard to the Henderson site. I have asked Pete Frank, Kerr-McGee Vice President of Public Affairs, to follow up with your Washington staff to determine whether we can be of assistance in your efforts to engage the federal government regarding its responsibility for the Henderson site.

Sincerely,

Luke R. Corbett  
Chairman and Chief Executive Officer

DIANE FEINSTEIN  
CALIFORNIA



COMMITTEE ON APPROPRIATIONS  
COMMITTEE ON ENERGY AND NATURAL RESOURCES  
COMMITTEE ON THE JUDICIARY  
COMMITTEE ON RULES AND ADMINISTRATION  
SELECT COMMITTEE ON INTELLIGENCE

**United States Senate**  
WASHINGTON, DC 20510-0504

<http://feinstein.senate.gov>

January 23, 2003

Mr. Luke R. Corbett  
Chairman and Chief Executive Officer  
Kerr-McGee Corporation  
Kerr-McGee Center  
P.O. Box 25861  
Oklahoma City, OK 73125

Dear Mr. Corbett:

Thank you for your response to my January 6 letter and for providing my staff the opportunity to visit your facility in Henderson, Nevada. I am pleased to know that you share my concerns over perchlorate contamination in the Colorado River and a genuine desire to see the cleanup effort progress as quickly as possible.

According to the information provided to my staff, I understand that Kerr-McGee has decided to install between three and six additional extraction wells in the area between Athens Road and the Las Vegas Wash. I also understand that this process should be completed in the next four to six weeks. While I know that it is difficult to predict the precise impact these additional wells will have on the reducing the flow of perchlorate, I believe this is an important step in the right direction. I commend you for making this decision and for your ongoing efforts to reduce the amount of perchlorate leaching into Lake Mead.

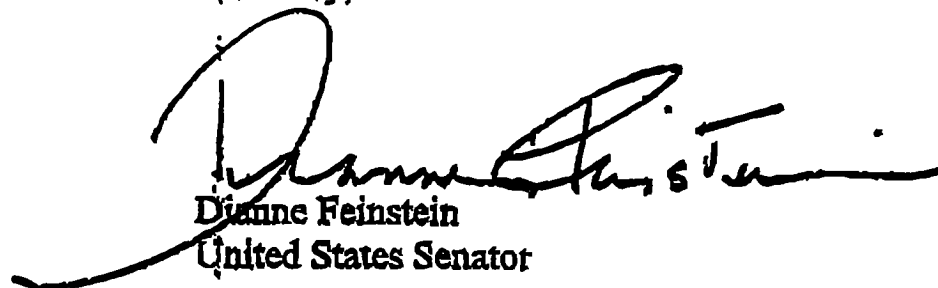
I hope that you will keep me informed about the results of your efforts as new perchlorate monitoring data becomes available. I am particularly interested in the benefits of the slurry wall at Athens Road, which was completed in November 2002. I understand that you will be able to evaluate the efficacy of the wall in May, approximately the same time that the Nevada

Environmental Protection completes a study of additional remediation opportunities in and adjacent to the wash gravel area. I would appreciate being informed of the findings of both of these efforts.

As you know, perchlorate contamination of drinking water supplies is a problem of growing concern nationwide. It is also an issue where I believe the federal government can and should play a leading role. Given that approximately 90% of all perchlorate manufactured in the U.S. was produced for the Department of Defense, I believe they bear a special responsibility to help remedy many of the contaminated sites around the country. I want you to know that I intend to pursue this matter further with the Secretary Rumsfeld and work with Senator Reid to insure that the DOD is meeting its responsibilities with regards to your Henderson facility as well as other perchlorate-related formerly used defense sites.

Thank you again for your cooperation on this matter. I look forward to hearing the results of your cleanup efforts and to working together to insure the safety of the drinking water supplies along the lower Colorado River.

Sincerely,



Dianne Feinstein  
United States Senator

cc: U.S. Senator Harry Reid

Thank you so much for taking such prompt & additional action.

02/04/2003 16:15 FAX 405 270 41

KM LAW

006

02/04/2003 16:56 FAX 405 270 3940

KERR-MCGEE

001

02/04/2003 15:55 FAX 405 270 2226

KERR MCGEE ORC

001

~~cc: Corbett, Cooney, Drake, Webster, ...~~



**KERR-MCGEE CORPORATION**  
KERR-MCGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

LUKE R. CORBETT  
CHAIRMAN AND  
CHIEF EXECUTIVE OFFICER

January 9, 2003

The Honorable Dianne Feinstein  
United States Senator  
Washington, DC 20510-0504

Dear Senator Feinstein:

I received your letter this week, regarding perchlorate and water quality. Safety and environmental responsibility are top priorities at Kerr-McGee. We pride ourselves on being a responsible environmental steward and a good corporate citizen. The safety of our workers and neighbors is paramount, and we work hard to positively impact the communities where we live, work and play.

Upon receiving your letter, I asked George Christiansen, our vice president in charge of Safety and Environmental Affairs, to carefully review and consider your comments, provide a response to you, and arrange for your staff to visit the Henderson site. Mr. Christiansen's response is attached.

As you will see, Kerr-McGee stepped forward and started working with Region 9 of EPA and the Nevada Department of Environmental Protection (NDEP) as soon as perchlorate was found in Lake Mead. As a responsible corporate citizen, we are making every effort to do the right thing, and we are committed to continuing our cleanup efforts at Henderson under the direction of EPA and NDEP.

Mr. Christiansen has arranged for James Peterson and Guillermo Gonzalez of your staff, to tour the Henderson site next week. Two of our environmental experts will meet with Mr. Peterson and Mr. Gonzalez to brief them on the project, answer questions and discuss your comments.

We hope we can count on your help as we continue our work. We look forward to working with you and your staff and will keep you informed of our progress. Thank you for your suggestions.

Sincerely,

Luke R. Corbett  
Chairman and Chief Executive Officer

Attachment

02/04/2003 TUE 16:43 [TX/RX NO 7421]

02/04/2003 TUE 16:06 [TX/RX NO 8353]



**KERR-MCGEE CO.**  
KERR-MCGEE CENTER • P.O. BOX 22861 • OKLAHOMA

To: Stephanie  
Smith

X4101

GEORGE D. CHRISTIANSEN  
VICE PRESIDENT  
SAFETY & ENVIRONMENTAL AFFAIRS

January 9, 2003

The Honorable Dianne Feinstein  
United States Senator  
Washington, DC 20510-0504

Dear Senator Feinstein:

Mr. Corbett asked me to respond to your recent letter regarding perchlorate and water quality. We share your interest in protecting the environment and place top priority on environmental responsibility at all of our locations worldwide.

Consistent with our emphasis on environmental stewardship, we have worked with both Region 9 of EPA and the Nevada Department of Environmental Protection (NDEP) since perchlorate was detected in Lake Mead in 1997. Upon detection, and at our sole expense, we immediately began a thorough review of the groundwater conditions in the vicinity of the former Henderson production facility to identify remediation opportunities.

In 1999, again at our expense, we began treating surface water near the Las Vegas Wash using a state-of-the-art ion exchange system under the supervision of NDEP. In 2000, we began working on an innovative design for a new treatment facility. We then began treating groundwater in addition to surface water - approximately doubling the volume of water being treated. Our remediation strategy is to maximize capture and control of the groundwater. Through various remediation techniques, we have essentially obtained control of the groundwater at the plant site and at a second location between the site and the Las Vegas Wash (the Athens Road well field). As we remediate this site, we will continue to be responsive to the requests of EPA and NDEP.

As you know, the Henderson plant produced perchlorate for United States defense and space programs. The U.S. Navy oversaw the design and operations of the Henderson plant, and in fact, owned the site for more than 10 years. The U.S. government remained the end-user for nearly all of the perchlorate produced at the plant until operations were discontinued in 1998. Although the U.S. government therefore should be principally responsible for perchlorate found in groundwater affected by the plant, the U.S. government so far has refused to accept financial responsibility for the remediation work. We pride ourselves on doing the right thing and have not waited for the U.S. government to accept responsibility for its actions. We hope you will help ensure that the federal government steps forward to accept financial responsibility for the cleanup that we began more than three years ago.

Senator Dianne Feinstein  
Page 2

Regarding health effects, more is known about perchlorate than just about any other chemical of environmental concern because physicians have used perchlorate for over half a century to treat thyroid disorders. Numerous peer-reviewed and published human health studies suggest that perchlorate levels much higher than those found in the Colorado River are safe. We believe the best science should be used in establishing safe drinking water levels and continue to support studies to provide additional scientific data on this matter. Abstracts of recent peer reviewed and published human health studies, including those on children, are attached.

In your letter, you offer comments that are worthy of further discussion. We have scheduled a meeting and a tour with James Peterson and Guillermo Gonzalez of your staff. I understand that Mr. Peterson is inviting a representative of the Metropolitan Water District to join him. This past year, a delegation from the Metropolitan Water District toured our facility. We will continue to work under the direction of EPA and NDEP as we move forward.

We appreciate your interest in our efforts and your suggestions. We look forward to the opportunity to meet with your staff and to work with you in the future.

Sincerely,



George Christiansen  
Vice President  
Safety and Environmental Affairs

Attachment

Handwritten notes and stamps at the top of the page, including "JAN 7 2003" and "SENATOR FEINSTEIN".

DIARNE FEINSTEIN  
CALIFORNIA

COMMITTEE ON APPROPRIATIONS  
COMMITTEE ON ENERGY AND NATURAL RESOURCES  
COMMITTEE ON THE JUDICIARY  
COMMITTEE ON RULES AND ADMINISTRATION  
SELECT COMMITTEE ON INTELLIGENCE

# United States Senate

WASHINGTON, DC 20510-0504  
<http://feinstein.senate.gov>

January 6, 2003

Luke R. Corbett  
Chairman and Chief Executive Officer  
Kerr-McGee Corporation  
Kerr-McGee Center  
P.O. Box 25861  
Oklahoma City, Oklahoma 73125

Dear Mr. Corbett:

I am writing to express my deep concerns over the perchlorate contamination in the Colorado River caused by Kerr-McGee's perchlorate production facility near Henderson, Nevada and to seek your cooperation to accelerate your ongoing clean-up effort.

As you well know, Kerr-McGee's perchlorate spill poses a serious threat to drinking water supplies in Southern California, as well as Nevada and Arizona. I know that your company has made a significant effort to prevent further contamination of the Colorado River. However, I believe these efforts are not sufficient to prevent further damage to Southern California's drinking water supply and precious aquifers.

While I understand that Kerr-McGee has committed tens of millions of dollars to clean-up the Henderson facility, every day approximately 450 pounds of perchlorate continue to leech into Lake Mead and the Colorado River via the Las Vegas Wash. As a result, Colorado River water entering California now contains perchlorate at between 4 and 9 parts per billion. This contamination exceeds the safe drinking water standards now under consideration by California officials and poses a health threat to the 17 million water users in Southern California. Furthermore, several water agencies who rely on Colorado River water for recharge have recently

MILBURN OFFICE:  
1100 G STREET  
SUITE 2100  
FREDERICK, CA 92721  
(951) 465-9400

LOS ANGELES OFFICE:  
11111 Santa Monica Boulevard  
SUITE 215  
LOS ANGELES, CA 90025  
(310) 814-9300

SAN DIEGO OFFICE:  
780 B STREET  
SUITE 1050  
SAN DIEGO, CA 92101  
(619) 231-8772

SAN FRANCISCO OFFICE:  
ONE PONY STREET  
SUITE 2100  
SAN FRANCISCO, CA 94104  
(415) 393-0707

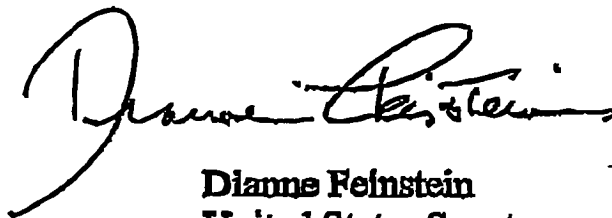
discovered perchlorate contamination in their aquifers, which stands to significantly increase the cost and duration of the clean-up effort.

To address perchlorate contamination from the Colorado River and local sources, I convened a roundtable meeting at the headquarters of the Metropolitan Water District on December 19, 2002. At that meeting, I was briefed on the scope and severity of the contamination from local, state, and federal officials. A number of suggestions were made regarding steps that Kerr-McGee could take to accelerate their clean-up efforts, including:

- Improving extraction of groundwater between Athens Road and the Las Vegas Wash by installing additional remediation wells;
- Extracting high concentration perchlorate contaminated groundwater in the Las Vegas Wash gravel area; and,
- Treating or containing all groundwater now using proven technology through direct ion exchange treatment and additional lined evaporation ponds to contain and concentrate groundwater prior to treatment.

I hope that you will strongly consider these suggestions and do all that you can to prevent further contamination. I appreciate your attention to this matter and would also appreciate hearing from you regarding what additional measures you plan to take to remedy this situation as soon as possible.

Sincerely,



Dianne Feinstein  
United States Senator



## **Attachment 3**

### **Analytical Summary for Las Vegas Wash Constituents**



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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	7/16/2001	7/16/2001	7/30/2001	7/30/2001	8/13/2001	8/13/2001
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2107170080	2107170079	2107310088	2107310087	2108140237	2108140236
	Sample Number			WASH 6.05 LW	WASH UP LW		
	Remarks						
	Superseded						

**Other**

Total Dissolved Solids	mg/l	1500 v	1490 v	1450 v	1440 v	1400 v	1410 v
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**Metals**

Boron	mg/l	0.57 v	0.58 v	0.57 v	0.6 v	0.51 v	0.57 v
Chromium	mg/l	0.0012 v	0.0014 v	0.0021 v	0.0052 v	0.0014 v	0.0011 v
Copper	mg/l	0.0095 v	0.0058 v	0.0086 v	0.0094 v	0.0043 v	0.0023 v
Iron	mg/l	0.15 v	0.19 v	0.27 v	0.25 v	0.22 v	0.23 v
Manganese	mg/l	0.037 v	0.035 v	0.049 v	0.05 v	0.037 v	0.016 v
Molybdenum	mg/l	0.024 v	0.025 v	0.026 v	0.027 v	0.027 v	0.012 v

**Inorganics**

Chloride	mg/l	298 vd	293 vd	273 vd	275 vd	270 vd	270 vd
Fluoride	mg/l	0.94 v	0.93 v	0.92 v	0.92 v	0.96 v	0.97 v

See analytical flag codes on last page.

# Analyses Summary Report

Site Name: Henderson

2/13/2003 3:52:02 PM

Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	8/27/2001	8/27/2001	9/10/2001	9/10/2001	9/24/2001	9/24/2001
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2108280162	2108280153	2109110092	2109110091	2109250201	2109250197
	Sample Number						
	Remarks						
	Superseded						
<b>Other</b>							
Total Dissolved Solids	mg/l	1420 v	1420 v	1470 v	1520 v	1420 v	1410 v
<b>Metals</b>							
Boron	mg/l	0.56 v	0.53 v	0.59 v	0.6 v	0.54 v	0.54 v
Chromium	mg/l	0.0015 v	0.0024 v	0.002 v	0.0018 v	0.0035 v	0.003 v
Copper	mg/l	0.0053 v	0.0057 v	0.0054 v	0.0047 v	0.0074 v	0.0081 v
Iron	mg/l	0.1 u	0.16 v	0.24 v	0.22 v	0.14 v	0.19 v
Manganese	mg/l	0.017 v	0.034 v	0.044 v	0.04 v	0.035 v	0.034 v
Molybdenum	mg/l	0.026 v	0.024 v	0.022 v	0.022 v	0.023 v	0.023 v
<b>Inorganics</b>							
Chloride	mg/l	260 vd	260 vd	280 vd	280 vd	270 vd	280 vd
Fluoride	mg/l	0.89 v	0.97 v	0.87 v	0.9 v	0.92 v	0.94 v

See analytical flag codes on last page.

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**Analyses Summary Report****Site Name: Henderson****2/13/2003 3:52:02 PM**

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	10/9/2001	10/9/2001	10/22/2001	10/22/2001	11/5/2001	11/5/2001
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2110100007	2110100006	2110230086	2110230085	2111060004	2111060003
	Sample Number						
	Remarks						
	Superseded						

**Other**

Total Dissolved Solids	mg/l	1460 v	1530 v	1480 v	1500 v	1570 v	1540 v
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**Metals**

Boron	mg/l	0.57 v	0.61 v	0.6 v	0.63 v	0.66 v	0.62 v
Chromium	mg/l	0.0035 v	0.0028 v	0.0022 v	0.0022 v	0.0023 v	0.0019 v
Copper	mg/l	0.0086 v	0.0091 v	0.0077 v	0.0069 v	0.014 v	0.0083 v
Iron	mg/l	0.16 v	0.16 v	0.32 v	0.24 v	0.42 v	0.41 v
Manganese	mg/l	0.035 v	0.033 v	0.047 v	0.037 v	0.058 v	0.044 v
Molybdenum	mg/l	0.022 v	0.022 v	0.022 v	0.02 v	0.022 v	0.019 v

**Inorganics**

Chloride	mg/l	290 vd	290 vd	290 vd	290 vd	280 vd	270 vd
Fluoride	mg/l	0.93 v	0.96 v	0.96 v	0.97 v	0.88 v	0.89 v

See analytical flag codes on last page.

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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	11/19/2001	11/19/2001	12/3/2001	12/3/2001	12/18/2001	12/18/2001
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2111200039	2111200038	2112040008	2112040007	2112190130	2112190128
	Sample Number						
	Remarks						
	Superseded						

Other							
Total Dissolved Solids	mg/l	1540 v	1560 v	1590 v	1590 v	1600 v	1680 v
Metals							
Boron	mg/l	0.67 v	0.68 v	0.69 v	0.7 v	0.66 vd	0.75 vd
Chromium	mg/l	0.0026 v	0.0022 v	0.0016 v	0.0016 v	0.0013 v	0.0014 v
Copper	mg/l	0.0085 v	0.0076 v	0.0071 v	0.0075 v	0.0082 v	0.0088 v
Iron	mg/l	0.32 v	0.3 v	0.31 v	0.32 v	0.37 vd	0.38 vd
Manganese	mg/l	0.059 v	0.042 v	0.044 v	0.044 v	0.048 v	0.057 v
Molybdenum	mg/l	0.02 v	0.018 v	0.017 v	0.017 v	0.02 v	0.019 v
Inorganics							
Chloride	mg/l	320 vd	310 vd	290 vd	280 vd	320 vd	320 vd
Fluoride	mg/l	0.98 v	1 v	0.93 v	0.97 v	0.97 v	1 v

See analytical flag codes on last page.

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**Analyses Summary Report****Site Name: Henderson****2/13/2003 3:52:02 PM**

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<b>Sample Type:</b>	<b>Station (Site)</b>	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
<b>Water</b>	<b>Sample Date</b>	1/2/2002	1/2/2002	1/14/2002	1/14/2002	1/28/2002	1/28/2002
	<b>Lab</b>	MWL	MWL	MWL	MWL	MWL	MWL
	<b>Lab Number</b>	2201030100	2201030097	2201150049	2201150047	2201290006	2201290004
	<b>Sample Number</b>						
	<b>Remarks</b>						
	<b>Superseded</b>						

**Other**

Total Dissolved Solids	mg/l	1560 v	1590 v	1570 v	1610 v	1530 v	1600 v
------------------------	------	--------	--------	--------	--------	--------	--------

**Metals**

Boron	mg/l	0.6 v	0.67 vd	0.66 v	0.67 v	0.64 v	0.67 v
Chromium	mg/l	0.0021 v	0.0011 v	0.0012 v	0.0021 v	0.0058 v	0.0049 v
Copper	mg/l	0.0078 v	0.0063 v	0.0037 v	0.0054 v	0.0061 v	0.0053 v
Iron	mg/l	0.24 v	0.28 vd	0.26 v	0.25 v	0.27 v	0.33 v
Manganese	mg/l	0.043 v	0.042 v	0.021 v	0.042 v	0.044 v	0.044 v
Molybdenum	mg/l	0.015 v	0.015 v	0.0083 v	0.016 v	0.017 v	0.017 v

**Inorganics**

Chloride	mg/l	300 vd	290 vd	310 vd	300 vd	290 vd	310 vd
Fluoride	mg/l	0.85 v	0.9 v	0.89 v	0.94 v	0.91 v	0.96 v

See analytical flag codes on last page.

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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	2/11/2002	2/11/2002	2/25/2002	2/25/2002	3/13/2002	3/13/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2202120008	2202120007	2202260018	2202260017	2203140021	2203140020
	Sample Number						
	Remarks						
	Superseded						

<b>Other</b>							
Total Dissolved Solids	mg/l	1550 v	1590 v	1550 v	1570 v	1540 v	1600 v
<b>Metals</b>							
Boron	mg/l	0.65 v	0.67 v	0.57 v	0.59 v	0.62 v	0.66 v
Chromium	mg/l	0.0016 v	0.0014 v	0.0028 v	0.0027 v	0.0077 v	0.0071 v
Copper	mg/l	0.0058 v	0.0056 v	0.0037 v	0.003 v	0.0098 v	0.0048 v
Iron	mg/l	0.4 v	0.41 v	0.22 v	0.23 v	0.24 v	0.19 v
Manganese	mg/l	0.065 v	0.057 v	0.047 v	0.045 v	0.048 v	0.045 v
Molybdenum	mg/l	0.018 v	0.018 v	0.021 v	0.021 v	0.021 v	0.022 v
<b>Inorganics</b>							
Chloride	mg/l	320 vd	300 vd	260 vd	260 vd	293 vd	303 vd
Fluoride	mg/l	0.9 v	0.96 v	0.91 v	0.96 v	0.89 v	0.94 v

See analytical flag codes on last page.

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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	3/26/2002	3/26/2002	4/10/2002	4/10/2002	4/24/2002	4/24/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2203280080	2203280078	2204110024	2204110023	2204250025	2204250024
	Sample Number						
	Remarks						
	Superseded						

<b>Other</b>							
Total Dissolved Solids	mg/l	1520 v	1810 v	1640 v	1650 v	1600 v	1700 v
<b>Metals</b>							
Boron	mg/l	0.64 v	0.93 v	0.65 v	0.65 v	0.62 v	0.6 v
Chromium	mg/l	0.0041 v	0.0036 v	0.0026 v	0.0017 v	0.001 u	0.0089 v
Copper	mg/l	0.0043 v	0.0027 v	0.0027 v	0.002 v	0.0024 v	0.0071 v
Iron	mg/l	0.29 v	0.23 v	0.19 v	0.2 v	0.1 u	0.17 v
Manganese	mg/l	0.041 v	0.038 v	0.049 v	0.049 v	0.047 v	0.048 v
Molybdenum	mg/l	0.019 v	0.02 v	0.021 v	0.022 v	0.023 v	0.022 v
<b>Inorganics</b>							
Chloride	mg/l	150 vd	400 vd	320 vd	330 vd	330 vd	320 vd
Fluoride	mg/l	0.96 v	1 v	0.93 v	0.98 v	0.91 v	0.96 v

See analytical flag codes on last page.



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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	5/8/2002	5/8/2002	5/22/2002	5/22/2002	6/5/2002	6/5/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2205090014	2205090013	2205230074	2205230073	2206060012	2206060011
	Sample Number						
	Remarks						
	Superceded						

**Other**

Total Dissolved Solids	mg/l	1580 v	1550 v	1400 v	1450 v	1490 v	1490 v
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**Metals**

Boron	mg/l	0.59 v	0.59 v	0.52 v	0.59 v	0.56 v	0.54 v
Chromium	mg/l	0.0022 v	0.0025 v	0.0031 v	0.0031 v	0.0023 v	0.0031 v
Copper	mg/l	0.0048 v	0.0044 v	0.0036 v	0.0041 v	0.0043 v	0.0052 v
Iron	mg/l	0.16 v	0.17 v	0.17 v	0.21 v	0.24 v	1.1 v
Manganese	mg/l	0.046 v	0.043 v	0.037 v	0.036 v	0.041 v	0.06 v
Molybdenum	mg/l	0.026 v	0.027 v	0.023 v	0.023 v	0.028 v	0.028 v

**Inorganics**

Chloride	mg/l	330 vd	310 vd	310 vd	310 vd	310 vd	300 vd
Fluoride	mg/l	0.99 v	1 v	1 v	1 v	0.98 v	0.98 v

See analytical flag codes on last page.

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**Analyses Summary Report****Site Name: Henderson****2/13/2003 3:52:02 PM**

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	6/20/2002	6/20/2002	7/1/2002	7/1/2002	7/17/2002	7/17/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2206210058	2206210057	2207020043	2207020042	2207180037	2207180036
	Sample Number						
	Remarks						
	Superseded						

<b>Other</b>							
Total Dissolved Solids	mg/l	1600 v	1580 v	1530 v	1520 v	1530 v	1550 v
<b>Metals</b>							
Boron	mg/l	0.59 v	0.61 v	0.58 v	0.58 v	0.58 v	0.59 v
Chromium	mg/l	0.0062 v	0.0068 v	0.0038 v	0.005 v	0.0022 v	0.0019 v
Copper	mg/l	0.028 v	0.015 v	0.0056 v	0.0061 v	0.004 v	0.0034 v
Iron	mg/l	1.5 v	1.6 v	0.7 v	1.3 v	0.19 v	0.18 v
Manganese	mg/l	0.088 v	0.084 v	0.062 v	0.072 v	0.045 v	0.039 v
Molybdenum	mg/l	0.029 v	0.029 v	0.021 v	0.021 v	0.029 v	0.027 v
<b>Inorganics</b>							
Chloride	mg/l	310 vd	310 vd	310 vd	300 vd	310 vd	300 vd
Fluoride	mg/l	0.99 v	0.98 v	1 v	1 v	1 v	1 v

See analytical flag codes on last page.

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**Analyses Summary Report****Site Name:** Henderson2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	7/31/2002	7/31/2002	8/14/2002	8/14/2002	8/29/2002	8/29/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2208010062	2208010061	2208150071	2208150070	2208300125	2208300124
	Sample Number						
	Remarks						
	Superseded						

**Other**

Total Dissolved Solids	mg/l	1580 v	1650 v	1600 v	1580 v	1510 v	1520 v
------------------------	------	--------	--------	--------	--------	--------	--------

**Metals**

Boron	mg/l	0.64 v	0.66 v	0.62 v	0.64 v	0.59 v	0.58 v
Chromium	mg/l	0.0027 v	0.0024 v	0.0051 v	0.004 v	0.0015 v	0.0016 v
Copper	mg/l	0.006 v	0.006 v	0.0058 v	0.005 v	0.006 v	0.0092 v
Iron	mg/l	0.21 v	0.2 v	0.2 v	0.2 v	0.24 v	0.26 v
Manganese	mg/l	0.048 v	0.049 v	0.046 v	0.043 v	0.032 v	0.037 v
Molybdenum	mg/l	0.031 v	0.03 v	0.028 v	0.027 v	0.026 v	0.028 v

**Inorganics**

Chloride	mg/l	330 vd	320 vd	300 vd	310 vd	310 vd	320 vd
Fluoride	mg/l	1 v	1 v	1.1 v	1.1 v	1 v	1.1 v

See analytical flag codes on last page.

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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	9/4/2002	9/4/2002	9/18/2002	9/18/2002	10/3/2002	10/3/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2209050041	2209050040	2209190044	2209190043	2210040068	2210040067
	Sample Number						
	Remarks						
	Superseded						

Other							
Total Dissolved Solids	mg/l	1560 v	1550 v	1600 v	1530 v	1580 v	1620 v
Metals							
Boron	mg/l	0.6 v	0.6 v	0.65 v	0.63 v	0.59 v	0.55 v
Chromium	mg/l	0.0042 v	0.001 u	0.0024 v	0.0016 v	0.0058 v	0.0056 v
Copper	mg/l	0.0061 v	0.0032 v	0.0052 v	0.0064 v	0.0065 v	0.0062 v
Iron	mg/l	0.19 v	0.12 v	0.18 v	0.18 v	0.17 v	0.17 v
Manganese	mg/l	0.039 v	0.037 v	0.043 v	0.039 v	0.044 v	0.039 v
Molybdenum	mg/l	0.027 v	0.028 v	0.027 v	0.027 v	0.023 v	0.021 v
Inorganics							
Chloride	mg/l	150 vd	140 vd	260 vd	240 vd	310 vd	320 vd
Fluoride	mg/l	1.1 v	1.1 v	1 v	1 v	0.94 v	0.94 v

See analytical flag codes on last page.

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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	10/16/2002	10/16/2002	11/6/2002	11/6/2002	11/20/2002	11/20/2002
	Lab	MWL	MWL	MWL	MWL	MWL	MWL
	Lab Number	2210170021	2210170020	2211070074	2211070073	2211210080	2211210079
	Sample Number						
	Remarks						
	Superseded						

**Other**

Total Dissolved Solids	mg/l	1730 v	1680 v	1610 v	1610 v	1640 v	1700 v
------------------------	------	--------	--------	--------	--------	--------	--------

**Metals**

Boron	mg/l	0.7 v	0.73 v	0.66 v	0.66 v	0.55 v	0.6 v
Chromium	mg/l	0.0029 v	0.0025 v	0.0036 v	0.0029 v	0.0051 v	0.0046 v
Copper	mg/l	0.0047 v	0.005 v	0.0046 v	0.0036 v	0.0051 v	0.0044 v
Iron	mg/l	0.15 v	0.2 v	0.28 v	0.21 v	0.11 v	0.11 v
Manganese	mg/l	0.04 v	0.042 v	0.051 v	0.052 v	0.042 v	0.046 v
Molybdenum	mg/l	0.022 v	0.022 v	0.023 v	0.023 v	0.023 v	0.024 v

**Inorganics**

Chloride	mg/l	340 vd	330 vd	360 vd	340 vd	360 vd	340 vd
Fluoride	mg/l	1.1 v	1.1 v	0.97 v	1 v	1 v	1.1 v

See analytical flag codes on last page.

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**Analyses Summary Report**

Site Name: Henderson

2/13/2003 3:52:02 PM

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Sample Type:	Station (Site)	LVW 6.05	LVW Upgradient	LVW 6.05	LVW Upgradient
Water	Sample Date	12/4/2002	12/4/2002	12/18/2002	12/18/2002
	Lab	MWL	MWL	MWL	MWL
	Lab Number	2212050035	2212050034	2212190060	2212190059
	Sample Number				
	Remarks				
	Superseded				

	<b>Other</b>				
Total Dissolved Solids	mg/l	1720 v	1750 v	1670 v	1740 v
	<b>Metals</b>				
Boron	mg/l	0.51 v	0.54 v	0.71 v	0.77 v
Chromium	mg/l	0.0028 v	0.0024 v	0.0027 v	0.0021 v
Copper	mg/l	0.005 v	0.0044 v	0.0049 v	0.0047 v
Iron	mg/l	0.21 v	0.23 v	0.1 u	0.1 u
Manganese	mg/l	0.049 v	0.05 v	0.042 v	0.047 v
Molybdenum	mg/l	0.022 v	0.022 v	0.023 v	0.022 v
	<b>Inorganics</b>				
Chloride	mg/l	340 vd	340 vd	350 vd	360 vd
Fluoride	mg/l	0.98 v	1.1 v	1 v	1.1 v

**Analytic Flag Codes:**

* Surrogate outside QC limits	a Not available	b Analyte detected in blank and sample
c Coelute	d Diluted	e Exceeds calibration range
f Calculated from higher dilution	g Concentration > value reported	i Insufficient sample
j Est. value; conc. < quan. limit	l Less than detection limit	m Matrix interference
n Not measured	p > 40% rpd between primary 1deg and 2 deg column.	q Uncertain value
s Surrogate	t Trace amount	u Not detected
v Detected value	w Btwn CRDL/IDL	x Surrogate diluted but within QC limits
z Unknown		

## Attachment 4

### Ion Exchange Process Influent and Effluent Constituents



C:\Documents and  
Settings\zsmc1\My Dc

# Analyses Summary Report

Site Name: Henderson

2/24/2003 12:37:18 PM

Sample Type:	Station (Site)	IX Effluent	IX Influent
Water	Sample Date	10/8/2001	10/8/2001
	Lab	MWL	MWL
	Lab Number	2110090083	2110090081
	Sample Number		
	Remarks		
	Superseded		

## Other

Percent Unionized Ammonia 25C	%	1.38 v	1.73 v
Apparent Color	ACU	5 v	25 v
sulfide	mg/l	0.1 u	0.1 u
Surfactants	mg/l	0.207 v	1.77 vd
Total Dissolved Solids	mg/l	6680 v	6600 v
Total Suspended Solids	mg/l	10 u	10 u
Laboratory pH	s.u.	7.4 v	7.5 v
1,2-Diphenylhydrazine	ug/l	10 u	10 u
bis(2-ethylhexyl)adipate	ug/l	0.6 u	0.6 u
Bromacil	ug/l	0.2 u	0.2 u
Butachlor	ug/l	0.05 u	0.05 u
Caffeine	ug/l	0.02 u	0.02 u
Chlorate	ug/l	95000 vd	93000 vd
Diazinon	ug/l	0.1 u	0.1 u
Metribuzin	ug/l	0.05 u	0.05 u
Mirex	ug/l	0.05 u	0.05 u
Molinate	ug/l	0.2 u	0.2 u
Prometryn	ug/l	0.5 u	0.5 u
Propachlor	ug/l	0.05 u	0.05 u
Simazine	ug/l	0.05 u	0.05 u
Thiobencarb	ug/l	0.2 u	0.2 u
trans-Nonachlor	ug/l	0.05 u	0.05 u
Trifluralin	ug/l	0.1 u	0.1 u

## Metals

Antimony	mg/l	0.005 ud	0.005 ud
Arsenic	mg/l	0.11 vd	0.115 vd
Arsenic III	mg/l	0.015 ud	0.0417 vd
Barium	mg/l	0.018 vd	0.019 vd
Beryllium	mg/l	0.005 ud	0.005 ud
Boron	mg/l	2.7 v	2.6 vd
Cadmium	mg/l	0.0025 ud	0.0025 ud
Chromium	mg/l	0.005 ud	0.005 ud
Chromium-hexavalent	mg/l	0.005 u	0.005 u
Copper	mg/l	0.01 ud	0.01 ud
Iron	mg/l	0.1 u	1 ud
Magnesium	mg/l	200 vd	200 vd
Manganese	mg/l	1 vd	1.2 vd
Mercury	mg/l	0.0002 u	0.0002 u
Molybdenum	mg/l	0.089 vd	0.088 vd
Nickel	mg/l	0.035 vd	0.038 vd
Potassium	mg/l	37 vd	38 vd

See analytical flag codes on last page.



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**Analyses Summary Report**

Site Name: Henderson

2/24/2003 12:37:18 PM

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Sample Type:	Station (Site)	IX Effluent	IX Influent
Water	Sample Date	10/8/2001	10/8/2001
	Lab	MWL	MWL
	Lab Number	2110090083	2110090081
	Sample Number		
	Remarks		
	Superseded		

Selenium	mg/l	0.1 ud	0.1 ud
Sodium	mg/l	1400 vd	1400 vd
Strontium	mg/l	1.1 vd	1.1 vd
Thallium	mg/l	0.005 ud	0.005 ud
Vanadium	mg/l	0.063 vd	0.065 vd
Zinc	mg/l	0.026 vd	0.026 vd
Lead	ug/l	2.5 ud	2.5 ud

**Inorganics**

Biochemical oxygen demand	mg/l	3 u	3 u
Chemical oxygen demand	mg/l	5 v	5 u
Chloride	mg/l	1900 vd	1800 vd
Nitrate (as N)	mg/l	11 vd	11 vd
Nitrate/Nitrite	mg/l	11 v	11 v
Nitrite	mg/l	4 ud	4 ud
Sulfate	mg/l	1500 vd	1600 vd
Total Kjeldahl Nitrogen	mg/l	0.24 v	0.2 u
Total Phosphorus-P	mg/l	0.15 v	0.15 v
Ammonia (as N)	ug/l	50 u	50 u
Perchlorate	ug/l	51 vd	81000 vd

**Radiologic**

Gross Alpha	pCi/l	45 v	26 v
Ra-226 - insoluble	pCi/l	0.5 u	0.4 u
Ra-228 - insoluble	pCi/l	0.4 u	0.4 u

**Dioxins and Furans**

Tetrahydrofuran	ug/l	10 u	10 u
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**Herbicides**

Metolachlor	ug/l	0.05 u	0.05 u
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**Hydrocarbon**

Oil and grease	mg/l	3 u	3 u
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**PCBs**

Aroclor-1016	ug/l	0.5 u	0.5 u
Aroclor-1221	ug/l	0.5 u	0.5 u
Aroclor-1232	ug/l	0.5 u	0.5 u
Aroclor-1242	ug/l	0.5 u	0.5 u
Aroclor-1248	ug/l	0.5 u	0.5 u
Aroclor-1254	ug/l	0.5 u	0.5 u
Aroclor-1260	ug/l	0.5 u	0.5 u

**Pesticides**

4,4-DDD	ug/l	0.02 u	0.02 u
4,4-DDE	ug/l	0.02 u	0.02 u
4,4-DDT	ug/l	0.02 u	0.02 u
Aldrin	ug/l	0.02 u	0.02 u
Alpha-BHC	ug/l	0.2 v	0.48 vd

See analytical flag codes on last page.

# Analyses Summary Report

Site Name: Henderson

2/24/2003 12:37:18 PM

Sample Type:	Station (Site)	IX Effluent	IX Influent
Water	Sample Date	10/8/2001	10/8/2001
	Lab	MWL	MWL
	Lab Number	2110090083	2110090081
	Sample Number		
	Remarks		
	Superseded		

Alpha-chlordane	ug/l	0.05 u	0.05 u
Beta-BHC	ug/l	0.02 u	0.23 vd
Delta-BHC	ug/l	0.04 v	1 vd
Dieldrin	ug/l	0.02 u	0.02 u
Endosulfan I	ug/l	0.02 u	0.02 u
Endosulfan II	ug/l	0.02 u	0.02 u
Endosulfan Sulfate	ug/l	0.02 u	0.02 u
Endrin	ug/l	0.01 u	0.01 u
Endrin Aldehyde	ug/l	0.02 u	0.02 u
Gamma-BHC (Lindane)	ug/l	0.02 u	0.02 u
Gamma-Chlordane	ug/l	0.05 u	0.05 u
Heptachlor	ug/l	0.01 u	0.01 u
Heptachlor Epoxide	ug/l	0.01 u	0.01 u
Methoxychlor	ug/l	0.2 u	0.2 u
Tech-Chlordane	ug/l	0.2 u	0.2 u
Toxaphene	ug/l	0.5 u	0.5 u

**SVOAs**

2,4,5-Trichlorophenol	mg/l	0.005 u	0.005 u
2,4,6-Trichlorophenol	mg/l	0.005 u	0.005 u
2,4-Dichlorophenol	mg/l	0.005 u	0.005 u
2,4-Dimethylphenol	mg/l	0.005 u	0.005 u
2,4-Dinitrophenol	mg/l	0.05 u	0.05 u
2,4-Dinitrotoluene	mg/l	0.005 u	0.0001 u
2,6-Dinitrotoluene	mg/l	0.005 u	0.005 u
2-Chloronaphthalene	mg/l	0.005 u	0.005 u
2-Chlorophenol	mg/l	0.005 u	0.005 u
2-Methylnaphthalene	mg/l	0.005 u	0.005 u
2-Methylphenol	mg/l	0.005 u	0.005 u
2-Nitroaniline	mg/l	0.01 u	0.01 u
2-Nitrophenol	mg/l	0.005 u	0.005 u
3,3-Dichlorobenzidine	mg/l	0.05 u	0.05 u
3-Nitroaniline	mg/l	0.02 u	0.02 u
4,6-Dinitro-2-methylphenol	mg/l	0.05 u	0.05 u
4-Bromophenyl-phenylether	mg/l	0.005 u	0.005 u
4-Chloroaniline	mg/l	0.005 u	0.005 u
4-Chlorophenyl-phenylether	mg/l	0.005 u	0.005 u
4-Methylphenol	mg/l	0.005 u	0.005 u
4-Nitroaniline	mg/l	0.02 u	0.02 u
4-Nitrophenol	mg/l	0.01 u	0.01 u
Acenaphthene	mg/l	0.005 u	0.005 u
Acenaphthylene	mg/l	0.005 u	0.005 u
Aniline	mg/l	0.005 u	0.005 u
Anthracene	mg/l	0.00002 u	0.005 u

See analytical flag codes on last page.

# Analyses Summary Report

Site Name: Henderson

2/24/2003 12:37:18 PM

Sample Type:	Station (Site)	IX Effluent	IX Influent
Water	Sample Date	10/8/2001	10/8/2001
	Lab	MWL	MWL
	Lab Number	2110090083	2110090081
	Sample Number		
	Remarks		
	Superseded		

Benz(a)anthracene	mg/l	0.005 u	0.005 u
Benidine	mg/l	0.05 u	0.05 u
Benzo(a)pyrene	mg/l	0.00002 u	0.00002 u
Benzo(b)fluoranthene	mg/l	0.005 u	0.005 u
Benzo(g,h,i)perylene	mg/l	0.00005 u	0.01 u
Benzo(k)fluoranthene	mg/l	0.00002 u	0.005 u
Benzoic acid	mg/l	0.05 u	0.05 u
Benzyl alcohol	mg/l	0.005 u	0.005 u
bis(2-Chloroethoxy)methane	mg/l	0.01 u	0.01 u
bis(2-Chloroethyl)ether	mg/l	0.01 u	0.01 u
bis(2-Chloroisopropyl)ether	mg/l	0.01 u	0.01 u
bis(2-Ethylhexyl)phthalate	mg/l	0.0006 u	0.004 u
Butyl benzyl phthalate	mg/l	0.0005 u	0.005 u
Chrysene	mg/l	0.005 u	0.005 u
Dibenz(a,h)anthracene	mg/l	0.00005 u	0.01 u
Dibenzofuran	mg/l	0.005 u	0.005 u
Diethyl phthalate	mg/l	0.0005 u	0.005 u
Dimethoate	mg/l	0.01 u	0.01 u
Dimethyl phthalate	mg/l	0.005 u	0.005 u
Di-N-Butyl phthalate	mg/l	0.0005 u	0.01 u
Di-N-Octyl phthalate	mg/l	0.01 u	0.01 u
Fluoranthene	mg/l	0.005 u	0.005 u
Fluorene	mg/l	0.005 u	0.005 u
Hexachlorobenzene	mg/l	0.00005 u	0.00005 u
Hexachlorobutadiene	mg/l	0.01 u	0.01 u
Hexachlorocyclopentadiene	mg/l	0.01 u	0.01 u
Hexachloroethane	mg/l	0.005 u	0.005 u
Indeno(1,2,3-cd)pyrene	mg/l	0.00005 u	0.01 u
Isophorone	mg/l	0.005 u	0.0005 u
Naphthalene	mg/l	0.005 u	0.005 u
Nitrobenzene	mg/l	0.005 u	0.005 u
N-Nitrosodimethylamine	mg/l	0.005 u	0.005 u
N-Nitroso-di-N-propylamine	mg/l	0.005 u	0.005 u
N-Nitrosodiphenylamine	mg/l	0.005 u	0.005 u
p-Chloro-m-cresol	mg/l	0.005 u	0.005 u
Pentachlorophenol	mg/l	0.02 u	0.02 u
Phenanthrene	mg/l	0.00002 u	0.005 u
Phenol	mg/l	0.005 u	0.005 u
Pyrene	mg/l	0.005 u	0.005 u
Alachlor	ug/l	0.05 u	0.05 u
Atrazine	ug/l	0.05 u	0.05 u
<b>VOAs</b>			
1,1,1-Trichloroethane	mg/l	0.0005 u	0.0005 u

See analytical flag codes on last page.

# Analyses Summary Report

Site Name: Henderson

2/24/2003 12:37:18 PM

Sample Type:	Station (Site)	IX Effluent	IX Influent
Water	Sample Date	10/8/2001	10/8/2001
	Lab	MWL	MWL
	Lab Number	2110090083	2110090081
	Sample Number		
	Remarks		
	Superseded		

1,1,2,2-Tetrachloroethane	mg/l	0.0005 u	0.0005 u
1,1,2-Trichloroethane	mg/l	0.0005 u	0.0005 u
1,1-Dichloroethane	mg/l	0.0031 v	0.0031 v
1,1-Dichloroethene	mg/l	0.0005 u	0.0005 u
1,2,4-Trichlorobenzene	mg/l	0.005 u	0.005 u
1,2-Dichlorobenzene	mg/l	0.005 u	0.005 u
1,2-Dichloroethane	mg/l	0.0006 v	0.0005 u
1,2-Dichloropropane	mg/l	0.0005 u	0.0005 u
1,3-Dichlorobenzene	mg/l	0.005 u	0.005 u
1,4-Dichlorobenzene	mg/l	0.005 u	0.005 u
2-Hexanone	mg/l	0.01 u	0.01 u
4-Methyl-2-pentanone	mg/l	0.01 u	0.01 u
Acetone	mg/l	0.01 u	0.01 u
Acrolein	mg/l	0.05 u	0.05 u
Acrylonitrile	mg/l	0.05 u	0.05 u
Benzene	mg/l	0.0005 u	0.0005 u
Bromodichloromethane	mg/l	0.0005 u	0.0005 u
Bromoform	mg/l	0.0005 u	0.0005 u
Bromomethane	mg/l	0.0005 u	0.0005 u
Carbon disulfide	mg/l	0.001 u	0.001 u
Carbon tetrachloride	mg/l	0.0005 u	0.0005 u
Chlorobenzene	mg/l	0.0005 u	0.0005 u
Chloroethane	mg/l	0.0005 u	0.0005 u
Chloroform	mg/l	0.0005 u	0.0006 v
Chloromethane	mg/l	0.0005 u	0.0005 u
cis-1,2-Dichloroethene	mg/l	0.0005 u	0.0005 u
cis-1,3-Dichloropropene	mg/l	0.0005 u	0.0005 u
Dibromochloromethane	mg/l	0.0005 u	0.0005 u
Dichlorodifluoromethane	mg/l	0.0005 u	0.0005 u
Ethylbenzene	mg/l	0.0005 u	0.0005 u
m,p-Xylene	mg/l	0.0005 u	0.0005 u
Methyl ethyl ketone	mg/l	0.01 u	0.01 u
Methylene chloride	mg/l	0.003 u	0.003 u
o-Xylene	mg/l	0.0005 u	0.0005 u
Styrene	mg/l	0.0005 u	0.0005 u
Tetrachloroethene	mg/l	0.0005 v	0.0006 v
Toluene	mg/l	0.0005 u	0.0005 u
trans-1,2-Dichloroethylene	mg/l	0.0005 u	0.0005 u
trans-1,3-Dichloropropene	mg/l	0.0005 u	0.0005 u
Trichloroethene	mg/l	0.0007 v	0.0007 v
Trichlorofluoromethane	mg/l	0.0005 u	0.0005 u
Vinylacetate	mg/l	0.01 u	0.01 u
Vinylchloride	mg/l	0.0005 u	0.0005 u

See analytical flag codes on last page.

**Analytic Flag Codes:**

*	Surrogate outside QC limits	a	Not available	b	Analyte detected in blank and sample
c	Coelute	d	Diluted	e	Exceeds calibration range
f	Calculated from higher dilution	g	Concentration > value reported	i	Insufficient sample
j	Est. value; conc. < quan. limit	l	Less than detection limit	m	Matrix interference
n	Not measured	p	> 40% rpd between primary 1 deg and 2 deg column.	q	Uncertain value
s	Surrogate	t	Trace amount	u	Not detected
v	Detected value	w	Between LOD and DL	x	Surrogate diluted but within QC limits
z	Unknown				

03/03/03  
Rene  
M



**KERR-McGEE CORPORATION**

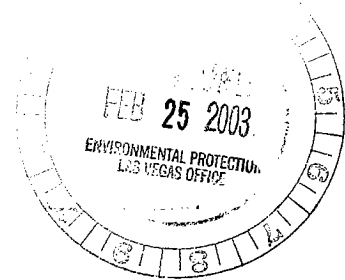
KERR-McGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

SAFETY AND ENVIRONMENTAL AFFAIRS  
William J. Ganus  
Director – Special Projects

February 20, 2003

VIA FEDERAL EXPRESS

Paul Hackenberry  
McKinley & Associates  
5690 Riggins Ct.  
Suite C  
Reno, Nevada 89502



Re: Hydrogeologic Files for the Henderson, Nevada area

Dear Mr. Hackenberry:

Enclosed you will find a CD which contains the mxd files for 5 maps for the Henderson area and a prj file. The README FIRST file will give you the mxd file name and map description for each map and the prj file name for the map projection. If you have any questions do not hesitate to contact me at 405-270-2658.

Sincerely,

William J. Ganus

Enclosure 1 CD-ROM

cc: Todd Croft (without CD)

02/20/03  
*[Signature]*



**KERR-McGEE CORPORATION**

KERR-McGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

SAFETY AND ENVIRONMENTAL AFFAIRS  
William J. Ganus  
Director – Special Projects

February 10, 2003

VIA FEDERAL EXPRESS

Paul Hackenberry  
McKinley & Associates  
5690 Riggins Ct.  
Suite C  
Reno, Nevada 89502



Re: Hydrogeologic Maps for the Henderson, Nevada area

Dear Mr. Hackenberry:

Enclosed you will find a CD which contains the files for 5 maps for the Henderson area. The README FIRST file will give you the Map Title and Map File Name for each map. If you have any questions do not hesitate to contact me at 405-270-2658.

Sincerely,

*[Signature]*  
William J. Ganus

Enclosure 1 CD-ROM

✓ cc: Todd Croft (without CD)

**Todd Croft**

---

**From:** Crowley, Susan [SCROWLEY@KMG.com]  
**Sent:** Friday, February 07, 2003 1:51 PM  
**To:** Todd Croft  
**Cc:** Bailey, Keith; Stater, Rick; Corbett, Pat; Krish, Ed; Reed, Thomas; Ganus, Bill  
**Subject:** Pounds Perchlorate Removed - Jan 2003

Todd,  
Below are the pounds perchlorate removed from the environment over the life of the perchlorate remediation project, with some specific numbers from January 2003.

- **From the Seep Area (groundwater and surface water combined): 192.5 tons total.** This includes both surface water capture from initiation of the project plus seep area groundwater extraction since 3-5-02. During **January 2003 - 7,806 lbs** ClO<sub>4</sub> were removed via both extraction of groundwater and **5,281 lbs** were removed via capture of surface flow, for a total of **13,087 lbs** from the area. Concentrations in this area have decreased through the fall and winter, thus impacting the mass capture. However, concentrations are expected to rise again in early spring which will result in a corresponding increase in mass capture.
- **Seep area groundwater collected prior to 3-5-02: 13.22 tons total** (some of which went to the GW-11 pond the remaining treated in the wash IX).
- **On-site groundwater well collection field: 451.8 tons total.** This continues to be a very effective removal area - primarily because of it's vicinity to the source. During **January 2003 - 34,755 lbs** were collected or a little over 1,000 lbs / day.
- **Athens Rd area groundwater well collection field: 76.7 tons total.** Removal rate from this area has remained at its high level seen in December 2002. During **January 2003 - 36,013 lbs** were collected. This equates to a removal rate of over 1,000 lbs / day which rivals the on-site collection as the most effective collection area.

**Total removed as of 12-31-02: 721.07 tons total**

Susan Crowley  
Kerr-McGee Chemical LLC  
PO Box 55  
Henderson, NV 89009  
(702) 651-2234 office  
(702) 592-7727 cell  
(702) 651-2310 fax

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02/03/03

Dr. Laubsch's paper's talk on  
mobility of perchlorate in soils  
from the Las Vegas Wash

pg 105-

Perchlorate - no cation exchange capacity  
(Perchlorate is a negative charge & so are  
clay minerals negatively charged)

perchlorate leaching results - most  
leaches immediately with first pass of  
water. little or no clay is left behind

↑  
The results did not tend to correlate  
concentration vs soil type.

\* Higher values of perchlorate in soil  
seen to be near the seep area. low  
concentrations were found up wash &  
down wash

Perchlorate retardation factor  $\sim 1.01$   
i.e. 101 pore volumes to flush out

**Todd Croft**

---

**From:** Gibbs, John [jpgibbs@kmg.com]  
**Sent:** Saturday, February 01, 2003 5:51 AM  
**To:** Terre Maize  
**Cc:** Todd Croft; Doug Zimmerman; Allen Biaggi  
**Subject:** Request for studies

<<ChileStudy.pdf>> <<ChileStudyMap.PDF>> <<Wyngaarden 1952>>

Here are the studies that you requested. Let me know if you need any others. Please note my slight change of email address to jpgibbs@kmg.com

*John P. Gibbs, M.D., FACOEM  
Medical Director and Vice President  
Health Management Division  
Kerr-McGee Shared Services LLC  
P.O. Box 25861  
Oklahoma City, OK 73125  
Phone: (405) 270-2909  
Cell: (405) 203-6417*

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*Fax: (405) 270-3526*

*copying of the message is prohibited. Please let me know immediately by return e-mail if*

*email: jpgibbs@kmg.com*

*you have received this message by mistake, then delete the e-mail message. Thank you.*

<<...OLE\_Obj...>>

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**KERR-MCGEE CHEMICAL LLC**

KERR-MCGEE CENTER - OKLAHOMA CITY, OKLAHOMA 73125

(405) 270-1313  
FAX (405) 270-3977

January 27, 2003

State of Nevada  
Department of Conservation and Natural Resources  
Division of Environmental Protection  
Attention: Mr. Douglas Zimmerman

Re: Perchlorate Destruction System at Henderson

Gentlemen:

Pursuant to that certain Administrative Order on Consent between the State of Nevada, Department of Conservation and Natural Resources, Division of Environmental Protection (NDEP) and Kerr-McGee Chemical LLC (Kerr-McGee) dated October 8, 2001, (the AOC) Kerr-McGee agreed, among other things, to promptly complete construction of a treatment system capable of treating 825 gallons per minute for removal of perchlorate. This system was identified in the AOC as the "New Ion Exchange\Catalytic Destruction Plant" (the New Plant).

As you are well aware, Kerr-McGee completed construction of the New Plant but encountered a number of mechanical and start-up difficulties that have proven difficult to solve. In an effort to address the possibility the New Plant problems cannot be thoroughly resolved within a reasonable time frame, Kerr-McGee has investigated certain alternatives, the most promising of which seems to be a bio-remediation system.

Kerr-McGee wants to investigate thoroughly its options for dealing with perchlorate in ground water but does not want to expend significant time and resources on an option NDEP finds unacceptable. Therefore, we ask that you confirm NDEP would have no objection to, and would accept, a bio-remediation system being substituted for the New Plant contemplated under the AOC *provided* such bio remediation system met the requirements of Article II paragraph 2 of said AOC.

January 27, 2003

Page 2

If you are in agreement with the foregoing, please so signify by countersigning this letter where provided for below and returning a copy for our records.

Very truly yours,

Kerr-McGee Chemical LLC

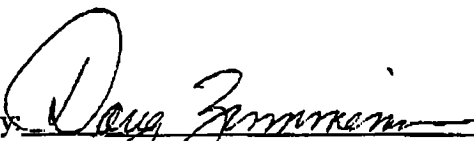


By:

Agreed to and accepted this 11<sup>th</sup> day of

February, 2003

State of Nevada, Department of Conversation and Natural Resources,  
Division of Environmental Protection

By: 

Title: Bureau Chief

DIANNE FEINSTEIN  
CALIFORNIA



COMMITTEE ON APPROPRIATIONS  
COMMITTEE ON ENERGY AND NATURAL RESOURCES  
COMMITTEE ON THE JUDICIARY  
COMMITTEE ON RULES AND ADMINISTRATION  
SELECT COMMITTEE ON INTELLIGENCE

# United States Senate

WASHINGTON, DC 20510-0504

<http://feinstein.senate.gov>

January 23, 2003

Mr. Luke R. Corbett  
Chairman and Chief Executive Officer  
Kerr-McGee Corporation  
Kerr-McGee Center  
P.O. Box 25861  
Oklahoma City, OK 73125

Dear Mr. Corbett:

Thank you for your response to my January 6 letter and for providing my staff the opportunity to visit your facility in Henderson, Nevada. I am pleased to know that you share my concerns over perchlorate contamination in the Colorado River and a genuine desire to see the cleanup effort progress as quickly as possible.

According to the information provided to my staff, I understand that Kerr-McGee has decided to install between three and six additional extraction wells in the area between Athens Road and the Las Vegas Wash. I also understand that this process should be completed in the next four to six weeks. While I know that it is difficult to predict the precise impact these additional wells will have on the reducing the flow of perchlorate, I believe this is an important step in the right direction. I commend you for making this decision and for your ongoing efforts to reduce the amount of perchlorate leaching into Lake Mead.

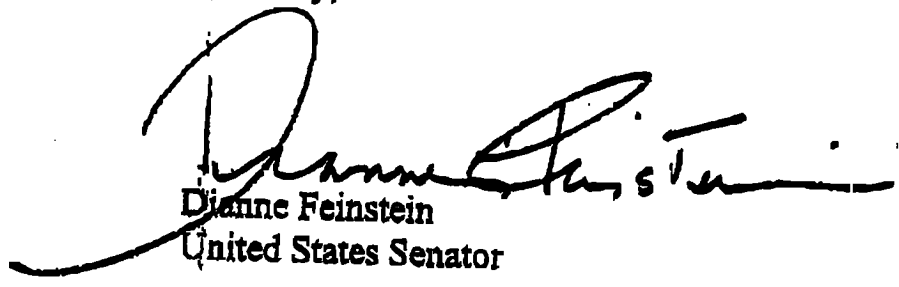
I hope that you will keep me informed about the results of your efforts as new perchlorate monitoring data becomes available. I am particularly interested in the benefits of the slurry wall at Athens Road, which was completed in November 2002. I understand that you will be able to evaluate the efficacy of the wall in May, approximately the same time that the Nevada

Environmental Protection completes a study of additional remediation opportunities in and adjacent to the wash gravel area. I would appreciate being informed of the findings of both of these efforts.

As you know, perchlorate contamination of drinking water supplies is a problem of growing concern nationwide. It is also an issue where I believe the federal government can and should play a leading role. Given that approximately 90% of all perchlorate manufactured in the U.S. was produced for the Department of Defense, I believe they bear a special responsibility to help remedy many of the contaminated sites around the country. I want you to know that I intend to pursue this matter further with the Secretary Rumsfeld and work with Senator Reid to insure that the DOD is meeting its responsibilities with regards to your Henderson facility as well as other perchlorate-related formerly used defense sites.

Thank you again for your cooperation on this matter. I look forward to hearing the results of your cleanup efforts and to working together to insure the safety of the drinking water supplies along the lower Colorado River.

Sincerely,

  
Dianne Feinstein  
United States Senator

cc: U.S. Senator Harry Reid

*Thank you so much for taking such prompt & additional action.*

## Todd Croft

---

**From:** Todd Croft  
**Sent:** Tuesday, January 21, 2003 10:09 AM  
**To:** 'JC.Davis@lvvwd.com'  
**Cc:** Allen Biaggi; Doug Zimmerman; Terre Maize  
**Subject:** Dave Danelski; Enterprise Press; Chromium questions

JC:

Dave Danelski just called to do a follow up story to a perchlorate story he ran in late November 2002. H wanted to know if the Kerr-McGee clean up of a chromium plume in Henderson had any ramifications to the LV Wash &/or Lake Mead. I indicated our data did not show Total Chromium greater than .01 mg/L in the discharge from the perchlorate remediation system. Our other data does not show the chromium plume has migrated to or near the LV Wash.

Dave may call you for chromium monitoring data from the Raw & Finished drinking water from Lake Mead.

BYE TJC

## Todd Croft

---

**From:** Todd Croft  
**Sent:** Wednesday, January 15, 2003 5:45 PM  
**To:** 'scrowley@kmg.com'  
**Cc:** 'kbailey@kmg.com'; Doug Zimmerman  
**Subject:** Perchlorate data needs; Questions; Proposed meeting schedule; IX information desired

Susan & Keith:

The following is a listing of data needs and schedule; questions; the timing of a proposed meeting between Kerr-McGee, EPA-Region 9, and NDEP; and an informational request. Please consider these issues and either call Todd and Doug or e-mail your response. We desire to answer these items within the next week (by ~01/23/03) and sooner would be preferred:

1) NDEP & EPA need to be copied on monitoring data more quickly than at present:

(1) We desire the 4th Quarter report for perchlorate monitoring and capture/extraction performance ASAP (i.e. by 01/23/03);

(2) We need the performance data (from the seep, seep area, Athens road, the on-site extraction wells, the discharge to the LV Wash) pretty much on a "real-time" basis. We will work w/ you on this but believe weekly data submittals would be best. E-copies could work for the weekly submittals followed by a monthly hard copy submittal. The hard copies should be provided by the 5th of each month. The weekly data should be provided by Tuesday of the week following data collection; and

(3) NDEP continues to desire the "Perchlorate Removed from the Environment" submittal be provided on a monthly basis by the 5th of each month. These data <sup>are</sup> quite helpful particularly when received early in the month.

2) Why is Kerr-McGee injecting stabilized lake water down-gradient of the on-site slurry wall?

3) Why has "Perchlorate Removed from the Environment" at the on-site (Chromium Treatment Line) dropped? The last three months of data are:

October 2002	39,255 lbs
November 2002	36,514 lbs
December 2002	32,401 lbs

4) NDEP & EPA Region 9 desire to schedule the next meeting w/ Kerr-McGee. We propose a meeting on January 27th or 28th. It is possible that Jeff Scott (EPA Region 9) may accompany Mitch Kaplan & Larry Bowerman.

5) NDEP is trying to arrange a tour of the Las Vegas Wash by SNWA to discuss erosion control structures; the schedule for the current construction and for future structures; and related issues. We will try to tie this tour to sometime on January 27th or 28th. Would one or more Kerr-McGee representatives desire to participate in that tour?

6) Keith/Susan: Can you provide or guide me to IX information? We have been approached w/ a request for that information. I believe we need:

- \*specifications
- \*cost
- \*logistics
- \*contacts

7) Is GAC currently in place at the Wash IX? Has it been removed? If it has been removed, why?

Thanks for considering the above questions and requests. Doug & I will be available at different portions of the day Thursday (01/16/03) should you desire to call.

THX BYE TJC



01/15/03

OK  
to Susan  
C. P. 2 will

Susan Crowley (Kerr-McGee) pg 10F

1) we need monitoring data quickly:  
1) need 4th Q 2002 ASAP - (By 01/23/03)

2) need data (particularly Athens Road; The Seep; & The Seep Area) <sup>weekly</sup> Monthly (more or less real time) - we need this by ~ the 5th of each month

✓ w/ Susan what works for them

3) need you to provide the "Perchlorate removed from the environment" monthly (by ~ the 5th of each month)

2) why is Kerr-McGee injecting stabilized lake water down gradient of the slurry wall?

3) why has clay "Removed From The Environment" at the on-site (chromium treatment line) dropped?

October 2002	...	39,255	lbs
November 2002	...	36,514	lbs
December 2002	...	32,401	lbs

01/15/03

wednesday

4) Desire to schedule the next of 2 of  
meeting of Ken-McGee. 27428 <sup>potential</sup> meeting <sup>needed</sup>  
Desire Tuesday 01/28/03 in Am.

\* NDEP & EPA to meet 01/27/03

\* NDEP / EPA / Ken-McGee to meet 01/28/03  
in Norway

\* Tour of Lo wash & erosion control  
structures in afternoon (01/ 10/03)

↑

would Ken-McGee desire to participate

5) Keith / Susan

\* Desire IX info for Bahama (S.W.I.A.)

• Specs

• contracts

• cost

• logistics

Administration  
Water Pollution Control  
Air Quality  
(2) 486-2850

RECEIVED  
ENVIRONMENTAL  
PROTECTION

Governor

03 JAN 15 AM 10:00



For  
Julie  
Mauvey  
NDEP  
Carson City.

Federal Facilities  
Corrective Actions  
Waste Management  
Facsimile 486-2863

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**  
(Las Vegas Office)  
1771 East Flamingo Road, Suite 121-A  
Las Vegas, Nevada 89119-0837

January 13, 2003

Mr. William D. Mitchell  
Legal Assistant  
Engstrom, Lipscomb & Lack  
10100 Santa Monica Boulevard  
16<sup>th</sup> Floor  
Los Angeles, CA 90067-4107

Re.: Kerr McGee Perchlorate Consent Agreement

Dear Mr. Mitchell:

The Nevada Division of Environmental Protection (NDEP) has received your Freedom of Information Request, dated January 7, 2003, for a copy of the referenced document. Your letter was received in the Las Vegas office on January 9, 2003. As you requested, a copy of the Perchlorate Consent Agreement is enclosed.

You may wish to call Todd Croft in the NDEP-Las Vegas office at (702) 486-2871 to obtain additional information.

Sincerely,

Sara Arav-Piper ESIII  
Remediation and LUST Branch  
Bureau of Corrective Actions  
NDEP-Las Vegas Office

Encl:

SAP:sap

cc: Mr. Doug Zimmerman, Chief, Bureau of Corrective Actions, NDEP, Carson City  
Mr. Todd Croft, Supervisor, Bureau of Corrective Actions, NDEP, Las Vegas

LAW OFFICES  
**ENGSTROM, LIPSCOMB & LACK**

A PROFESSIONAL CORPORATION

10100 SANTA MONICA BOULEVARD, 16<sup>TH</sup> FLOOR

LOS ANGELES, CALIFORNIA 90067-4107

TELEPHONE 310-552-3800

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BRIAN J. LAWLER

KENNETH L. CROWDER  
OF COUNSEL

GLORIA S. WELLER  
DIRECTOR OF ADMINISTRATION

JOHN ALVA  
LITIGATION SUPPORT

January 7, 2003

Mr. Todd Croft  
Nevada Division of Environmental Protection  
1771 East Flamingo Road  
Suite 121A  
Las Vegas, NV 89119

Re: Kerr McGee Perchlorate Consent Agreement  
File 38000-2111

Dear Mr. Croft:

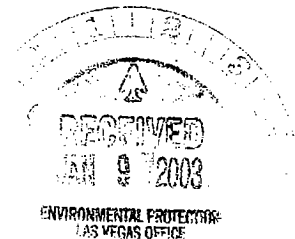
As we discussed on the phone last week, this is a Freedom of Information request for a copy of the October 2001 Perchlorate Consent Agreement with Kerr McGee.

Thank you for your assistance.

Sincerely,

*William D. Mitchell*

William D. Mitchell  
Legal Assistant



## Todd Croft

---

**From:** Todd Croft  
**Sent:** Sunday, January 12, 2003 4:22 PM  
**To:** Allen Biaggi; Doug Zimmerman; Terre Maize  
**Subject:** FW: Keith Rogers (RJ) Contact Friday afternoon (01/10/03)

Allen, Doug, and Terre:

Please use this FWD and disregard the earlier e-mail Re: Keith Rogers. I had a date error (times three) within the text. The date errors have been revised within the e-mail (below).

THX BYE TJC

-----Original Message-----

**From:** Todd Croft  
**Sent:** Sunday, January 12, 2003 3:48 PM  
**To:** Doug Zimmerman; Terre Maize  
**Cc:** Allen Biaggi  
**Subject:** Keith Rogers (RJ) Contact Friday afternoon (01/10/03)

Allen, Doug, & Terre:

Keith Rogers called Friday afternoon (01/10/03) at around 1:30 p.m. He had only a few questions Re: perchlorate. He was mostly interested in the amount going into Lake Mead. He was doing a follow up story to ones referencing Senator Feinstein.

He indicated he had two letters in hand from Kerr-McGee. These were in response to the letter to Luke Corbett at Kerr-McGee from Senator Feinstein. One letter was from Luke Corbett (CEO) and the other was from George Christianson (sp?) (VP). Both were apparently dated 01/09/03 and were apparently sent to Senator Feinstein.

I provided Keith w/ the summary information from Northshore Road; i.e. annual average of the daily mass since we began gathering this information in January 1998. These numbers show the drop in mass loading (sustained) after the seep capture and treatment began. The numbers are as follows:

1998	816 lbs/day
1999	941 lbs/day
2000	631 lbs/day
2001	514 lbs/day
2002	534 lbs/day

The above mass estimates are newly revised numbers based upon "Real Time" flow data from the USGS gauge at Northshore road. Historically, we used a less refined flow number of "Mean Daily Discharge".

I also provided him w/ the Kerr-McGee data of Mass removed from Athens Road during November 2002 (I did not yet have the December 2002 data when we spoke). In November 2002, 29,932 lbs were removed. That is just under 1,000 lbs/day!

Keith was pretty happy to obtain this information. He indicated he would fax to us the two Kerr-McGee response letters once he read them and prepared his story.

Sorry for this e-mail not going out a little sooner. Outlook was down some on Friday and other perchlorate issues kept me busy.

BYE TJC

**Todd Croft**

---

**From:** Todd Croft  
**Sent:** Friday, January 10, 2003 8:50 AM  
**To:** 'Corbett, Pat'  
**Cc:** Doug Zimmerman  
**Subject:** RE: 01/14/03 meeting in Henderson; 8:00 a.m.

Pat:

Thanks. See you on Tuesday at 8:00 a.m.

BYE TJC

-----Original Message-----

**From:** Corbett, Pat [mailto:PCorbett@kmg.com]  
**Sent:** Friday, January 10, 2003 8:21 AM  
**To:** Todd Croft  
**Cc:** Gibbs, John; Frank, Pete  
**Subject:** RE: 01/14/03 meeting in Henderson; 8:00 a.m.

Todd, I'm sorry but I think the meeting is set. We can be clear up-front that Doug will be joining us and will arrive as soon as possible.

Pat

-----Original Message-----

**From:** Todd Croft [mailto:tcroft@ndep.nv.gov]  
**Sent:** Thursday, January 09, 2003 7:08 PM  
**To:** pcorbett@kmg.com  
**Subject:** 01/14/03 meeting in Henderson; 8:00 a.m.

Pat:

I informed Doug & Allen of the upcoming meeting set for next Tuesday a.m. Allen will be in Las Vegas giving a perchlorate presentation to the Colorado River Commission. His presentation is similar to the one he provided in Ontario, Ca in October 2002; we updated it a little for CRC.

Doug Zimmerman and I will attend the meeting. Doug has asked "Is there any flexibility on the meeting time? Can it be shifted to begin at about 8:30 a.m.?" If so, that would help him fly in on the early a.m. flight and not be late to the meeting. Please let me know your thoughts on this. Either way, we will both attend.

Also, I was contacted this afternoon by Guillermo Gonzales. I believe he is the office manager for Senator Feinstein's LA office. I believe he has been assigned to the perchlorate issue. He indicated he would be attending a meeting in Henderson (w/ a colleague) next Wednesday. I told him I would be present at that meeting. I did not recall you listing him as one of the people to attend the meeting; heads up.

THX BYE TJC

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## Todd Croft

---

**From:** Todd Croft  
**Sent:** Sunday, January 12, 2003 3:48 PM  
**To:** Doug Zimmerman; Terre Maize  
**Cc:** Allen Biaggi  
**Subject:** Keith Rogers (RJ) Contact Friday afternoon (01/10/03)

Allen, Doug, & Terre:

Keith Rogers called Friday afternoon (01/10/03) at around 1:30 p.m. He had only a few questions Re: perchlorate. He was mostly interested in the amount going into Lake Mead. He was doing a follow up story to ones referencing Senator Feinstein.

He indicated he had two letters in hand from Kerr-McGee. These were in response to the letter to Luke Corbett at Kerr-McGee from Senator Feinstein. One letter was from Luke Corbett (CEO) and the other was from George Christianson (sp?) (VP). Both were apparently dated 01/09/03 and were apparently sent to Senator Feinstein.

I provided Keith w/ the summary information from Northshore Road; i.e. annual average of the daily mass since we began gathering this information in January 1998. These numbers show the drop in mass loading (sustained) after the seep capture and treatment began. The numbers are as follows:

1998	816 lbs/day
1999	941 lbs/day
2000	631 lbs/day
2001	514 lbs/day
2002	534 lbs/day

The above mass estimates are newly revised numbers based upon "Real Time" flow data from the USGS gauge at Northshore road. Historically, we used a less refined flow number of "Mean Daily Discharge".

I also provided him w/ the Kerr-McGee data of Mass removed from Athens Road during November 2001 (I did not yet have the December 2001 data when we spoke). In November 2001, 29,932 lbs were removed. That is just under 1,000 lbs/day!

Keith was pretty happy to obtain this information. He indicated he would fax to us the two Kerr-McGee response letters once he read them and prepared his story.

Sorry for this e-mail not going out a little sooner. Outlook was down some on Friday and other perchlorate issues kept me busy.

BYE TJC

**Todd Croft**

**From:** Crowley, Susan [SCROWLEY@KMG.com]

**Sent:** Friday, January 10, 2003 3:23 PM

**To:** Todd Croft

**Cc:** Bailey, Keith; Corbett, Pat; Stater, Rick; Krish, Ed; Reed, Thomas; Dixon, John; Christiansen, George; Ganus, Bill; Doug Zimmerman

Todd,  
Below are the pounds perchlorate removed from the environment over the life of the perchlorate remediation project, with some specific numbers from December 2002.

- **From the Seep Area (groundwater and surface water combined): 186.00 tons total.** This includes both surface water capture from initiation of the project plus seep area groundwater extraction since 3-5-02. During **December 2002 - 4,695 lbs** ClO<sub>4</sub> were removed via both extraction of groundwater and **6,453 lbs** were removed via capture of surface flow, for a total of **11,148 lbs** from the area. Concentrations in this area have decreased through the fall and winter, thus impacting the mass capture. However, concentrations are expected to rise again in early spring which will result in a corresponding increase in mass capture.
- **Seep area groundwater collected prior to 3-5-02: 13.22 tons total** (some of which went to the GW-11 pond the remaining treated in the wash IX).
- **On-site groundwater well collection field: 434.46 tons total.** This continues to be a very effective removal area - primarily because of its vicinity to the source. During **December 2002 - 32,401 lbs** were collected or a little over 1,000 lbs / day.
- **Athens Rd area groundwater well collection field: 58.68 tons total.** You can see the removal rate from this area has improved considerably. During **December 2002 - 36,271 lbs** were collected. This equates to a removal rate of over 1,000 lbs / day which rivals the on-site collection as the most effective collection area.

**Total removed as of 12-31-02: 679.14 tons total**

Susan Crowley  
Kerr-McGee Chemical LLC  
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## Todd Croft

---

**From:** Todd Croft  
**Sent:** Thursday, January 09, 2003 4:55 PM  
**To:** Allen Biaggi  
**Cc:** Doug Zimmerman; Terre Maize  
**Subject:** RE: 01/14/03 (Tues.) meeting at Kerr-McGee; 8:00 a.m.

Allen:

Yes. I was informed by Pat Corbett that the meeting begins at 8:00 a.m. I'm not sure of the duration. I suspect it will be at least a 3 hour meeting as Pat desires to talk, then tour the groundwater treatment facilities, and then talk some more. If the tour extends off-site to the LV Wash, it could add another hour or so.

Also, I just got off the phone from returning a call to Guillermo Gonzales (sp?). I believe he is the office manager for Senator Feinstein's LA office. He will also attend the 01/14/03 meeting.

Mr. Gonzales (sp?) asked the following questions:

- 1) How much has Kerr-McGee spent to date?
- 2) How much water is being pumped?
- 3) How much has the State of Nevada spent on this project to date?
- 4) What kind of technology is being used for the cleanup?

BYE TJC

-----Original Message-----

**From:** Allen Biaggi  
**Sent:** Thursday, January 09, 2003 3:31 PM  
**To:** Todd Croft  
**Subject:** RE: 01/14/03 (Tues.) meeting at Kerr-McGee; 8:00 a.m.

Do I have this correct that the meeting begins at 8:00 AM? Duration?

-----Original Message-----

**From:** Todd Croft  
**Sent:** Thursday, January 09, 2003 2:02 PM  
**To:** Doug Zimmerman; Terre Maize  
**Cc:** Allen Biaggi  
**Subject:** 01/14/03 (Tues.) meeting at Kerr-McGee; 8:00 a.m.

Doug, Terre, & Allen:

Pat Corbett called a few minutes ago from Kerr-McGee. He has invited me to participate in a meeting next Tuesday (01/14/03) morning at the Henderson plant site. The meeting was precipitated by the recent letter from Senator Feinstein. The following should be attending this meeting:

Pat Corbett	Kerr-McGee, Oklahoma City
Dr. Gibbs	Kerr-McGee (internal expert on perchlorate)
Pete Frank	Kerr-McGee, Washington, DC office
James Peterson	Senator Feinstein's office
Garry Reynoldson (sp?)	Senator Reid's office

Pat indicated he would lead the meeting. He plans on meeting for a while, then conducting a plant tour of the perchlorate remediation system, followed by additional discussion.

I indicated to Pat That I would be pleased to attend and thought it a wise thing to do. I also indicated I would check w/ Doug Re: my attendance and see if Doug desires to attend as well.

Pat asked for me to get back to him as soon as possible Re: attendance.

Please note that this is the same day that Allen will be giving a presentation to the Colorado River Commission. That presentation has been prepared, is on CD, and is in Allen's hands.

Please get back to me at your earliest convenience w/ your thoughts so I can get back to Pat.

THX BYE TJC

## Todd Croft

---

**From:** Doug Zimmerman  
**Sent:** Tuesday, December 24, 2002 11:43 AM  
**To:** 'Crowley, Susan'  
**Cc:** Todd Croft; 'Bowerman.Larry@epamail.epa.gov'  
**Subject:** Monitoring data and other issues

Susan - During our recent conference call we discussed opportunities/issues associated with capture and treatment of additional groundwater impacted by perchlorate. Resin availability on a worldwide basis and the maximum pumping rates of the seep wells were among the issues discussed. I believe it was Keith Bailey who offered to document in writing some of the discussion and I indicated we would let you know if that was needed. At this time I believe it would be very helpful to have these issues documented in writing, please let me know when you can get this to us - thanks.

Additionally, Larry Bowerman and I were discussing your data submittal in early December that showed the lbs/tons captured and I concur with his request that you provide this same information on a monthly basis. It very clearly shows the significant level of effort and effectiveness of Kerr McGee's work.

Please contact me if you have any questions - Merry Christmas and Happy New Year!

Doug Zimmerman  
Chief  
Bureau of Corrective Actions  
Nevada Division of Environmental Protection  
333 W. Nye Lane  
Carson City, NV 89706  
(775) 687-4670, extension 3127  
(775) 687-6396 FAX  
dzimmerm@ndep.state.nv.us

## Todd Croft

---

**From:** Crowley, Susan [SCROWLEY@KMG.com]  
**Sent:** Tuesday, December 03, 2002 10:48 AM  
**To:** Todd Croft  
**Subject:** RE: City of Henderson (COH) WRF Tour; 12/04/02; Logistics

Todd,  
Thanks for the tour info - I'll meet you there by 9:00 am. Keith Bailey will be tagging along as well.

Thanks also for the CD and text. Both are copied and set aside for delivery back to you tomorrow. I ran the CD - very cool graphics. I'm sure Ed will also have an opinion on the supporting info. He'll be in town next week (and the following) if you need anything. Thanks.

Susan Crowley  
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-----Original Message-----

**From:** Todd Croft [mailto:tcroft@ndep.nv.gov]  
**Sent:** Tuesday, December 03, 2002 10:44 AM  
**To:** scrowley@kmg.com  
**Subject:** FW: City of Henderson (COH) WRF Tour; 12/04/02; Logistics

Susan:

Please see the related "FWD" for logistics for the COH WRF tour. Also, I dropped off the AMPAC GW Model report and CD last night. I believe I surprised your security personnel.

BYE TJC

> -----Original Message-----

> **From:** Todd Croft  
> **Sent:** Tuesday, December 03, 2002 10:38 AM  
> **To:** 'Peggy.Roefer@lvvwd.com'  
> **Cc:** 'Joseph.Leising@lvvwd.com'  
> **Subject:** City of Henderson (COH) WRF Tour; 12/04/02; Logistics

> Peggy:

>  
> We should all plan to meet just prior to 9:00 a.m. at the COH WRF main  
> Administration Bldg. (green roof). The facility is located just off  
> of Pabco Road & Athens Road in Henderson, NV. We have set aside 3  
> hours for this tour (9:00 a.m. thru Noon). Also, after lunch (or  
> prior to lunch if time permits), we may elect to swing past the  
> Bostich Weir construction project. If you can spare the time, your  
> participation on that visit would be helpful.

>

> Please pass this information on to Joe Leising and Mike Gore.

>

> THX BYE TJC

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12/18/02  
Tues

Larry Bowerman  
11/22/2002 10:06 AM

To: Catherine Kuhlman/R9/USEPA/US@EPA  
cc: Jeff Scott/R9/USEPA/US@EPA, Arlene Kabei/R9/USEPA/US@EPA,  
Mitch Kaplan/R9/USEPA/US@EPA, Ronald  
Leach/R9/USEPA/US@EPA, Kevin Mayer/R9/USEPA/US@EPA,  
Rebecca Jamison/R9/USEPA/US@EPA, Julie  
Anderson/R9/USEPA/US@EPA, Elizabeth  
Adams/R9/USEPA/US@EPA, (bcc: Larry Bowerman/R9/USEPA/US)  
Subject: Perchlorate and Kerr McGee, Henderson, NV

Cat

I was sent a copy of your 11/20/02 and 11/21/02 email messages about the upcoming (12/3/02) conference call that Wayne and Laura are having with Winston Hickox to possibly discuss perchlorate, among other topics. I noted that you may not be aware of the current situation regarding Kerr McGee and perchlorate, so I am sending you a brief summary, as follows:

**Overview:** While perchlorate levels in Las Vegas Wash have not decreased as quickly as we had hoped they would, levels in the Wash have dropped by at least a third since November 1999 when Kerr McGee began capturing and treating a seep near the Wash. Further, while Kerr McGee's new treatment plant has experienced operational difficulties and is not currently operating, it is not correct to assume that there is no control of the Kerr McGee plume. During 2002 Kerr McGee achieved full implementation of its three pronged perchlorate source control strategy, and perchlorate treatment is occurring using 15 standard once-through ion exchange units. We are hopeful that as a result of these controls, perchlorate levels in Las Vegas Wash will drop further in 2003. It is also worth noting that perchlorate levels in Las Vegas Wash are not likely to decrease rapidly because of the large amount of perchlorate that is in "wash gravels" underneath and near the sides of the Wash. This perchlorate is already beyond the last current capture point in Kerr McGee's three pronged control strategy. We are beginning to investigate whether it is feasible to capture and treat any of this additional perchlorate in the "wash gravels."

**Kerr McGee's Three Pronged Perchlorate Control Strategy:** Since the 1997 discovery of perchlorate entering Las Vegas Wash, EPA and Nevada have focussed on achieving source control and reducing releases to Las Vegas Wash as quickly as possible. The Kerr McGee plume is by far the most significant source of perchlorate entering Las Vegas Wash. A strategy was developed to capture and treat perchlorate at three locations: 1) on Kerr McGee property where perchlorate is most concentrated, 2) at Athens Road about midway between Kerr McGee and Las Vegas Wash where there is a narrow channel that makes effective capture possible, and 3) near Las Vegas Wash where capture will have the most immediate impact on reducing releases to the Wash. Nearly complete capture was achieved on Kerr McGee property in October 2001 when a slurry wall was completed, significantly enhancing capture by the 21 extraction wells at this location. Midpoint capture began in July 2002 when the 7 Athens Road extraction wells began operation. These wells are designed to capture 90-95% of the perchlorate at this location. The first reductions of perchlorate near Las Vegas Wash began in November 1999 when Kerr McGee began capture and treatment of a seep, achieving about 45-50% control of the Kerr McGee plume. In November 2001 four extraction wells began operation near Las Vegas Wash increasing capture to about 60%. As a result of the implementation of the source control strategy, perchlorate levels in Las Vegas Wash and parts of Lake Mead have begun to decrease. Levels should continue to decrease over the next one to three years as the control strategy further reduces releases to Las Vegas Wash. However, it will take years for perchlorate levels throughout Lake Mead and the Lower Colorado River to drop dramatically because of the large amount of water already impacted by past perchlorate releases.

**Todd Croft**

---

**From:** Crowley, Susan [SCROWLEY@KMG.com]  
**Sent:** Thursday, December 05, 2002 3:38 PM  
**To:** Todd Croft  
**Cc:** Stater, Rick; Bailey, Keith; Taylor, Bill; Corbett, Pat  
**Subject:** Perchlorate Removed from the Environment

Todd,

Below are the pounds perchlorate removed from the environment over the life of the perchlorate remediation project, with some specific numbers from October and November 2002.

- **From the Seep Area (groundwater and surface water combined): 180.43 tons.** This includes both surface water capture from initiation of the project plus seep area groundwater extraction since 3-5-02. During **October 2002 - 14,528 lbs** ClO<sub>4</sub> were removed via both extraction of groundwater and capture of surface flow. During **November 2002 - 17,769 lbs** were collected for treatment.
- **Seep area groundwater collected prior to 3-5-02: 13.22 tons** (some of which went to the GW-11 pond the remaining treated in the wash IX).
- **On-site groundwater well collection field: 418.25 tons.** This continues to be the most effective removal area - primarily because of it's vicinity to the source. During **October 2002 - 39,255 lbs** were collected, while during **November 2002 - 36,514 lbs** were collected.
- **Athens Rd area groundwater well collection field: 40.54 tons.** You can see the removal rate from this area has improved considerably. During **October 2002 - 10,259 lbs** were collected, while during **November 2002 - 29,932 lbs** were collected.

**Total removed as of 11-30-02: 639.23 tons**

Susan Crowley  
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## Todd Croft

---

**From:** Todd Croft  
**Sent:** Tuesday, November 26, 2002 9:33 AM  
**To:** 'Peggy.Roefer@lvvwd.com'  
**Cc:** Doug Zimmerman  
**Subject:** RE: Question

Peggy:

I believe you'll find the seep will continue to be present particularly as long as the City of Henderson (COH) operates the "Birding Pond" RIBs. I understand the COH has a waste water treatment plant expansion that will allow for a change in their process by approximately five (5) years from now. That change, I'm told, will allow for cessation of use of the RIBs. It is likely the seep will diminish substantially (or completely dry up) once this localized recharge is curtailed.

With regard to perchlorate, I believe you'll find that the perchlorate concentrations observable at and near the seep will begin to decline within the next 5 months as the effects of continuous operation at the Athens Road Well Field become apparent. A number of people have described their thoughts on what we will likely see as "The perchlorate concentration will likely drop substantially within approximately six months of initiating continuous operation of the Athens Road Well Field. The perchlorate values will then likely tail, or begin to drop more slowly, as we move through the next 6 months to 1.5 years." NDEP is hopeful that Kerr-McGee will effect greater than 95% capture efficiency at the Athens Road Well Field. Assuming a 95% or better capture efficiency and continued operation of the COH RIBs, we will likely see remarkable reductions in perchlorate concentrations both at the seep and in seep area wells by late April 2003.

I hope the above helps to answer your questions.

BYE TJC

-----Original Message-----

From: Peggy.Roefer@lvvwd.com [mailto:Peggy.Roefer@lvvwd.com]  
Sent: Tuesday, November 26, 2002 9:16 AM  
To: Todd Croft  
Subject: Question

Joe Leising and I were having a conversation today and we have a question. What do you expect the final results to be of the dewatering at Athens Road? Will the flow at the seep at the Las Vegas Wash disappear, or will there be water but the perchlorate will be removed? Thank you.



## Todd Croft

---

**To:** Crowley, Susan  
**Subject:** RE: perchlorate graph

Susan:

- 1) first intake is at elevation 1,050 feet ALMS;
- 2) second intake is at elevation 1,000 feet ALMS; &
- 3) current lake level (as of 10/30/02) is at elevation 1,154 feet ALMS.

Observing the graph you'll likely find the perchlorate values at the first intake begin to rise in early November and tend to fall again by late January each year.

Since last week, SNWA has managed the intake issue by blending water from both intakes to provide for a "finished water" w/ perchlorate values less than 18 ppb. They are blending ~2/3rds from the first intake and ~1/3rd from the second (lower) intake.

The graph I sent to you is a "live graph" in that if you position your cursor on a data point and let it rest there a moment, it will display the perchlorate value and date of sampling.

I'll keep you apprised as things develop.

BYE TJC

-----Original Message-----

From: Crowley, Susan [mailto:SCROWLEY@KMG.com]  
Sent: Wednesday, November 20, 2002 10:06 AM  
To: Todd Croft  
Subject: RE: perchlorate graph

Todd,

I know this is a difficult question to answer but can SNWA tell how long this perchlorate concentration in the traditional intake will last. An easier question - where is the second intake?

Susan Crowley  
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-----Original Message-----

From: Todd Croft [mailto:tcroft@ndep.state.nv.us]  
Sent: Wednesday, November 20, 2002 9:30 AM  
To: scrowley@kmg.com  
Subject: FW: perchlorate graph

Susan:

Please find attached a graph of SNWA perchlorate data from Lake Mead (Raw & Finished water quality). Please note that they are now blending water from the two intakes to achieve Finished water w/ perchlorate concentrations that are less than 18 ppb.

BYE TJC

-----Original Message-----

From: Peggy.Roefer@lvvwd.com [mailto:Peggy.Roefer@lvvwd.com]

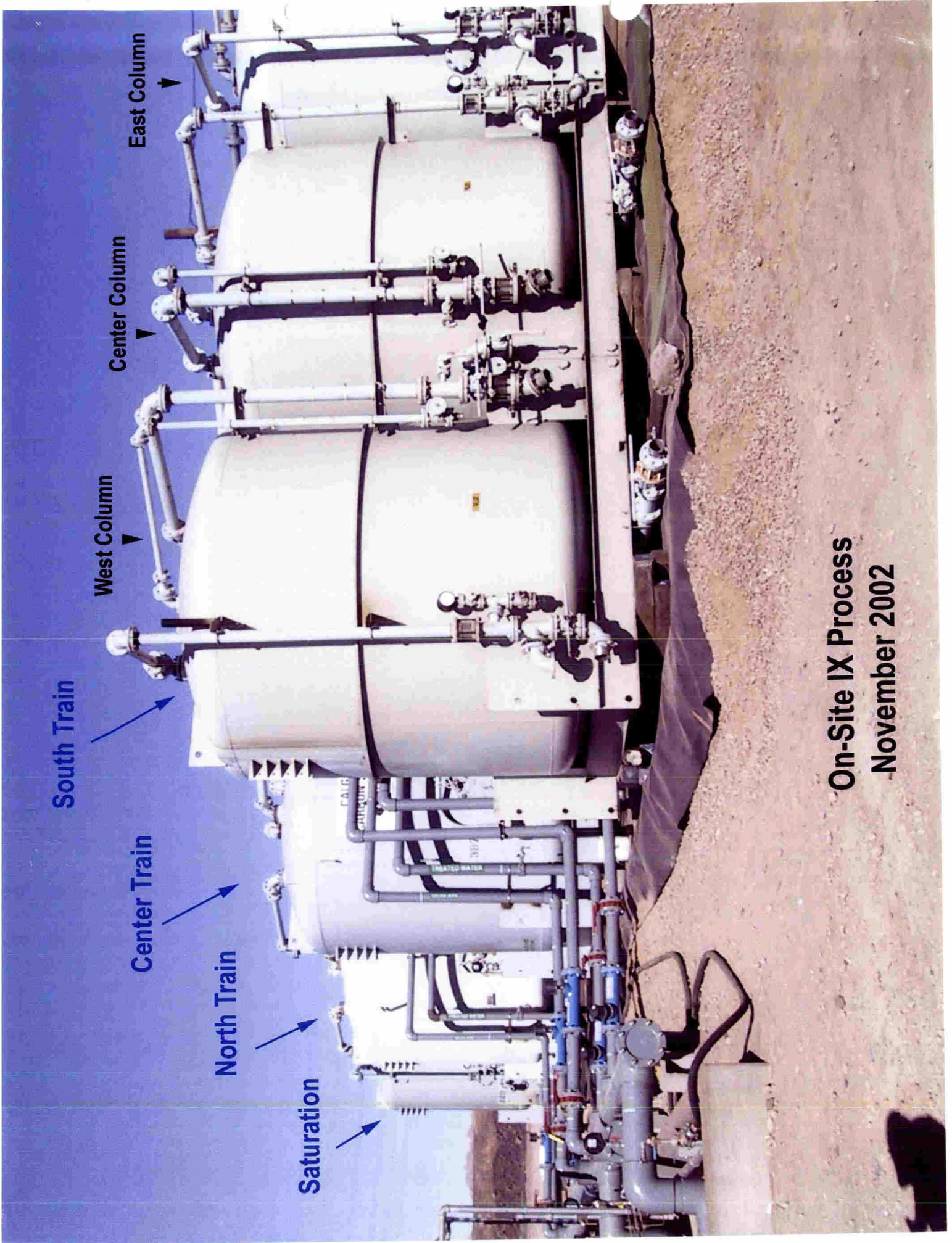
Sent: Wednesday, November 20, 2002 9:17 AM

To: Todd Croft

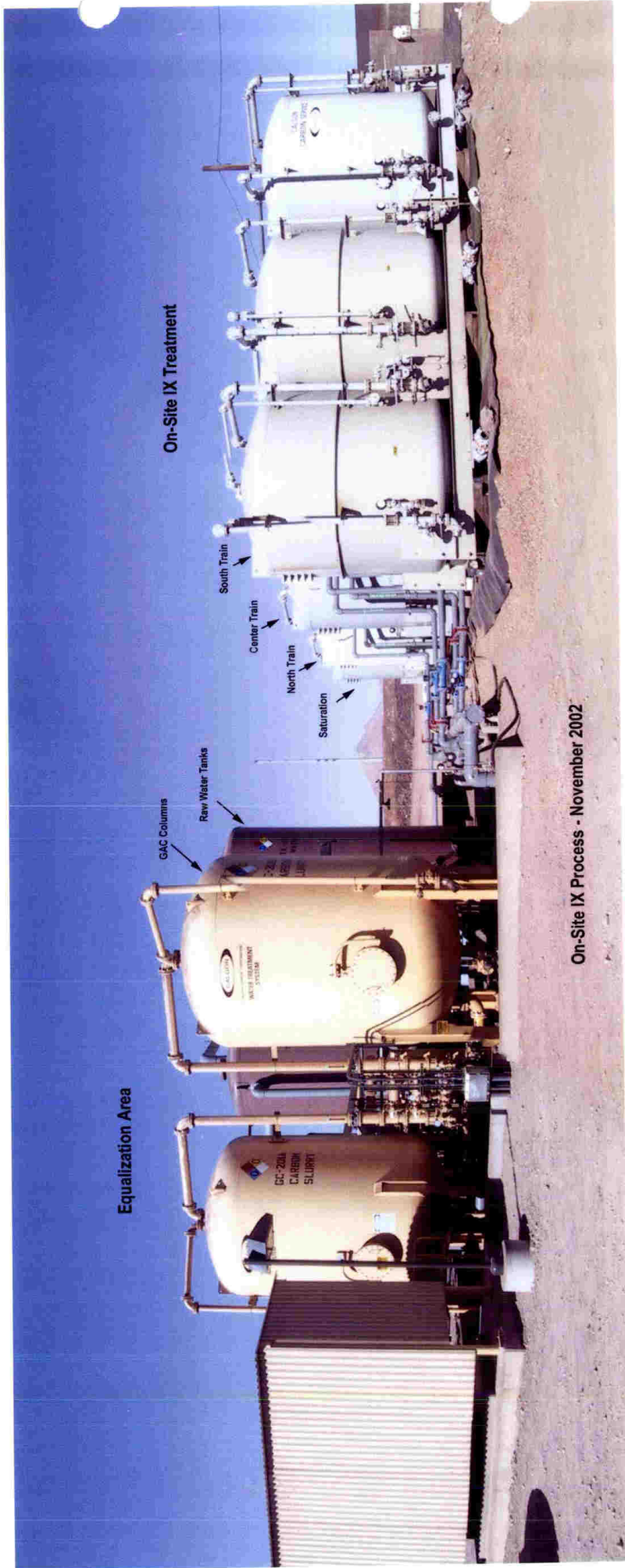
Subject: perchlorate graph

Attached find a graph of the Alfred Merritt Smith Water Treatment Facility raw and finished water perchlorate concentrations. If you look at Sheet 1 the concentrations for River Mountains Water Treatment Facility raw and finished water as also listed. The RMWTF started producing water in October and so there is limited information available. (See attached file: perchlorate monthly STREAM report.xls)

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On-Site IX Process  
November 2002



Equalization Area

GAC Columns

Raw Water Tanks

On-Site IX Treatment

North Train

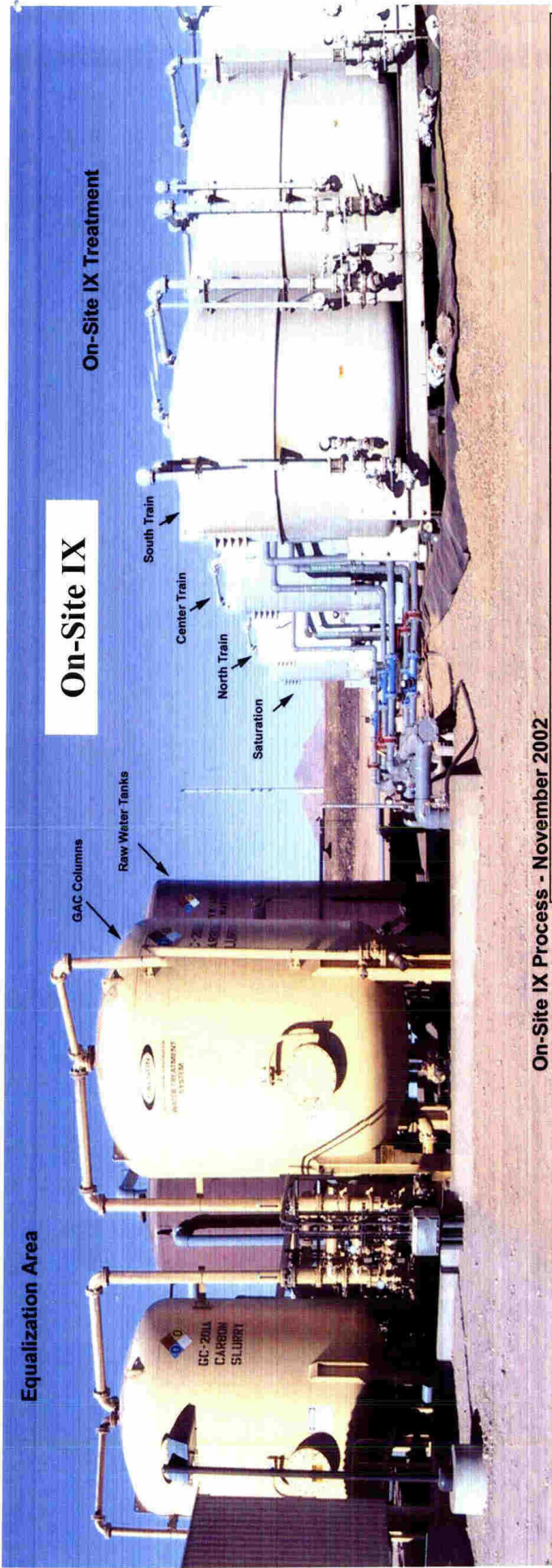
Center Train

South Train

Saturation

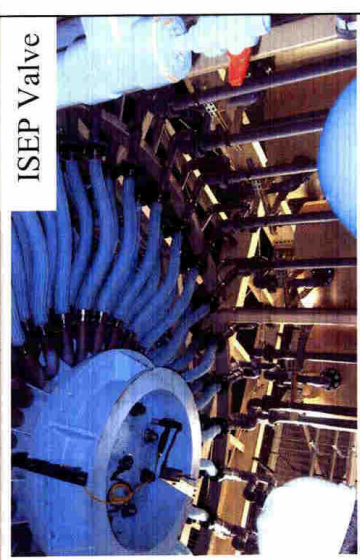
On-Site IX Process - November 2002



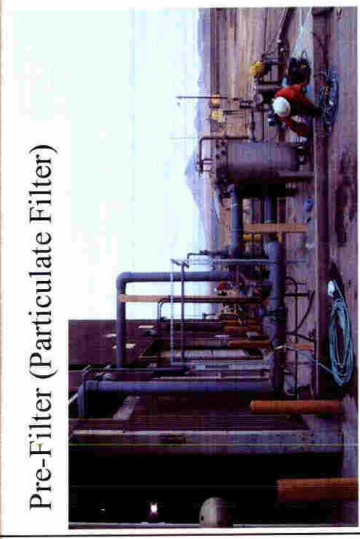


On-Site IX Process - November 2002

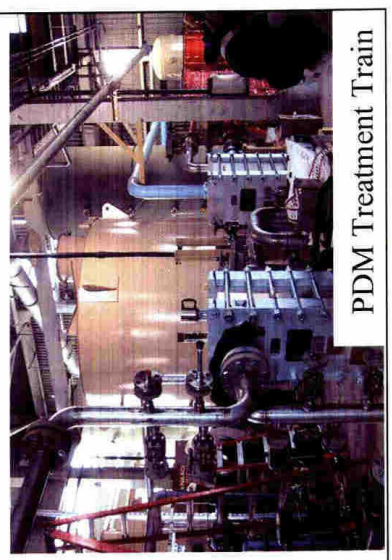
# Perchlorate Remedial Systems



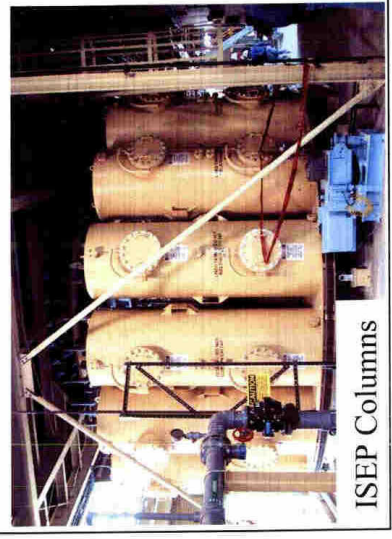
ISEP Valve



Pre-Filter (Particulate Filter)



PDM Treatment Train



ISEP Columns

## Todd Croft

---

**From:** Shannon Harbour  
**Sent:** Friday, October 11, 2002 2:09 PM  
**To:** Allen Biaggi  
**Cc:** Todd Croft  
**Subject:** Presentation - Tech Transfer

Allen,

Here is the follow-up information that you wanted for your presentation in Ontario.

WECCO does stand for Western ElectroChemical Company. AP&PC stands for American Potash & Chemical Company.

KMCLLC does not presently produce any perchlorate precursors. They were phased out as follows: Sodium Chlorate - 1st, Sodium Perchlorate - 2nd, and Ammonium Perchlorate - Last. The sodium chlorate plant is still intact and can be brought back into production if so desired (KMCLLC has no plans to restart but new owner????). The other two plants are presently being dismantled. KMCLLC continues to manufacture manganese dioxide, boron trichloride (1.8 million lbs capacity), and metallic boron (sporadically ~ 4,000 - 8,000 lbs at a time).

I have updated the presentation to correct the errors noted yesterday.

Shannon Harbour, EI  
Staff Engineer  
Bureau of Corrective Actions  
NV Division of Environmental Protection  
1771 E. Flamingo Rd. Ste 121-A  
Las Vegas, NV 89119  
Office: (702) 486-8267  
Fax: (702) 486-2863

**Todd Croft**

---

**To:** Crowley, Susan**Subject:** RE: Maps Accompanying the 2002 Second Q Perchlorate Remediation Update

Susan:

Thanks for this e-mail information and for the extra map follow through. I received my initial set yesterday and scanned through these last night. Mitch & Doug had not yet received their copies as of this a.m.; we tele-conferenced earlier today. It appears to me that the data shows progress particularly immediately down gradient of the on-site slurry wall. Lets discuss report formatting and data needs next week and at our 09/19 meeting.

Lets plan on meeting at about 9:30 a.m. on 09/19. Mitch, Larry, & Doug will all be in town by early evening the prior night. Mitch & Larry will be staying at the Fiesta in Henderson.

THX BYE TJC

-----Original Message-----

**From:** Crowley, Susan [mailto:SCROWLEY@KMG.com]**Sent:** Thursday, September 05, 2002 11:37 AM**To:** Todd Croft**Subject:** Maps Accompanying the 2002 Second Q Perchlorate Remediation Update

Todd,

I wanted to make sure you knew that I remembered you needed 6 extra sets of the maps (which were forwarded with the quarterly report) generated as a result of the May 2002 sampling. Ed is printing the sets and I'll forward these along as soon as they are received. In case you get questions ... the report (with the plates) has already been forwarded to Doug, MWD, SNWA and Brenda. Thanks.

Susan Crowley  
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**KERR-McGEE CHEMICAL LLC**

POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

August 30, 2002



Mr. Todd Croft  
Supervisor  
Nevada Division of Environmental Protection  
1771 E. Flamingo Road, Suite 121-A  
Las Vegas, NV 89119

Subject: Perchlorate Remediation – Second Quarter 2002 Status Report

Dear Mr. Croft:

Kerr-McGee Chemical LLC (Kerr-McGee) entered into an Administrative Order on Consent (AOC) with Nevada Division of Environmental Protection (NDEP) in October 2001. In that AOC, Kerr-McGee agreed to provide regular reports describing the progress towards construction completion for the ion exchange / catalytic destruction plant and following its start-up, continuing reports on the status of its operation. Status of various aspects of the perchlorate remediation project is provided below.

**On-Site Groundwater Extraction (II.2.A)**

A slurry wall was installed late in 2001 and has been functioning since. During the second quarter, the on-site well field extracted approximately 55 gpm on a continual basis, at an average concentration of approximately 1730 ppm. This groundwater was placed into the on-site double-lined pond, GW-11, for eventual treatment in the ISEP perchlorate removal process. A total of 319.92 tons of perchlorate have been removed from the environment in this area, including the second quarter. This continues to be the area of most effective removal.

**Athens Road Groundwater Extraction (II.2.B)**

During the second quarter the Athens Road Well Field was commissioned for service. A total of 8 extraction wells are capable of collecting groundwater, with the intent to capture the perchlorate flux at this location. In support of the ISEP process, the well field extracts approximately 263 gpm from the environment at an average perchlorate concentration of 264 ppm. This collected groundwater was transported to the ISEP process for treatment. A total of 4.53 tons of perchlorate have been removed from the environment in this area, including the second quarter.

**Las Vegas Wash and Seep Area (II.2.C)**

The groundwater collection wells in the seep area began pumping in the last quarter 2001, and were averaging a total flow of approximately 275 gpm at the quarter's end. The surface flow capture also continues with amounts varying with the natural seasons as well as COH water introduction into the upgradient evaporation ponds; at quarter's end the flow approximated 115 gpm. Collectively, the water from the seep area averaged approximately 120 ppm.

The wash ion-exchange process continues to run, treating water from the seep area and has removed a total of approximately 142.34 tons of perchlorate from collected water. NPDES Discharge Permit limits were met for this operation.



Mr. Todd Croft  
August 30, 2002  
Page 2

#### **Pipeline from Las Vegas Wash to Kerr-McGee Facility (II.2.D)**

The raw water supply pipeline is complete and earlier in the year was utilized to transport groundwater from the seep area to the on-site GW-11 pond. As the new ion exchange (ISEP) and catalytic destruction (PDM) portions of the perchlorate remediation process (PRP) began start-up operation, the raw water supply pipeline was also pressed into service to transport groundwater collected from the Athens Road Well Field to the ISEP process. The treated water discharge line was likewise pressed into service to transport the ISEP treated water to the seep area for discharge.

#### **New Ion Exchange / Catalytic Destruction Plant (II.2.E)**

Construction of the new on-site ISEP and PDM processes was completed and the processes began start-up operation on March 29, 2002. The ISEP process treats groundwater extracted from the environment. The PDM process regenerates the resin utilized in the ISEP process. While the ISEP process has been in use elsewhere the PDM process is a new technology designed by Calgon Carbon Corporation specifically for this service. The ISEP process demonstrated perchlorate reduction capabilities that meet the NPDES Discharge Permit limits. The PDM process has experienced start-up difficulties and while still being capable of supporting the ISEP process, has run alternate trains to allow both process and mechanical issues to be resolved.

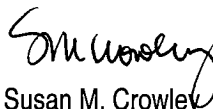
#### **Monitoring**

During the second quarter, Kerr-McGee and American Pacific Corporation completed a cooperative effort to sample the Henderson regional groundwater, with an expectation that updated water level and perchlorate contour maps could be developed. The resultant Plates 1 to 4 are attached to this status report. Plate 1 displays the potentiometric surface of the quaternary alluvium aquifer as of May 2002. Plate 2 provides the perchlorate contours for the quaternary alluvium aquifer in May 2002. Plate 3 provides the perchlorate contours for the deeper muddy creek aquifer in May 2002. Finally, Plate 4 provides the isoconductivity contours for the quaternary alluvium aquifer in May 2002.

While groundwater monitoring has been on-going, in the past it has been primarily related to the investigative portion of Kerr-McGee's remediation efforts. During the second quarter, a routine groundwater monitoring program was initiated to follow the expectations for aquifer changes as the various well fields have begun routine operation. The results of this monitoring effort are just now being received and evaluated. The following quarterly status report can include information on well field performance.

Please feel free to contact me at (702) 651-2234 if you have any questions related to this information. Thank you.

Sincerely,



Susan M. Crowley  
Staff Environmental Specialist

By Certified Mail - 7099 3220 0000 6094 0366

Mr. Todd Croft  
August 30, 2002  
Page 3

cc: LKBailey  
PSCorbett  
WOGreen  
KAHasbrouck  
E Krish  
TWReed  
JTSmith, Covington and Burling  
FRStater  
WKTaylor  
R Waters  
Rick Simon, ENSR  
Brenda Pohlmann, City of Henderson  
Barry Conaty, City of Henderson  
Doug Zimmerman, NDEP  
Marshall Davis, Metro Water District of Southern California  
Pat Mulroy, Southern Nevada Water Authority  
Mitch Kaplan, EPA Region IX

## Todd Croft

---

To: Doug Zimmerman  
Cc: wjfrey@ag.state.nv.us  
Subject: FW: FIRST AMENDMENT TO ADMINISTRATIVE ORDER ON CONSENT



AOC - 1st Amend  
Final.doc

Doug & Bill:

Attached, please find a draft amendment to the Kerr McGee AOC to facilitate operation of both the full scale treatment plant and the Temp. IX, concurrently. I've scanned this and find it appears to be fairly well done. Please try to check it over and provide comments at your earliest opportunity. The sooner we get this amendment completed, the closer we are to accomplishing more complete capture.

THX BYE TJC

-----Original Message-----

From: Crowley, Susan [mailto:SCROWLEY@KMG.com]  
Sent: Friday, May 03, 2002 3:04 PM  
To: Todd Croft  
Cc: Stater, Rick; Bailey, Keith; Corbett, Pat; Smith, JT; Green, W. O.; Goresen, Thomas; Christiansen, George  
Subject: FIRST AMENDMENT TO ADMINISTRATIVE ORDER ON CONSENT

Todd,  
Several days ago we discussed the use of an Amendment to the October 8, 2001 Administrative Order on Consent (AOC) to cement the strategy for seep area water collection for perchlorate remediation. Towards that end, attached (in a "Word" file) is a draft of the Amendment document. Please review this and provide us comments. Thank you.

<<AOC - 1st Amend Final.doc>>  
Susan M. Crowley  
Kerr-McGee Chemical LLC  
(702) 651-2234  
(702) 592-7727 cell  
(702) 651-2310 fax

## Todd Croft

---

**From:** BILL FREY [WJFREY@ag.state.nv.us]  
**Sent:** Friday, May 03, 2002 4:15 PM  
**To:** Todd Croft  
**Subject:** Re: FW: FIRST AMENDMENT TO ADMINISTRATIVE ORDER ON CONSENT

Thank you for your message. I am unable to access my email until May 13. If this matter can wait I will respond then. If you need immediate assistance please contact Sandy Gibbons at 775-684-1238.

## Todd Croft

---

**From:** Todd Croft  
**Sent:** Friday, May 03, 2002 4:16 PM  
**To:** Doug Zimmerman  
**Subject:** FW: FW: FIRST AMENDMENT TO ADMINISTRATIVE ORDER ON CONSENT

DZ:

FYI. Bill is out of pocket all next week. Should we proceed without him, seek other AG assistance, or other?

BYE TJC

-----Original Message-----

**From:** BILL FREY [mailto:WJFREY@ag.state.nv.us]  
**Sent:** Friday, May 03, 2002 4:15 PM  
**To:** Todd Croft  
**Subject:** Re: FW: FIRST AMENDMENT TO ADMINISTRATIVE ORDER ON CONSENT

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**Cc:** Stater, Rick; Bailey, Keith; Corbett, Pat; Smith, JT; Green, W. O.; Goresen, Thomas; Christiansen, George  
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AOC - 1st Amend  
Final.doc

Todd,

Several days ago we discussed the use of an Amendment to the October 8, 2001 Administrative Order on Consent (AOC) to cement the strategy for seep area water collection for perchlorate remediation. Towards that end, attached (in a "Word" file) is a draft of the Amendment document. Please review this and provide us comments. Thank you.

<<AOC - 1st Amend Final.doc>>  
Susan M. Crowley  
Kerr-McGee Chemical LLC  
(702) 651-2234  
(702) 592-7727 cell  
(702) 651-2310 fax

## FIRST AMENDMENT TO ADMINISTRATIVE ORDER ON CONSENT

This amendment to the Administrative Order on Consent of October 8, 2001, ("AOC") between the State of Nevada, Department of Conservation and Natural Resources, Division of Environmental Protection ("NDEP") and Kerr-McGee Chemical LLC ("Kerr-McGee") is being made and entered into by these two Parties this \_\_\_\_ day of May 2002.

**WHEREAS**, the Parties entered into the AOC to govern a remedial action designed to reduce the amount of perchlorate in ground and surface water reaching the Las Vegas Wash ("Wash") and Lake Mead;

**WHEREAS**, Kerr-McGee committed in the AOC to construct and operate a treatment system capable of treating 825 gallons per minute (gpm) of ground and surface water for removal of perchlorate and subsequent discharge in accordance with permit limits set forth in NDEP Clean Water Act Permit No. NV 0023060 of August 7, 2000;

**WHEREAS**, Kerr-McGee further committed in the AOC to install wells to recover approximately 350 gallons per minute of groundwater from an area adjacent to a surface water "seep" which discharges to the Wash;

**WHEREAS**, Kerr-McGee has been operating a temporary ion-exchange system since November 1999 to treat perchlorate contaminated water from the seep and has been discharging this water under a Clean Water Act

permit issued by NDEP, and presently Kerr-McGee is treating and discharging such seep water under Permit No. NV 0023060;

**WHEREAS**, Kerr-McGee has committed in Section II.F. of the AOC to maintain the existing, temporary ion exchange in “ready mode for contingency use” for a period of 12 months; and

**WHEREAS**, NDEP has determined a need to supplement temporarily the capacity of the new 825 gpm treatment system and has expressed a willingness to work with Kerr-McGee on Clean Water Act permit provisions that could allow simultaneous operation of both the 825 gpm system and the temporary ion exchange system (with a treatment capacity of approximately 400 gpm).

**NOW, THEREFORE**, in consideration of and in exchange for the mutual undertakings and covenants set forth in the AOC and this First Amendment, intending to be legally bound, NDEP and Kerr-McGee agree as follows:

1. NDEP and Kerr-McGee will cooperate to achieve expeditious permit modifications or approvals, as appropriate, to enable Kerr-McGee to treat up to 1225 gpm of water from the combination of the temporary ion exchange system and the new 825 gpm plant;



2. Upon grant of such water discharge permit approvals, and provided that operation is feasible consistent with such approvals, Kerr-McGee will operate the temporary ion exchange system to treat surface water flow from the seep in amounts up to the system's 400 gpm capacity for a period not to exceed the 12 month term identified in Section II.F. of the AOC.

3. The parties recognize that the planned collection of approximately 400 gpm of seep-area water for treatment in the 825 gpm system -- as well as seasonal variations in water volume -- may cause surface water flow from the seep to cease. In this event, the temporary ion exchange system will be returned to standby status in ready mode consistent with Section II.F.

IN WITNESS WHEREOF, NDEP and Kerr-McGee execute this First Amendment to the AOC by their duly authorized representatives on this \_\_\_\_ day of May 2002.

(775) 687-4670

TDD 687-4678

Administration  
Facsimile 687-5856

Water Pollution Control  
Facsimile 687-4684

Mining Regulation and  
Reclamation  
Facsimile 684-5259



Waste Management  
Corrective Actions  
Federal Facilities

Air Pollution Control  
Air Quality Planning  
Water Quality Planning

Facsimile 687-6396

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
**DIVISION OF ENVIRONMENTAL PROTECTION**

333 W. Nye Lane, Room 138  
Carson City, Nevada 89706

April 26, 2002

Susan Crowley  
Environmental Scientist  
Kerr McGee Chemical Corp.  
P.O. Box 55  
Henderson, NV 89009

**SUBJECT: NPDES Permit NV0023060 Las Vegas Wash Tracer Study**

Dear Ms. Crowley:

Your report of the Las Vegas Wash Tracer Study that was required by Condition I.A.16.c of subject permit has been reviewed. We find that it meets said permit condition. We further find that the results of the study clearly establish the boundary of the mixing zone. Therefore, there is no need for a permit modification.

Please call me at (775) 687-4670 ext. 3050 if you have any questions regarding this letter.

Sincerely,

Jonathan C. Palm, Ph.D., P.E.  
Permits Branch Supervisor  
Bureau of Water Pollution Control

cc: Leo Drozdoff, NDEP  
Jennifer McMartin, NDEP  
Doug Zimmerman, NDEP  
Nadir Sous, NDEP LV  
Todd Croft, NDEP LV





# KERR-McGEE CHEMICAL LLC

POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

April 3, 2002

RECEIVED  
ENVIRONMENTAL  
PROTECTION  
02 APR -8 AM 10:51

Mr. Todd Croft  
Remediation Branch Supervisor  
Nevada Division of Environmental Protection  
555 Washington Ave, Suite 4300  
Las Vegas, NV 89109

Subject: Perchlorate Remediation - ISEP Operation

Dear Mr. Croft:

As we discussed by telephone last Monday, Kerr-McGee Chemical LLC (Kerr-McGee) has met the March 29, 2002 requirements of the Administrative Order on Consent (as amended in Doug Zimmerman's letter of Dec. 20, 2001) by treating water, containing perchlorate, in Kerr-McGee's new ion-exchange/catalytic destruction plant. We also started up the Athens Road well field and lift station. Problems with the discharge line have restricted continued operation, but with your help, we have received the necessary permit from the Nevada Department of Transportation (NDOT) to modify the discharge line. We hope to have the full system operating by the end of next week.

On March 29, 2002 at 11:54 am, we began treating water, containing perchlorate. Pumping from the Athens Road collection system was initiated the same day. Unfortunately, the operations were halted at 3:30 pm when a large brush fire forced evacuation of our operators along the discharge pipeline to Las Vegas Wash. As you know, we have been experiencing air-locking along the discharge pipeline and operators were necessary to maintain flow. Representatives of the Clark County Fire Department advised our operators not to re-enter the Wash area that night. We resumed pumping and treatment Saturday morning and operated until water seepage was observed at the Jokers Wild casino parking lot, which forced another shut down. The short operating time did not load sufficient resin to require use of the new plant's regeneration brine circuit.

We are currently modifying the discharge line to install a 12-inch diameter HDPE line inside the existing vitrified clay pipe (VCP) under Boulder Highway and the casino parking lot. This was the original design for the line, but problems gaining access from the property owner to excavate in the parking lot forced use of the VCP line itself. With your help, we now have a permit from NDOT and have permission from the casino to make the needed modifications.

We have received the necessary pipeline components and have begun excavation at the man-holes on either end of the line to be replaced. We will begin fusing the HDPE pipe sections today and will expect to have the installation complete by the end of next week. We are hopeful that these modifications will allow full-flow operation of the line.

Thanks again for your help. If you have questions or comments, please call me at (702) 651-2234.

Sincerely,

Susan M. Crowley  
Staff Environmental Specialist

Certified Mail - 7099 3220 0000 6094 0311

cc: LKBailey  
WOGreen  
EKrish  
JTSmith, Covington and Burling  
WKTaylor  
Rick Simon, ENSR  
Doug Zimmerman, NDEP  
Barry Conaty, City of Henderson  
Mitch Kaplan, EPA Region IX

PSCorbett  
KAHasbrouck  
TWReed  
FRStater  
RWaters  
Brenda Pohlmann, NDEP  
Marshall Davis, Metro Water District Of Southern California  
Pat Mulroy, Southern Nevada Water Authority

**BRIEFING PAPER FOR MARCH 20, 2002 RISK MANAGEMENT  
DECISION TEAM (RMDT) MEETING  
REGARDING KERR MCGEE AND PERCHLORATE**

**QUESTIONS FOR RMDT CONSIDERATION**

1. Does the remediation approach currently being implemented by Kerr McGee Chemical Corporation (KMCC) maximize the capture of perchlorate? If not, why shouldn't we pursue additional measures?
2. What should be done about Las Vegas and Southern California (Los Angeles) drinking water supplies if the 1 part per billion health advisory level for perchlorate is adopted?

**THE PROBLEM**

Perchlorate-contaminated ground water threatens the drinking water supplies of nearly 15 million people along the Colorado River. The contamination affects communities and Tribal nations in Nevada, California and Arizona as well as the people of Mexico. In 1997, perchlorate was discovered in the lower Colorado River by the **Metropolitan Water District of Southern California**. The source of the perchlorate was traced back to Lake Mead, Las Vegas Wash and ultimately to the KMCC facility in Henderson, Nevada.

Perchlorate concentrations in Lake Mead have been measured up to **24 ppb (parts per billion)**. Perchlorate concentrations in the Colorado River below Hoover Dam have consistently averaged between 5 and 9 ppb (**Figure 1**). There is currently no enforceable regulatory limits such as an MCL (Maximum Contaminant Level) for perchlorate in drinking water. In 1992 at Region 9's request, **EPA's Office of Research and Development National Center for Environmental Assessment** came out with a **Provisional Reference Dose value for perchlorate of 4 ppb**. In 1995, following receipt of comments, the provisional reference dose was revised to a **range of 4-18 ppb**. The State of California then followed by adopting the reference dose range of 4-18 ppb. Currently, EPA has proposed a new **health advisory concentration for perchlorate of 1 ppb** based on human toxicological data that has been developed over the past few years. An external peer review and public comment process is underway with a decision on the health advisory level to be made later this year (2002) or early in 2003. Estimates are that it will take from 8 to 20 years for the natural flushing action in Lake Mead and the Lower Colorado River system to bring the concentration of perchlorate to below 1 ppb.

Perchlorate, the primary component of solid rocket fuel, is a recently discovered pollutant in our environment that can affect human health, specifically the functioning of the thyroid gland. Children are particularly sensitive to the effects of perchlorate. There is also developing concern over perchlorate uptake in plants such as lettuce which is a major cash crop adjacent to the Lower Colorado River. Perchlorate is a stable salt and highly soluble in water. It moves with ground water and is very difficult to remove.

## FACILITY DESCRIPTION

The Kerr McGee Chemical Corporation plant is located in Henderson, Nevada which is situated approximately 13 miles southeast of Las Vegas (**Figure 2**). This facility comprises part of the **BMI (Basic Management Incorporated) Complex** which is an approximately 850 acre industrial park. Perchlorates began to be produced at this location in the late 1940s. Perchlorate production wastes were disposed in the BMI pond system between 1951 and 1974 and in KMCC's own ponds between 1975 and 1980. These ponds leaked significant amounts of perchlorate into the underlying shallow ground water. KMCC took over operations through acquisitions and mergers and was the sole producer of ammonium perchlorate by 1967. Perchlorate was produced at KMCC's Electrolytic and Ammonium Perchlorate Plants. There was a second producer of perchlorate in this area; **American Pacific (Pepcon)** produced perchlorate up until 1988. A massive explosion destroyed their plant that year. Pepcon has since relocated to Utah where perchlorate production continues.

## HYDROGEOLOGIC SETTING

Ground water in the Las Vegas Valley occurs in a thick sequence of fine grained silts and clays interbedded with some sands and gravels. This sequence is known as the Muddy Creek Formation. This formation is regional in extent and is the first continuous aquifer underlying the Las Vegas Valley. Ground water occurs under confined conditions with some areas exhibiting artesian conditions. Ground water flow is generally southwest to northeast, discharging into Las Vegas Wash. There is a component of ground water flow in the deeper portions of the Muddy Creek Formation which likely flows directly to Lake Mead.

Overlying the Muddy Creek Formation is a variable thickness of unconsolidated alluvium consisting of sands, silts, and some gravels. This material is thickest along erosional channels (paleochannels) trending roughly northeast towards Las Vegas Wash. Hydrogeologic investigations by Kerr McGee and American Pacific (Pepcon) have found that these paleochannels act as preferential flow paths for ground water in the shallow alluvium. Hydraulic conductivities, determined through pump and tracer tests range from 1,700 to 4,500 gpd/sqft with corresponding transmissivities of 50,000 to 160,000 gpd/ft. Ground water flow velocities range from 25 to 85 feet/day.

## STRATEGY TO CONTROL/REMOVE PERCHLORATE FROM LAS VEGAS WASH AND LAKE MEAD

A three-pronged approach to the remediation of perchlorate in groundwater has been developed by KMCC with the assistance of NDEP and EPA. Namely: 1) Capture and treat the most concentrated perchlorate at its source on KMCC property, 2) extract and treat perchlorate from wells installed at a site about midway between the KMCC facility and the Wash (Athens Road wells), and 3) intercept and treat perchlorate contamination near Las Vegas Wash to reduce impacts on the Wash and Lake Mead as quickly as possible. **Figures 3 and 4** show the approximate locations of the three ground water interception areas, their relationship to KMCC, and to Las Vegas Wash and Lake Mead. Ground water extraction is already occurring at the

**Chrome Treatment System Line of Wells (CTL)** on KMCC property. The highest concentrations of perchlorate have been measured in the ground water in this area. The second area of capture will occur along **Athens Road**, located at the approximate midpoint between KMCC and Las Vegas Wash. This is an optimal location for perchlorate capture due to the configuration of one of the principal paleochannels running north from KMCC property to Las Vegas Wash. Athens Road capture and treatment is scheduled to begin by the end of March 2002. **Interception of ground water at Las Vegas Wash is occurring utilizing a seep capture system and four ground water extraction wells installed during the summer of 2001.** The removal of perchlorate at Las Vegas Wash is having the most **immediate** impact on water quality in the wash. Approximately 900 lbs/day of perchlorate was entering Las Vegas Wash prior to capture and treatment. Since November 1999, KMCC has operated a temporary ion exchange system adjacent to Las Vegas Wash for capture and treatment of perchlorate contaminated seep water.

**Chromium Treatment Line of Wells (CTL):** KMCC signed a consent agreement with NDEP in 1986 which directed KMCC to cleanup hexavalent chromium contamination in the shallow ground water. A determination was made that production units 4 and 5 had leaked chromium through their concrete basements into the soil and ground water. Chromium as high as 90 mg/l had been measured in the ground water. Ground water extraction began in 1987. Following treatment for chromium removal, the ground water was reinjected downgradient of the CTL wells. In 1997, high concentrations (up to 37,000 ppm) of perchlorate was discovered in the ground water near the chromium extraction area. In response, KMCC modified the chromium extraction system so that the ground water containing perchlorate would be pumped to the newly constructed 11.5 acre (70 million gallon) evaporation pond instead of being reinjected back into the aquifer. This was begun at the end of 1998. **Figure 4** shows the location of the evaporation pond and the CTL wells.

KMCC constructed a slurry wall immediately downgradient of the chrome treatment line of wells during the summer of 2001. It was completed on or about October 1, 2001. Fresh water from Lake Mead is injected into the subsurface using recharge trenches located immediately north (downgradient) of the slurry wall. The injected water maintains a hydraulic head in the aquifer and flow towards the Athens Road extraction wells. **Figure 5** shows the location of the CTL wells, slurry wall and recharge trenches. The purpose of this barrier was to enhance the capture efficiency of the chrome treatment wells. The slurry wall is approximately 1700 feet in length, 60 feet deep, and is **"keyed into"** the underlying Muddy Creek Formation. Measurements of pumping rates from the chrome treatment line of wells indicates that pumping rates have increased from approximately 25 gallons per minute prior to construction of the slurry wall to about 50 gpm following construction completion. **Perchlorate concentrations range from 1200 to 1900 ppm with an average of 1500 ppm (Table 1).** KMCC anticipates close to a **100% capture efficiency at the chrome treatment line of wells.**

**Athens Road Wells:** Seven extraction wells have been installed in a line crossing the main paleochannel at Athens Road (**Figure 7**). **Figure 6** shows the Athens Road wells in plan view. The total pumping capacity of these wells is approximately 300 gpm with perchlorate concentrations of approximately 300 ppm. The Athens Road wells are expected to become

operational by the end of March 2002. **KMCC expects to achieve at least a 95% capture efficiency with a total pumping rate of 300 gpm.** Calculated travel times for the ground water to move from Athens Road to Las Vegas Wash range from 6-12 months.

**Las Vegas Wash Seep/Temporary IX Treatment System:** The Southern Nevada Water Authority (SNWA) discovered a ground water seep discharging to the surface near Las Vegas Wash in April of 1999; it contained concentrations of perchlorate in the **85-140 ppm range.** **The flow of the seep has ranged from 300-700 gpm.** The location of this seep was consistent with the location where ground water containing high concentrations of perchlorate was entering Las Vegas Wash, based on the previous mapping of the paleochannels in the area. KMCC installed a pump, piping and a temporary ion exchange treatment system to capture and treat the seep water. In November 1999, perchlorate-contaminated groundwater began to be pumped from the seep through the treatment system and then discharged back to the seep, which in turn flows to Las Vegas Wash at concentrations of 1-2 ppm. The pumping/treatment rates from the temporary ion exchange treatment units have averaged about 350-400 gpm since that time. The operation of this system has achieved about 50% capture of perchlorate entering Las Vegas Wash.

**Treatment Plant:** A first of its kind treatment plant for perchlorate using an **ion exchange/catalytic destruction technology will begin operating in April of 2002 (Figure 4).** It is designed to handle 825 gpm of perchlorate-contaminated ground water received from all three extraction sources with a design inlet perchlorate concentration of 350 ppm. The treatment system includes approximately six miles of pipeline and three pumping stations that will carry the ground water to the plant and return it to Las Vegas Wash for discharge following treatment. **Operation of the treatment plant will result in the destruction of 1.2 million pounds of perchlorate per year.** The expected performance of the plant calls for 99% removal resulting in a perchlorate concentration of 3.5 ppm. KMCC's goal is to achieve a treatment level of 1 ppm. The NPDES permit requires an overall treatment efficiency of 97%.

## **CHRONOLOGY OF REMEDIAL ACTIONS TAKEN TO DATE**

- \* 1998: 11.5 acre evaporation pond constructed on KMCC property. Began receiving water from chrome treatment line wells on 12/30/98
- \* April 1999: Ground water seep discovered adjacent to Las Vegas Wash by the Southern Nevada Water Authority
- \* November 13, 1999: Seep capture/treatment begins in temporary ion exchange units
- \* 2000: Additional hydrogeologic investigations near Las Vegas Wash
- \* **2001: Construction of ion exchange/catalytic destruction perchlorate treatment plant begins including pipelines and pumping stations. Completion scheduled for March 2002**

- \* Summer 2001: Hydrogeologic investigations are conducted at Athens Road that include tracer and pump tests; four new ground water extraction wells are installed near Las Vegas Wash west of the ground water seep
- \* October 31, 2001: Pumping of the seep wells began at about 300 gpm. Water being piped to the evaporation pond to help reduce the perchlorate concentration in the evaporation pond to meet requirements for treatment; pumping also increases perchlorate removal/control near Las Vegas Wash
- \* Fall 2001: Wells installed along Athens Road
- \* March 2002: Pumping to begin at Athens Road wells

## **RESULTS OBSERVED IN LAS VEGAS WASH AND LAKE MEAD**

Numerous programs monitoring the concentrations of perchlorate in Las Vegas Wash and Lake Mead are being undertaken by KMCC, NDEP, SNWA and U.S.G.S. The SNWA has been monitoring perchlorate at Las Vegas Bay/Boulder Basin and at the Saddle Island water intake (**Alfred Merritt Smith Water Treatment Facility**). This is the main intake point for the City of Las Vegas' water supply. **Table 2 shows a significant decrease in perchlorate concentrations at Las Vegas Bay from a high of 170 ppb (avg) in 1999 to 50 ppb(avg) in 2001. Figure 9 shows that there is also a downward trend in perchlorate concentrations at the drinking water intake from 2000 to 2001.**

Three major factors have influenced perchlorate concentrations in Las Vegas Wash: 1) the startup of pumping and treating of water from the seep near Las Vegas Wash in November 1999, 2) the dewatering of the area near the construction of an erosion control structure in Las Vegas Wash from about February to June 2000, and 3) the start of extraction of ground water from four wells near Las Vegas Wash beginning in November 2001. Other factors influencing perchlorate concentrations could be rainfall, usage of the Rapid Infiltration Basins (RIBs) by the City of Henderson Waste Water Treatment Plant and natural fluctuations in ground water flow in the area. **Figure 8 (Perchlorate- Las Vegas Wash At North Shore Road)** [on which a linear regression line has been calculated from the data] clearly indicates a decrease in the concentration of perchlorate load at North Shore Road from approximately **900 lbs/day at the beginning of 1998 to approximately 400 lbs/day at the beginning of 2002** (See Figure 3 for location). The two major factors influencing perchlorate concentrations referenced above are depicted on this graph. (i.e. the seep capture treatment and dewatering associated with the erosion control structure).



## ATTENUATION OF PERCHLORATE IN LAKE MEAD AND THE LOWER COLORADO RIVER SYSTEM

If all perchlorate entering Lake Mead were stopped today, how long would it take for clean water inflows to reduce the perchlorate concentrations in Lake Mead and the Lower Colorado River system to below 1 part per billion? We roughly estimate, based on many assumptions, that it would take approximately 8-20 years for natural flushing action to reduce concentrations below 1 ppb.

Lake Mead was created in 1935 following construction of Hoover Dam and is the largest reservoir in the United States by volume (9.7 trillion gallons). Annual inflow and discharge from Hoover Dam is approximately 2.4 trillion gallons. It takes about four years for the total volume of Lake Mead to be replaced with water inflow from the Colorado, Virgin and Muddy Rivers, and Las Vegas Wash (9.7 trillion gallon volume divided by 2.4 trillion gallons per year inflow/outflow).

Water sampling and analysis throughout Lake Mead shows that Boulder Basin (including Las Vegas Bay) is the only part of Lake Mead where perchlorate has been detected. Saddle Island, the Southern Nevada Water Authority drinking water supply intake for over 1.2 million people in Las Vegas, City of North Las Vegas, Henderson, Boulder City and unincorporated parts of Clark County, is located in Boulder Basin. In 2001, the average perchlorate concentration detected at the Saddle Island drinking water intake was 10.35 ppb (see **Table 2**).

We estimate that it would take approximately 8-12 years for natural flushing action to reduce perchlorate concentrations in Boulder Basin (including Las Vegas Wash) to below 1 ppb. Perchlorate fully mixes with water in Las Vegas Wash and moves with it as it flows into Boulder Basin and over Hoover Dam. As the inflow from the upper Colorado River slowly replaces the existing volume of Boulder Basin with clean water, perchlorate levels are reduced over time. We estimate that it would take about two years for the full volume of Boulder Basin to be replaced with clean water. This estimate is based on the assumption that the volume of Boulder Basin is about half that of Lake Mead (4.85 trillion gallons divided by 2.4 trillion gallons per year inflow/outflow). Since the water in Boulder Basin is not perfectly mixed, we also assume that the concentration of perchlorate will be reduced by half with each volume change, assuming no new perchlorate is added to Boulder Basin. It would take four volume changes (8 years) for the perchlorate concentration to be reduced from the average of 10.35 ppb to below 1 ppb at the Saddle Island drinking water intake. It would take about six volume changes (12 years) for the average of 50 ppb in Boulder Basin (including Las Vegas Bay) to be reduced below 1 ppb.

We also estimate that it would take natural flushing action up to 20 years for both Lake Mead and the Lower Colorado River system to reach perchlorate concentrations of below 1 ppb. Perchlorate concentrations in the Lower Colorado River system (after Hoover Dam) average about 5-9 ppb. If we assume that the volume of the Lower Colorado River system is about the same as Lake Mead, it would take approximately four years for each volume change. Again, assuming that perchlorate will be reduced by half with each volume change, it would take three

volume changes (12 years) for the concentration to be reduced below 1 ppb. The eight years estimated for Lake Mead is added to the 12 years for the Lower Colorado River System to obtain a total of 20 years. The 20 years reflects the fact that Lake Mead will have to flush itself out first before clean water can enter the Lower Colorado River System.

## **WHAT MORE CAN BE DONE**

In light of EPA's proposed health advisory level of 1 ppb for perchlorate in water, additional remedial actions may need to be implemented to assure that human health in the Colorado River Basin is protected. After KMCC has operated the new treatment plant for 6-12 months and data of perchlorate concentrations from Las Vegas Wash and Lake Mead become available, it is hoped that decreases in perchlorate concentrations will help reveal whether there are additional source areas that had been previously masked by existing high perchlorate concentrations in Las Vegas Wash.

### **The following actions could be considered in the future:**

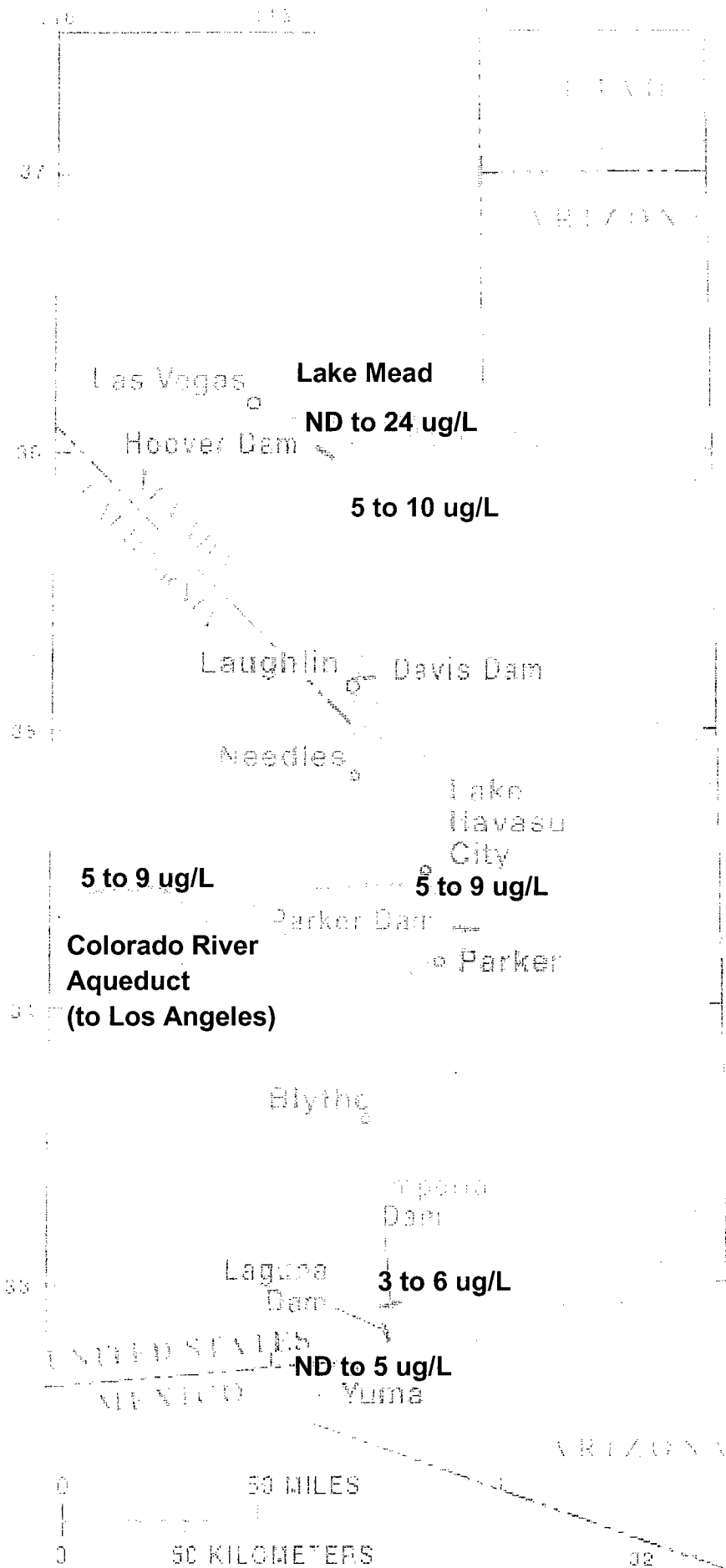
1) There currently is a problem involving one aspect of the perchlorate treatment system. The existing piping system will not permit the simultaneous operation of the ion exchange/catalytic destruction perchlorate treatment plant and the temporary ion exchange treatment system at Las Vegas Wash. The pressure head that is developed between the treatment plant on KMCC property and Las Vegas Wash is too great for the existing pumps at the temporary ion exchange units to overcome, given the existing piping arrangement. Solving this problem by installing a new piping arrangement would allow the temporary ion exchange units to operate for about another 6 to 12 months, and would achieve greater control of perchlorate near Las Vegas Wash (probably 70 to 90% control could be achieved) during the approximately one year that it will take the back end of the plume to travel from Athens Road to Las Vegas Wash.

2) Conduct hydrogeologic investigations to determine where additional sources of perchlorate are entering Las Vegas Wash and assess whether these sources are significant. Other source areas that could be investigated include:

- \* Plume from the former Pepcon Plant
- \* "Bank Storage" of perchlorate in ground water adjacent to and underlying Las Vegas Wash
- \* Ground Water Underflow from the Muddy Creek Formation to Las Vegas Wash or directly to Lake Mead
- \* Leakage from other unlined ponds located in the "common area" of the BMI Complex

**Figure 1**

**Lower Colorado River  
Perchlorate Concentrations  
1998 - 2001**



# Kerr McGee in Henderson, NV

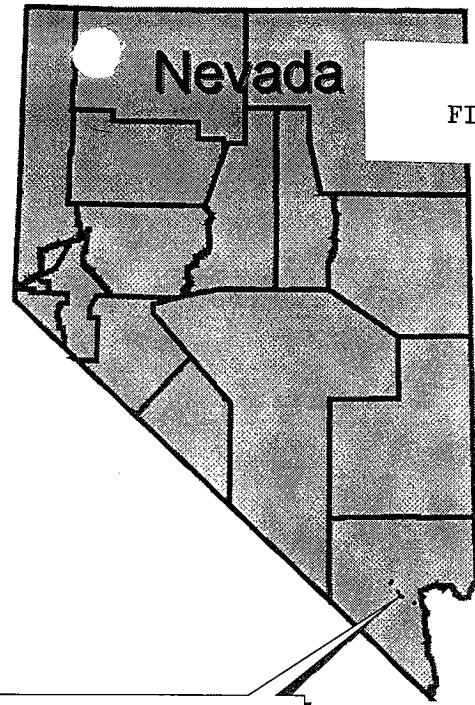
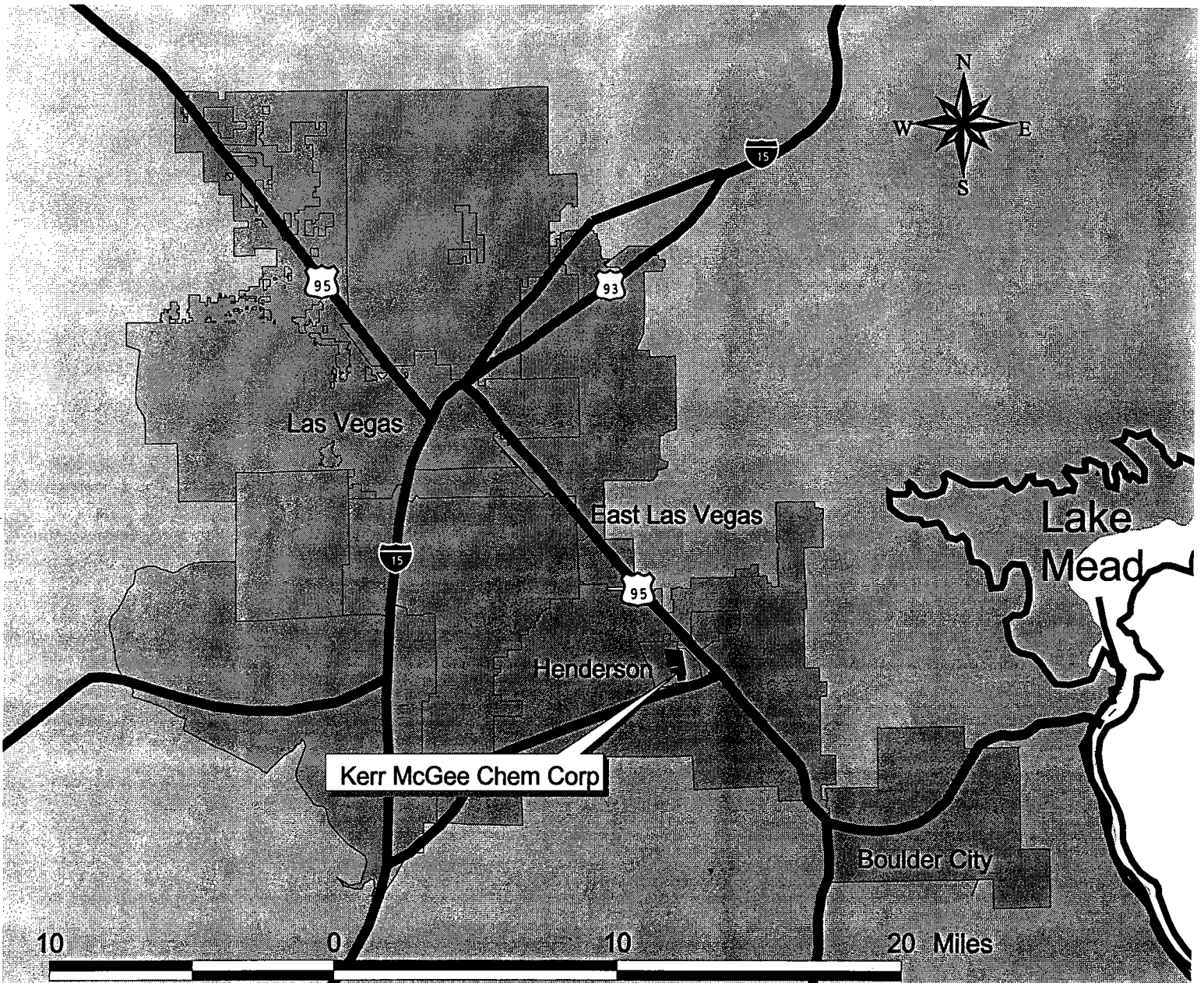


FIGURE 2

Kerr McGee Chem Corp





Las Vegas Wash  
North Shore Rd.:  
0.45 ppm

Lake Mead:  
0.050 pp

Drinking Water Intake:  
0.010 ppm

Seep Capture and  
Extraction Wells:  
100 ppm

Athens Road  
Extraction Wells:  
300ppm

Perchlorate & Chromium  
Extraction Wells:  
1500 ppm

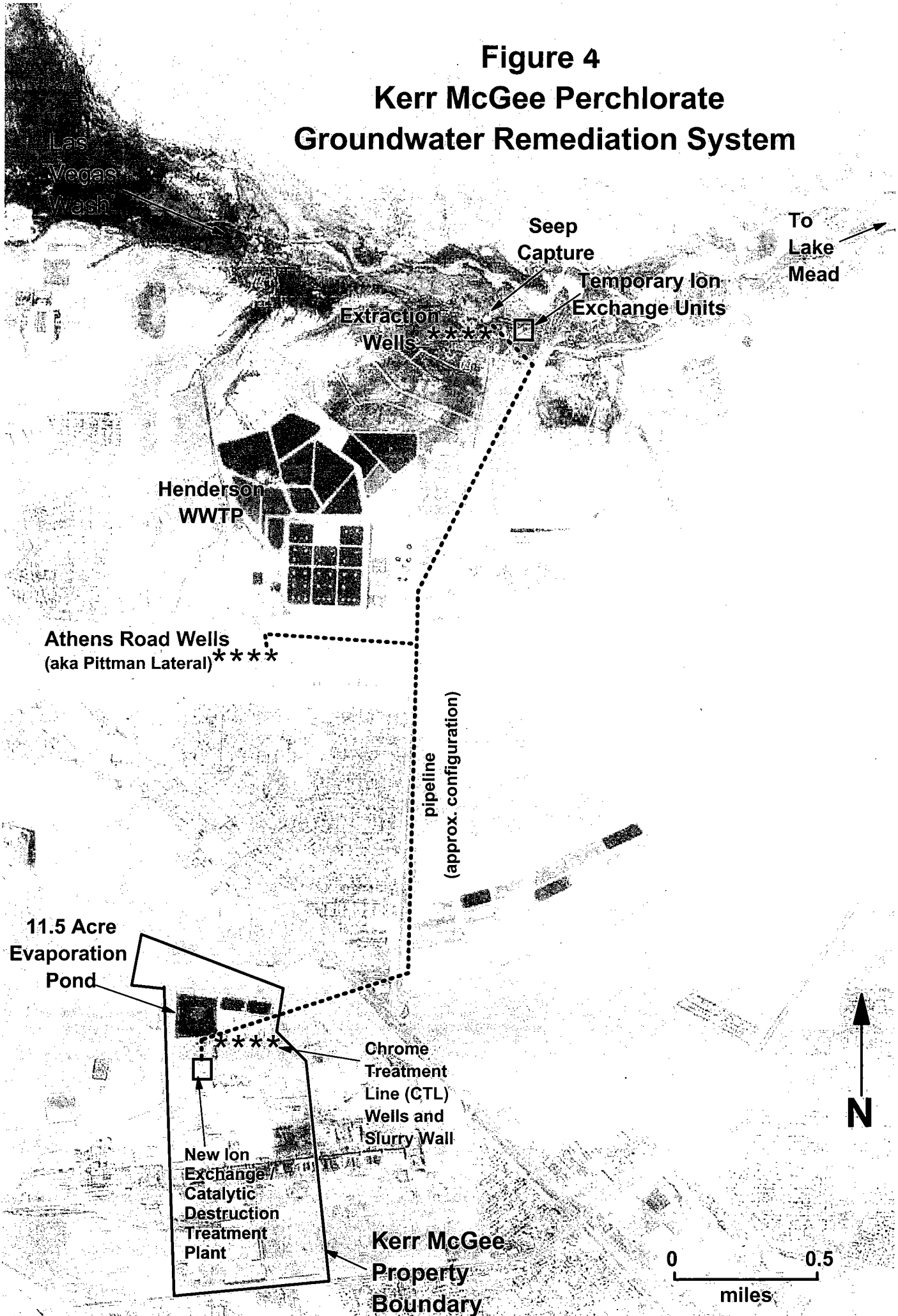
Kerr McGee Chem Corp

FIGURE 3

# Kerr McGee Remediation Project - Representative Perchlorate Concentrations



# Figure 4 Kerr McGee Perchlorate Groundwater Remediation System



RECHARGE TRENCHES

CONSENT ORDER BOUNDARY

TRAIN  
LOADING DOCK

BARRIER WALL  
LOCATION

GROUNDWATER  
PUMP

BETA DITCH

C-1  
POND

AP-4  
POND

AP-2  
POND

AP-1  
POND

KERR-McGEE CORP. - HYDROLOGIC SERVICES

KERR-McGEE CHEMICAL LLC  
HENDERSON, NEVADA

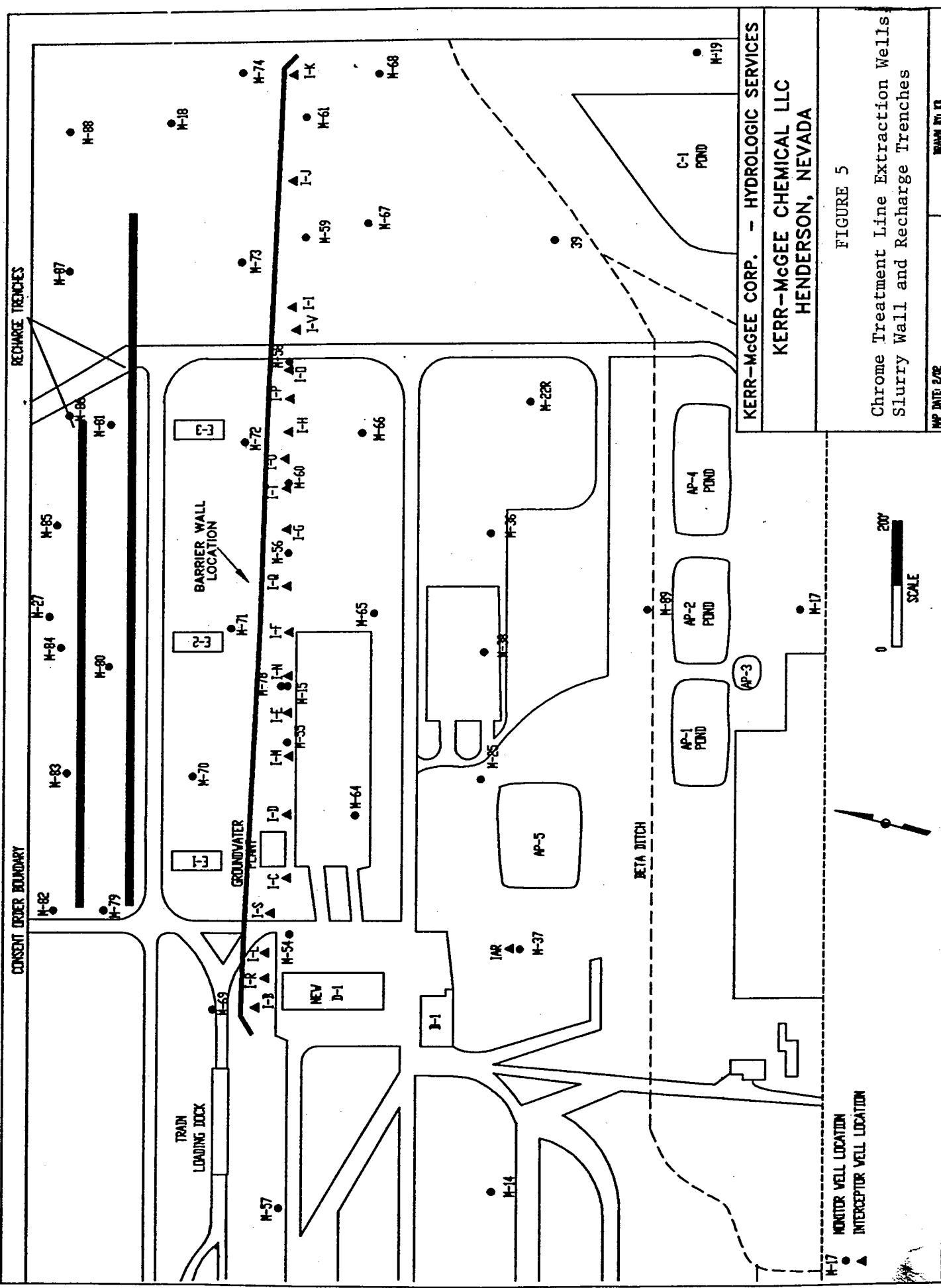
FIGURE 5

Chrome Treatment Line Extraction Wells  
Slurry Wall and Recharge Trenches

MAP DATE: 2/92

BAWV #7-13

● MONITOR WELL LOCATION  
▲ INTERCEPTOR WELL LOCATION



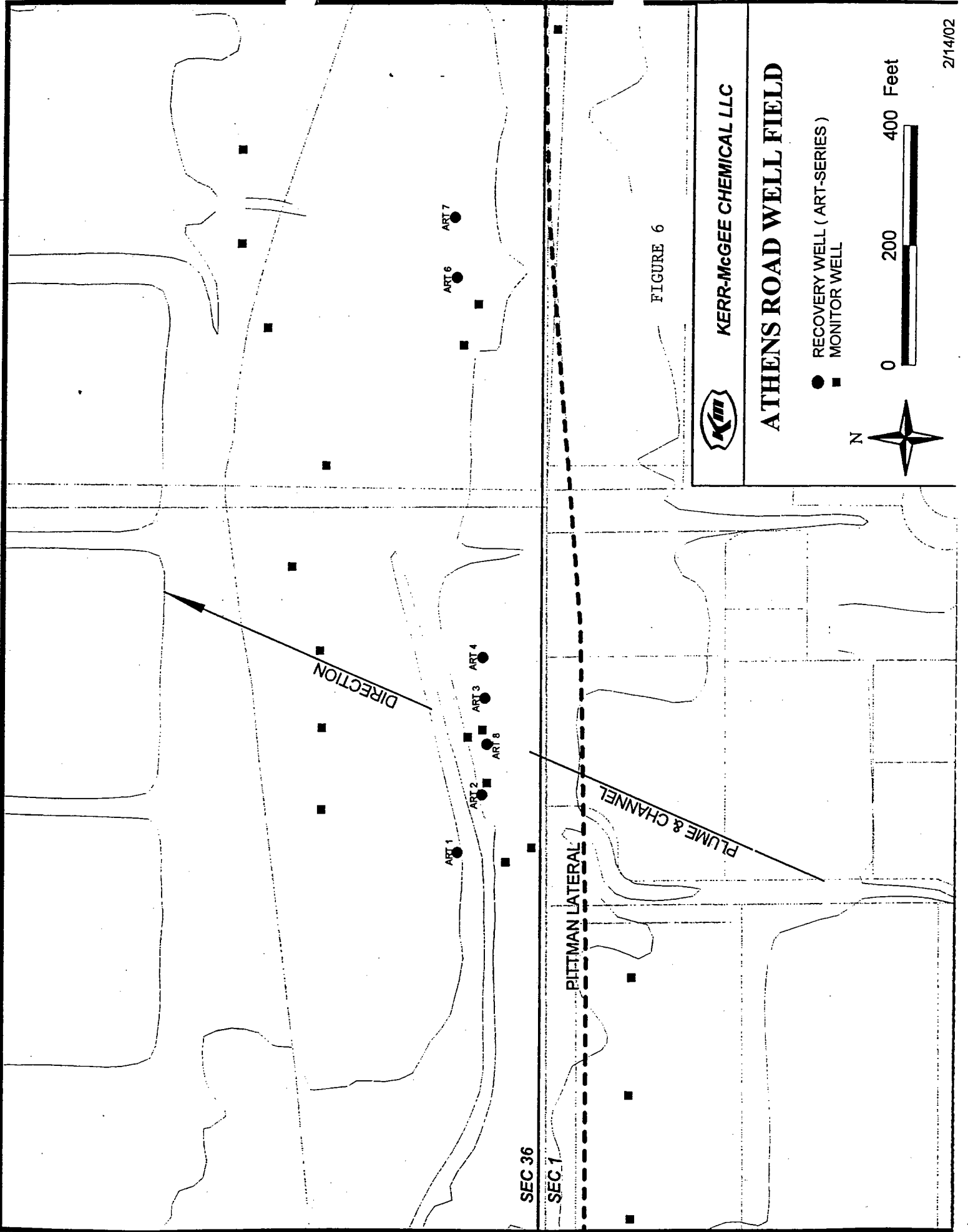


FIGURE 6



KERR-McGEE CHEMICAL LLC

# ATHENS ROAD WELL FIELD

- RECOVERY WELL ( ART-SERIES )
- MONITOR WELL





WEST

EAST

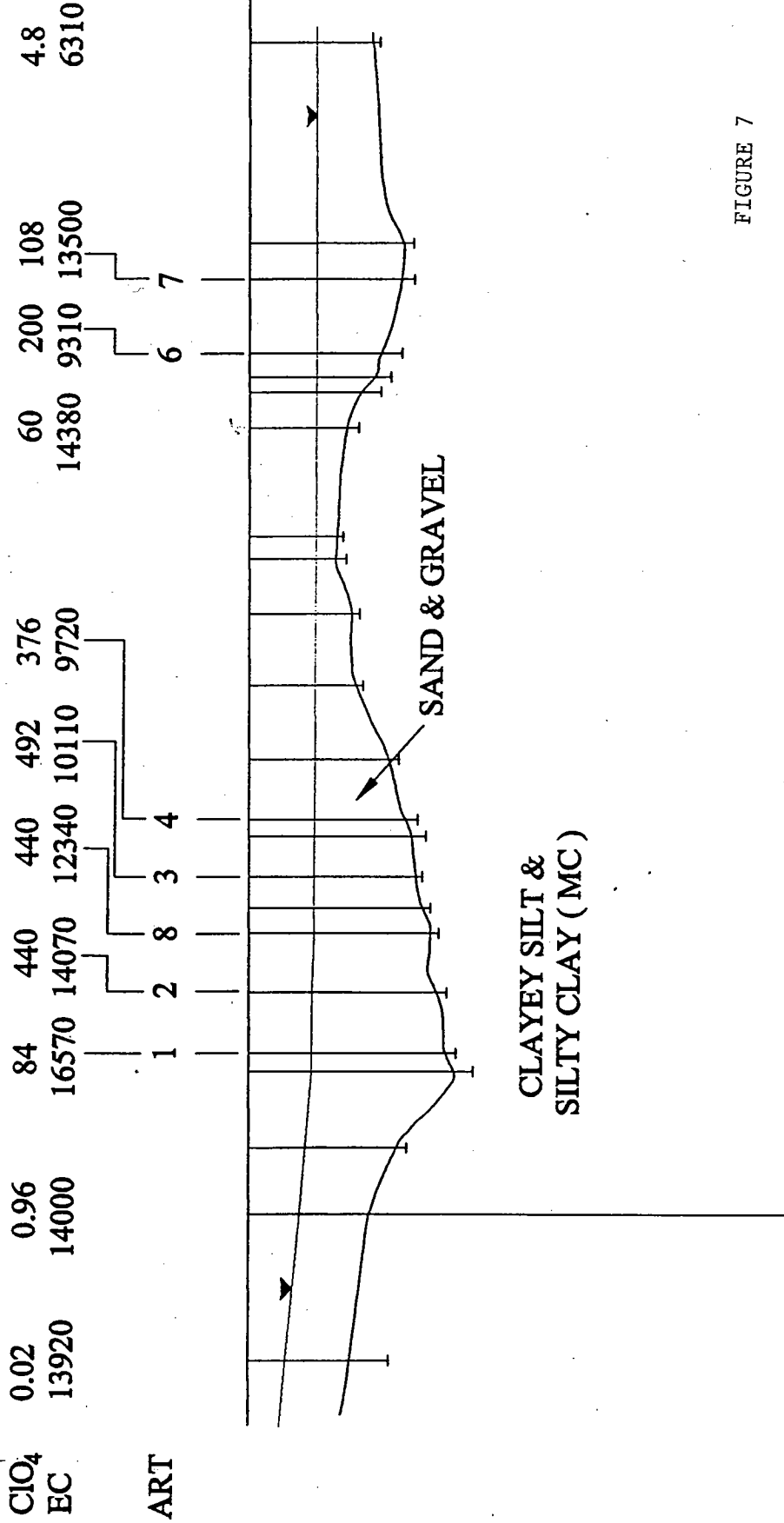


FIGURE 7

ClO<sub>4</sub> (ppm)  
EC (umho/cm)

# ALLUVIAL CHANNEL AT ATHENS ROAD

1" = 200' (H)  
1" = 40' (V)

Figure 8

### Perchlorate Las Vegas Wash - North Shore Road

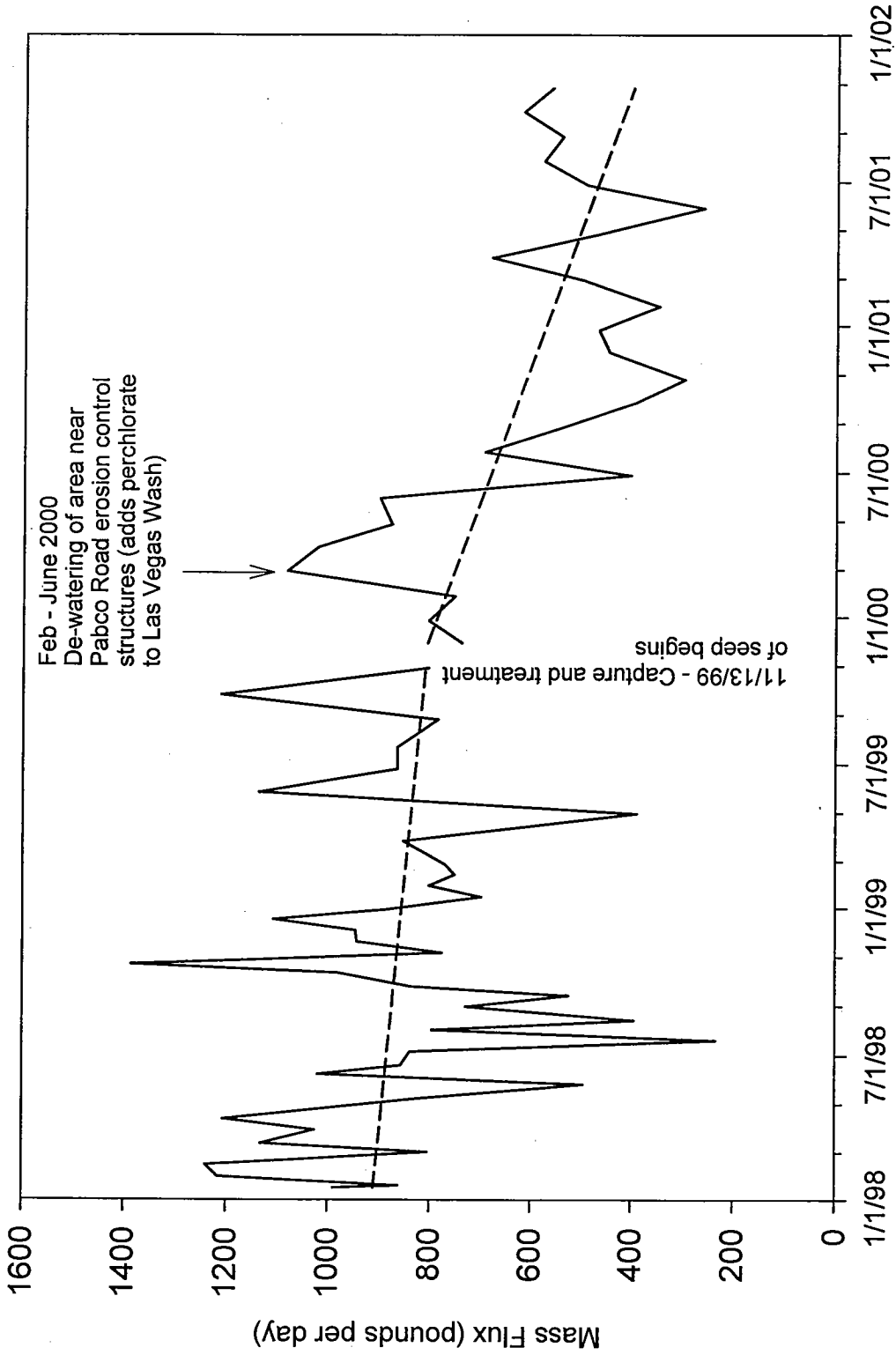
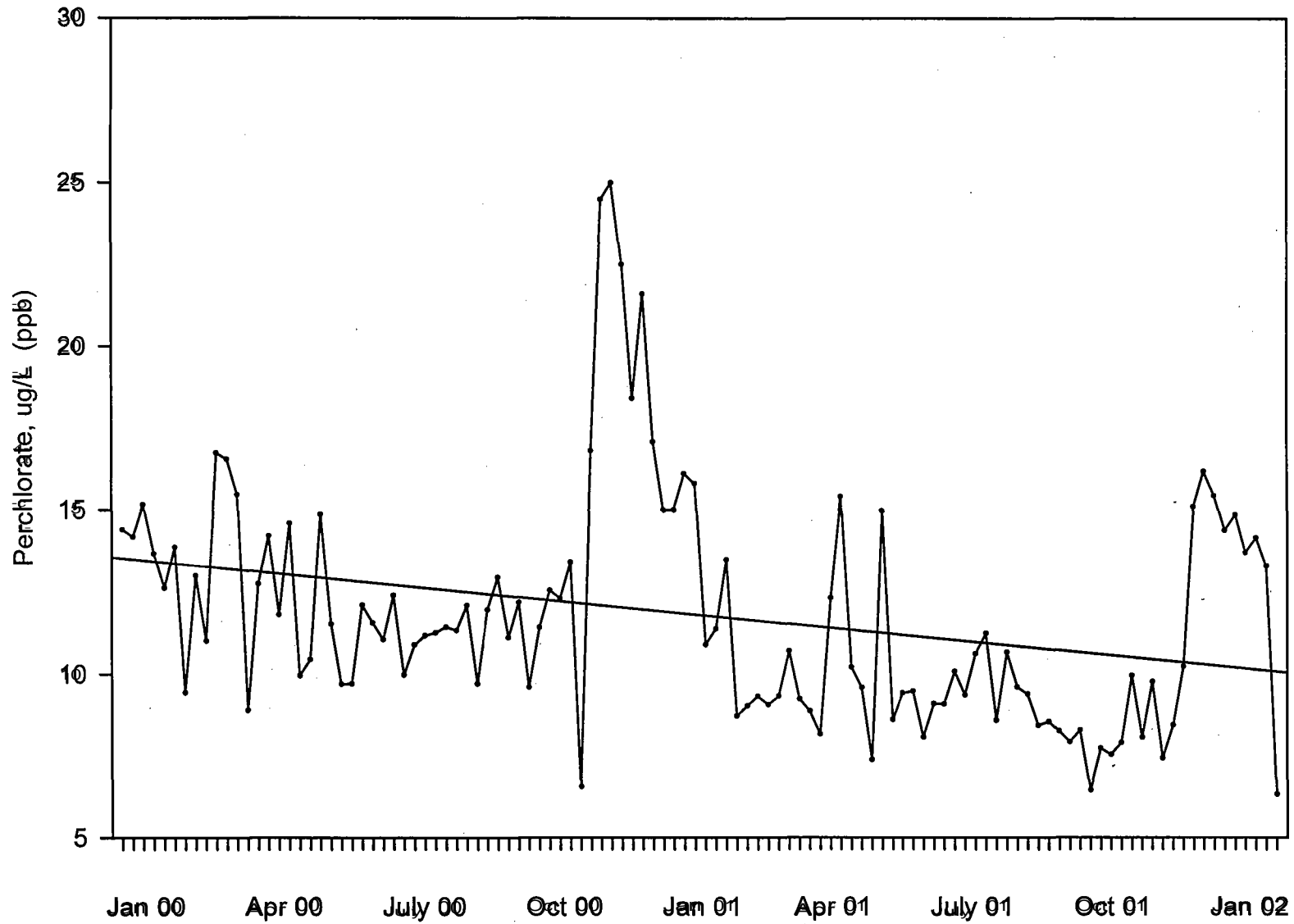
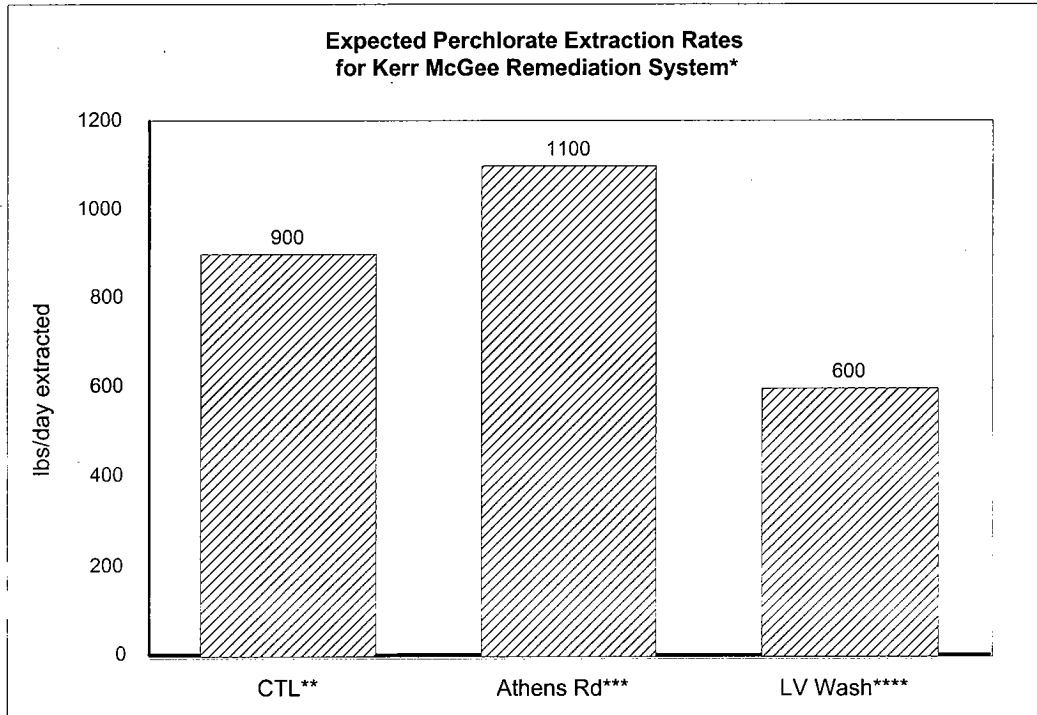


Figure 9  
Perchlorate Concentration at Saddle Island  
Drinking Water Intake - Lake Mead



**TABLE 1**



Pumping Rate	50 gpm	300 gpm	500 gpm
Concentration used in calculation	1500 ppm	300 ppm	100 ppm
Concentration Range	1200-1900 ppm	60-492 ppm	85-140 ppm

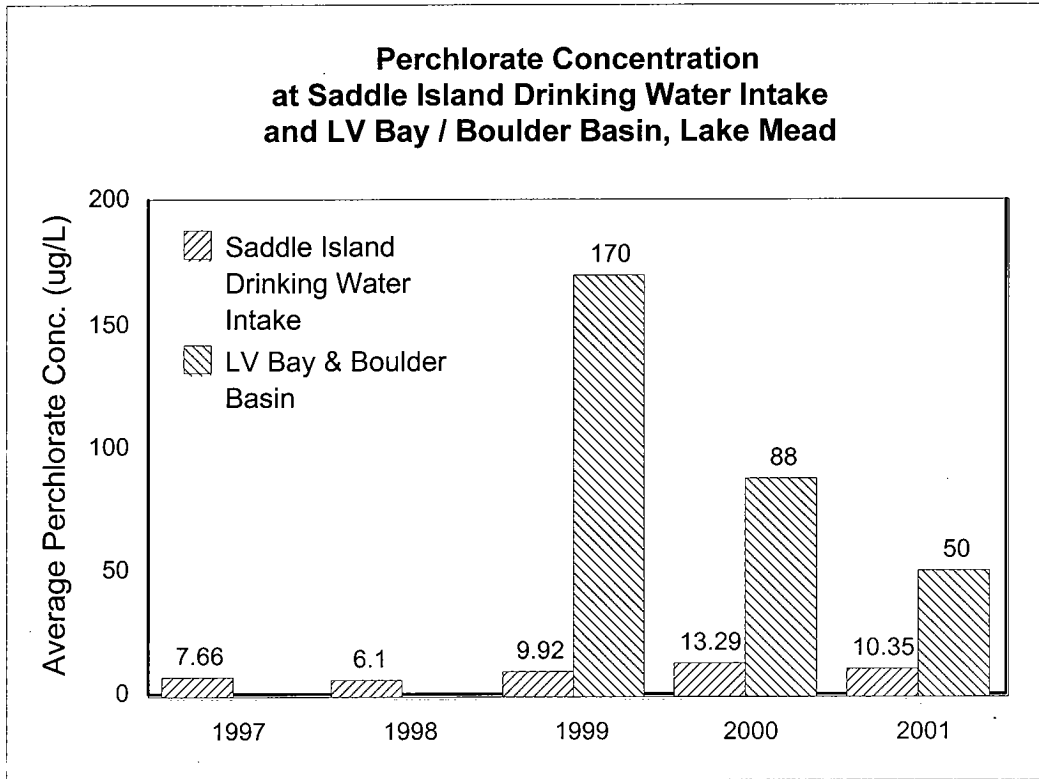
\* Perchlorate flux rate entering Las Vegas Wash was calculated at 900 lbs/day plus or minus 300 lbs/day based on North Shore Road concentrations and flow rates in Las Vegas Wash during 1998 and 1999.

\*\* CTL - Chrome treatment line at Kerr McGee facility.

\*\*\* Athens Road extraction wells are expected to begin operating by April 1, 2002.

\*\*\*\* Includes seep capture system and extraction wells.

TABLE 2



Notes:

1. In November 1999, seep capture begins at Las Vegas Wash.
2. From February to June 2000, de-watering of area near Pabco Road erosion control structure causes release of additional perchlorate into Las Vegas Wash.
3. The Las Vegas Bay and Boulder Basin water samples were taken by the Southern Nevada Water Authority (SNWA) at locations with high specific conductivity and at variable depths. Specific conductivity is used by SNWA to "track" the perchlorate plume and represents the locations most likely to have the highest concentrations.

**HIGHLIGHTS OF MARCH 20, 2002 RMDT PERCHLORATE BRIEFING PAPER**

- In 1997, perchlorate is identified in the Lower Colorado River by the Metropolitan Water District (L.A.). Perchlorate is traced back to Lake Mead, Las Vegas Wash and Kerr McGee Chemical Corporation (KMCC).
- Perchlorate is not a RCRA regulated pollutant.
- Uncontrolled perchlorate flux entering Las Vegas Wash (LVW) estimated at 900 plus or minus 300 lbs/day.
- Three-pronged perchlorate remediation strategy: Intercept/capture/treat perchlorate:
  - \* **Chrome Treatment Line (CTL)** on KMCC property where concentrations are highest
  - \* **At Athens Road** (about midway between KMCC and LVW) where there is a narrowing of the paleochannel
  - \* **Near Las Vegas Wash** where we can effect the quickest reductions of perchlorate entering the Wash
- Ground water plume travel time from Athens Road to LVW is estimated at 6 to 12 months.
- Data in LVW and Lake Mead show large variability; there are many variables influencing these data, many of which we don't understand. Known variables include perchlorate flux, Rapid Infiltration Basin (RIB) use, rainfall, Lake Mead flow dynamics, Lake Mead water levels.
- Significant perchlorate in Lake Mead and Lower Colorado River down to Mexican border (5-10 ug/l). Even if perchlorate from KMCC is stopped tomorrow, it will take many years for the system to flush itself out.
- **Existing Standard:** 4-18 ppb (parts per billion) based on provisional reference dose
- **Proposed Standard:** 1 ppb Health Advisory (2003) based on revised provisional reference dose
- **PRG (Preliminary Remediation Goal) EPA Region 9 (11/2000):** 18 ppb
- **Future Standard:** Maximum Contaminant Level?
- Discharge from new perchlorate treatment plant back to LVW:
  - \* If concentration at outlet is 10 ppm, 95 lbs/day to LVW (NPDES permit requirement)
  - \* If concentration at outlet is 1 ppm, 9.5 lbs/day to LVW (KMCC goal)

**AGENDA  
RISK MANAGEMENT DECISION TEAM (RMDT) MEETING  
KERR MCGEE, PERCHLORATE AND LAKE MEAD  
MARCH 20, 2002**

- |  |                                  |               |
|--|----------------------------------|---------------|
| <b>1. Introduction</b>   | <b>Larry Bowerman</b>            | <b>5 min</b>  |
| <b>2. RMDT Process and Today's Agenda</b>                                  | <b>Ron Leach</b>                 | <b>5 min</b>  |
| <b>3. Personal Introductions</b>   | <b>All</b>                       | <b>5 min</b>  |
| <b>4. Briefing Paper Highlights</b>  | <b>Mitch Kaplan</b>              | <b>10 min</b> |
| <b>5. Nevada Department of Environmental Protection (NDEP) Perspective</b> | <b>Doug Zimmerman/Todd Croft</b> | <b>15 min</b> |
| <b>6. Question 1 Discussion</b>  | <b>All</b>                       | <b>45 min</b> |

**Does the remediation approach currently being implemented by Kerr McGee Chemical Corporation maximize the capture of perchlorate? If not, why shouldn't we pursue additional measures?**

- ▶ **NDEP information on piping and other sources (10 min)**
- ▶ **Question 1 Conclusions, Action Items (5 min)**

- |                                 |            |               |
|---------------------------------|------------|---------------|
| <b>7. Question 2 Discussion</b> | <b>All</b> | <b>30 min</b> |
|---------------------------------|------------|---------------|

**What should be done about Las Vegas and Southern California (Los Angeles) drinking water supplies if the 1 part per billion health advisory level for perchlorate is adopted?**

- ▶ **Question 2 Conclusions, Action Items (5 min)**

- |                      |                  |              |
|----------------------|------------------|--------------|
| <b>8. Next Steps</b> | <b>Ron Leach</b> | <b>5 min</b> |
|----------------------|------------------|--------------|

- ▶ **Ron Leach prepares memorandum summarizing action items and conclusions**
- ▶ **Other**

March 20, 2002 RMDT Meeting  
Regarding Ken McGee + Perchlorate

<u>Name</u>	<u>Organization/Division</u>	<u>Telephone #</u>
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Karin Wong	EPA-Waste mgmt dw. - permits	415-972 3350
Cheryl Nelson	EPA - Waste Mgmt - Regulatory	415 972 3291
Kathi Moore	EPA - Superfund	415 972 3144
Kathy Baylor	EPA - Superfund	415 972-3271
Michael Feeley	EPA - RCRA	415 947-4287
Patrick Wilson	"	415. 972.3354
Bugs Bunny	Looney Tunes	415-972-
Jeff Scott	EPA R9	972-3311
Larry Bowerman	EPA, Region 9	415 972-3339
Rich Valle	"	415 972 3378
Lisa M. Vanderpool	WMD-EPA	2-3316
Steve ARMSTRONG	EPA	2-3352
Mary Blawie	USEPA - ecORISK	2-3357
MITCH KAPLAN	EPA R9 CORRECTIVE ACTION	2-3359
Steve Wall	EPA R9 Solid Waste	2-3380
Wendy Chavez	EPA / Press office	7-4248
Marvin Young	EPA/ Water Div / drinking water	2-3561
CARL WARREN	EPA WST-8	23355
Hanna Agrawal	EPA - WST5	23321
Charles Berrey	EPA SFD7-2	23146
Kevin Moyer	EPA - SFD-7-2	
Steve Linder	EPA WST-8	23369
Latha Rajagopalan	EPA WST-4	2-3344
Kim Sawada	" "	2-3358



Table 12. Perchlorate Concentration and Yearly Loading from Tributaries and Seeps in the Wash

Location	ID	Concentration (ug/L)		Ave. Concentration ug/L	Ave. Flow cfs*	Yearly Loading lbs/yr**	Daily Load lbs/day
		7/30/2001	10/24/2001				
Duck Creek	DC_1	13.62	20.44	17.03	6.150	206.0	.56
Flamingo Wash	FW_0	16.43	12.90	14.67	7.257	209.4	.57
GCS5 Seeps	LWC3.7	966.70	2041.00	1503.85	1.000	2958.8	8.11
Kerr McGee Seeps	LWC6.3	122934.00	72438.00	97686.00	1.500	57657.8	158.
Las Vegas Creek	LW12.1	15.31	10.05	12.68	2.856	71.2	.20
Meadows Detention Basin	LVC_2	9.64	13.11	11.37	0.312	7.0	.02
Monson Channel	MC_2	16.31	11.92	14.12	0.681	18.9	.05
Sloan Channel	SC_1	4.00	5.66	4.83	0.225	2.1	.01
<b>Total Yearly Loading (lbs/yr):</b>						<b>61131</b>	
<b>Total Yearly Loading (tons/yr):</b>						<b>30.57</b>	
<b>Total Daily Load (lbs/day):</b>							<b>167.52</b>

\* Average flow rates are used for tributaries. For seeps, 1 cfs flow has been assumed for LWC3.7 and 1.5 cfs for LWC6.3.

\*\* For Kerr-McGee Seep, assuming 80% of perchlorate removed and 20% of perchlorate discharged to the Wash.

April 1, 2002

**Perchlorate in Henderson (NV), Las Vegas Wash, Lake Mead and Lower Colorado River  
Key Points to Communicate**

**“Nuggets” (Top Five Points)**

\*Levels of perchlorate in drinking water in Las Vegas, Phoenix and Southern California are all within the existing 4-18 ppb provisional reference dose level.

\*In January 2002 the Agency proposed a 1 ppb Health Advisory for perchlorate, but it will be many years before drinking water suppliers are required to meet a new perchlorate treatment level.

\*Nevertheless, we are concerned that perchlorate levels in Lake Mead and the Lower Colorado River are above the proposed 1 ppb Health Advisory.

\*EPA and NDEP have required Kerr McGee Chemical (the principal source of perchlorate) to take significant steps to reduce the amount of perchlorate entering Lake Mead; these control efforts began in November 1999 with capture and treatment of seep water near Las Vegas Wash.

\*Due to the large mass of perchlorate in Lake Mead and the Lower Colorado River from past releases, we estimate that it will take 8 to 20 years for natural flushing action to reduce concentrations to 1 ppb in Lake Mead and the Lower Colorado River.

**I. Health Based Standards**

\*Existing EPA perchlorate standard is 4-18 ppb based on provisional reference dose.

\*Levels of perchlorate in drinking water in Las Vegas, Phoenix and Southern California are all within the existing 4-18 ppb provisional reference dose level.

\*In January 2002 EPA proposed a 1 ppb Health Advisory. This proposal is currently undergoing external peer review and will not become a final Health Advisory until about summer 2003. The level of the Health Advisory could change based on the peer review.

\*A Health Advisory is not an enforceable standard that drinking water suppliers are required to meet.

\*After a Health Advisory is adopted, the next step would be for the Water Program to develop a Maximum Contaminant Level (MCL) standard applicable to drinking water supply systems. This process could take several years.

\*We are concerned that perchlorate levels in Lake Mead and the Lower Colorado River system are above the proposed 1 ppb Health Advisory, even though drinking water supply systems are not currently required to meet this level (1 ppb).

**II. Perchlorate Control Strategy at Kerr McGee (KMCC)**

\*Perchlorate is a recently discovered pollutant; the contamination in Lake Mead and the Lower Colorado River was identified in 1997 when a new analytical method reduced the detection limit from 400 ppb to 4 ppb.

\*Kerr McGee Chemical in Henderson, Nevada has been identified as the principal source of perchlorate in Lake Mead and the Lower Colorado River, and steps have been taken to reduce the amount of perchlorate entering Lake Mead.

\*Kerr McGee is intercepting, capturing and treating perchlorate at 3 different locations to minimize perchlorate entering Lake Mead.

\*About 50% control of perchlorate was achieved beginning in November 1999 with seep capture and treatment in "temporary" ion exchange units.

\*About 60% control of perchlorate was achieved in April 2002 when the new perchlorate treatment plant began operation.

\*By the end of 2003 we expect 90 to 95% control of perchlorate, as the full impact of the 3 pronged control strategy takes effect.

\*We are currently working with Nevada Department of Environmental Protection (NDEP) to determine whether there are additional opportunities to quickly reduce perchlorate entering Lake Mead. A perchlorate mass balance for Las Vegas Wash is being prepared to assist in this process. Other possible sources of perchlorate entering Las Vegas Wash are a plume from Pepcon (a former perchlorate manufacturer located to the west of the BMI Complex) and the BMI Complex Common Area Ponds.

### **III. Perchlorate Levels in Lake Mead and Lower Colorado River System**

\*There currently is a large mass of perchlorate in Lake Mead and the Lower Colorado River due to historical releases from Kerr McGee (approximately 190 tons in Lake Mead alone).

\*Even if all current perchlorate releases entering Lake Mead were stopped today, we estimate that it will take 8 to 20 years for natural flushing action to reduce concentrations to 1 ppb throughout the system (Lake Mead and Lower Colorado River).

\*This length of time is due primarily to the large volume of water in Lake Mead and the Lower Colorado River, as compared to the inflow of clean water from the upper Colorado River.

\*We estimate that it will take 8 to 12 years for all concentrations of perchlorate in Lake Mead to fall to 1 ppb.

\*While the current perchlorate concentrations in the Lower Colorado River are lower (5 to 9 ppb compared to 5 to 50 ppb in Lake Mead), it will take up to 20 years for the Lower Colorado River concentrations to drop to 1 ppb. In large part, this is due to the fact that Lake Mead must be flushed out before the Lower Colorado River concentrations drop significantly.

United States  
Environmental Protection  
Agency

Regional Administrator  
75 Hawthorne Street  
San Francisco, CA 94105-3901

Region 9  
Arizona, California,  
Hawaii, Nevada  
Pacific Islands



**EPA**

## **Background Perchlorate Information for Arizona, California and Nevada**

The U.S. Environmental Protection Agency released a draft toxicity assessment today (Fri. Jan. 18) entitled, "Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization," that assesses risks posed by perchlorate, a chemical primarily used in solid rocket fuel.

The draft assessment has been released for public review. It proposes a new draft reference dose based on studies of toxicity of perchlorate. The agency's current reference dose, equates to approximately 4-18 parts per billion perchlorate in drinking water. The new draft reference dose equates to approximately 1 ppb perchlorate in drinking water. This is not a drinking water standard, but it is the first step in a public process to determine if the agency should set a federal drinking water standard for this contaminant.

Arizona has set a preliminary goal of 14 ppb for drinking water, California and Nevada's action level is 18 ppb in drinking water.

Perchlorate can affect how the thyroid gland functions. In children, the thyroid plays a major role in proper development, including the development of brain cells. Thyroid disorders in expectant mothers may result in effects to the developing fetus and newborn. Effects may include abnormal motor activity, decreased learning capability and other behavioral differences that can be tested and observed in animals.

Perchlorate is listed on the agency's unregulated contaminant list, and water systems have been required to test for the chemical since 2000. Colorado River supplies to Los Angeles, San Diego, Calif. and Phoenix Ariz. show perchlorate levels at five to six ppb, and in Las Vegas perchlorate levels have been measured at between 5-24 ppb.

Sensitive populations, like pregnant women, children and people who have health problems or compromised thyroid conditions, should follow the advice of their health care provider regarding the amount and type of liquids, including water that should be consumed. Since perchlorate may affect thyroid function, pregnant women may wish to ask their health care provider about the usefulness of thyroid hormone monitoring during various stages of their pregnancy and monitoring of children during various stages of growth and development.

This is a national study prepared by the NCEA through EPA's Office of Research and Development. The draft assessment will be available at <http://www.epa.gov/ncea> under "what's new". EPA will also hold an external scientific peer review workshop to review the assessment and to accept additional comments in Sacramento, Calif., on March 5-6. This meeting will be open to the public, and more information is available at <http://www.epa.gov/fedrgstr/> under the heading for Jan. 2.

**Questions and Answers**  
**Perchlorate**  
**1/18/02**

The United States Environmental Protection Agency (EPA) is releasing its revised draft toxicity assessment, "Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization." When finalized, this draft assessment will be an important update of EPA's health assessment that reflects the state of the science regarding the health effects of the chemical perchlorate. The preliminary revised human health risk estimates found in the document are still undergoing review and deliberations both by the external scientific community and within EPA, and do not represent EPA policy at this stage.

**What is Perchlorate?**

Perchlorate is both a naturally occurring and man-made chemical. Most of the perchlorate manufactured in the United States is used as the primary ingredient of solid rocket propellant. Wastes from the manufacture and improper disposal of perchlorate-containing chemicals are increasingly being discovered in soil and water.

**How Can Perchlorate Affect Human Health?**

Perchlorate interferes with iodide uptake into the thyroid gland. Because iodide is an essential component of thyroid hormones, perchlorate disrupts how the thyroid functions. In adults, the thyroid helps to regulate metabolism. In children, the thyroid plays a major role in proper development in addition to metabolism. Impairment of thyroid function in expectant mothers may impact the fetus and newborn and result in effects including changes in behavior, delayed development and decreased learning capability. Changes in thyroid hormone levels may also result in thyroid gland tumors. EPA's draft analysis of perchlorate toxicity is that perchlorate's disruption of iodide uptake is the key event leading to changes in development or tumor formation.

**What are the Preliminary Conclusions of the Draft Toxicity Assessment?**

The EPA draft assessment concludes that the potential human health risks of perchlorate exposures include effects on the developing nervous system and thyroid tumors. The draft assessment includes a draft reference dose (RfD) that is intended to be protective for both types of effects. It is based on early events that could potentially result in these effects, and factors to account for sensitive populations, the nature of the effects, and data gaps were used. The draft RfD is 0.00003 milligrams per kilogram per day (mg/kg/day). The RfD is defined as an estimate, with uncertainty spanning perhaps an order of magnitude, of a daily exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of adverse effects over a lifetime. As with any EPA draft assessment document containing a quantitative risk value, that risk value is also draft and should not at that stage be construed to represent EPA policy. Thus, the draft RfD for perchlorate is still undergoing science review and deliberations both by the external scientific community and within the Agency.

The assessment provides a hypothetical conversion of the draft RfD to a drinking water equivalent level (DWEL), assuming factors of 70 kilogram (kg) body weight and 2 liter (L) of water consumption per day. The converted draft estimate would be 1 microgram per liter (ug/L) or 1 part per billion (ppb). If the Agency were to make a determination to regulate perchlorate, the RfD along with other considerations would factor into the final value.

### **Does perchlorate cause cancer?**

Perchlorate is associated with disruption of thyroid function which can potentially lead to thyroid tumor formation. This draft toxicity assessment accounts for both developmental and tumor formation effects.

### **Does My Water Contain Perchlorate?**

There have been confirmed perchlorate releases in at least 20 states throughout the United States. Additional information and maps detailing those sites are available in Chapter 1 of the draft of the "Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization." EPA, other federal agencies, states, water suppliers and industry are already actively addressing perchlorate contamination through monitoring for perchlorate in drinking water and surface water. The full extent of perchlorate contamination is not known at this time.

### **What Is Being Done about Perchlorate?**

The draft toxicity assessment will undergo peer review, and once it is finalized, the reference dose will be used in EPA's ongoing efforts to address perchlorate problems. EPA's draft reference dose represents a preliminary estimate of a protective health level and is not a drinking water standard. In the future, EPA may issue a Health Advisory that will provide information on protective levels for drinking water. This is one step in the process of developing a broader response to perchlorate including, for example, technical guidance, possible regulations and additional health information. A federal drinking water regulation for perchlorate, if ultimately developed, could take several years.

In 1998, perchlorate was placed on EPA's Contaminant Candidate List for consideration for possible regulation. In 1999, EPA required drinking water monitoring for perchlorate under the Unregulated Contaminant Monitoring Rule (UCMR). Under the UCMR, all large public water systems and a representative sample of small public water systems are required to monitor for perchlorate over the next two years to determine whether the public is exposed to perchlorate in drinking water nationwide.

### **How is perchlorate removed from water?**

Several types of treatment systems designed to reduce perchlorate concentrations are operating around the United States, reducing perchlorate to below the 4 ppb quantitation level. Biological treatment and ion (anion) exchange systems are among the technologies that are being used, with additional treatment technologies under development.

Many other perchlorate studies have been completed during the last several years. A May 2000 summary of 65 perchlorate treatment studies is available online at [www.frtr.gov/perchlorate](http://www.frtr.gov/perchlorate) (click on "Treatment Technology," then look for "GWRTAC Technology Summary"). The summary report was prepared by the Ground-Water Remediation Technologies Analysis Center. Most of the projects described in the report are bench-scale and pilot-scale demonstrations of water treatment technologies, although several entries describe full-scale systems and soil treatment methods. Most of the projects employ biological treatment methods or ion (anion) exchange technology, although reverse osmosis, nanofiltration, granular activated carbon, and chemical reduction are also discussed. Results of federally-funded perchlorate treatment research managed by the American Water Works Research Foundation (AWWARF) are also becoming available (see <http://www.awwarf.com/research/spperch.asp>)

**What are the next steps to developing a final toxicity assessment?**

EPA will accept comments on the draft toxicity assessment document until March 6, 2002. Comments received by February 19, 2002, will be made available at the peer review workshop. This peer review will provide an independent review of the scientific information and interpretation used in the draft document. Please contact the Eastern Research Group (ERG), an EPA contractor, for more information on the comment process at (781) 674-7272.

As part of the review, an external peer review workshop will be held in Sacramento, CA on March 5 and 6, 2002. The peer review meeting is open to the public and an opportunity will be provided for oral public comment. The workshop is being organized and convened by ERG. In order to accommodate interested parties, please register for the workshop either by e-mail ([meetings@erg.com](mailto:meetings@erg.com)) or by calling the ERG registration line at (781) 674-7374. The deadline for registration is February 25, 2002.

**Is perchlorate-contaminated water safe to drink?**

EPA's draft toxicity assessment is preliminary and thus, it is difficult to make definitive recommendations at this stage. It is also important to recognize that estimates contained in this draft assessment are designed to be conservative. In other words, there are adjustment factors built into this estimate to help account for uncertainties in the underlying data and information used. Other factors that influence the answer to this question include how much water is consumed, the degree of perchlorate contamination and the health status of the consumer.

**Can pregnant women and children drink the water?**

Sensitive populations, like pregnant women, children and people who have health problems or compromised thyroid conditions, should follow the advice of their health care provider regarding the amount and type of liquids, including water that should be consumed.

**AGENDA**  
**RISK MANAGEMENT DECISION TEAM (RMDT) MEETING**  
**KERR MCGEE, PERCHLORATE AND LAKE MEAD**  
**MARCH 20, 2002**

- |   |                           |        |
|---|---------------------------|--------|
| 1. Introduction   | Larry Bowerman            | 5 min  |
| 2. RMDT Process and Today's Agenda                                  | Ron Leach                 | 5 min  |
| 3. Personal Introductions   | All                       | 5 min  |
| 4. Briefing Paper Highlights  | Mitch Kaplan              | 10 min |
| 5. Nevada Department of Environmental Protection (NDEP) Perspective | Doug Zimmerman/Todd Croft | 15 min |
| 6. Question 1 Discussion  | All                       | 45 min |

**Does the remediation approach currently being implemented by Kerr McGee Chemical Corporation maximize the capture of perchlorate? If not, why shouldn't we pursue additional measures?**

- ▶ NDEP information on piping and other sources (10 min)
- ▶ Question 1 Conclusions, Action Items (5 min)

- |                          |     |        |
|--------------------------|-----|--------|
| 7. Question 2 Discussion | All | 30 min |
|--------------------------|-----|--------|

**What should be done about Las Vegas and Southern California (Los Angeles) drinking water supplies if the 1 part per billion health advisory level for perchlorate is adopted?**

- ▶ Question 2 Conclusions, Action Items (5 min)

- |               |           |       |
|---------------|-----------|-------|
| 8. Next Steps | Ron Leach | 5 min |
|---------------|-----------|-------|

- ▶ Ron Leach prepares memorandum summarizing action items and conclusions
- ▶ Other



## HIGHLIGHTS OF MARCH 20, 2002 RMDT PERCHLORATE BRIEFING PAPER

- In 1997, perchlorate is identified in the Lower Colorado River by the Metropolitan Water District (L.A.). Perchlorate is traced back to Lake Mead, Las Vegas Wash and Kerr McGee Chemical Corporation (KMCC).
- Perchlorate is not a RCRA regulated pollutant.
- Uncontrolled perchlorate flux entering Las Vegas Wash (LVW) estimated at 900 plus or minus 300 lbs/day.
- Three-pronged perchlorate remediation strategy: Intercept/capture/treat perchlorate:
  - \* **Chrome Treatment Line (CTL)** on KMCC property where concentrations are highest
  - \* **At Athens Road** (about midway between KMCC and LVW) where there is a narrowing of the paleochannel
  - \* **Near Las Vegas Wash** where we can effect the quickest reductions of perchlorate entering the Wash
- Ground water plume travel time from Athens Road to LVW is estimated at 6 to 12 months.
- Data in LVW and Lake Mead show large variability; there are many variables influencing these data, many of which we don't understand. Known variables include perchlorate flux, Rapid Infiltration Basin (RIB) use, rainfall, Lake Mead flow dynamics, Lake Mead water levels.
- Significant perchlorate in Lake Mead and Lower Colorado River down to Mexican border (5-10 ug/l). Even if perchlorate from KMCC is stopped tomorrow, it will take many years for the system to flush itself out.
- **Existing Standard:** 4-18 ppb (parts per billion) based on provisional reference dose
- **Proposed Standard:** 1 ppb Health Advisory (2003) based on revised provisional reference dose
- **PRG (Preliminary Remediation Goal)** EPA Region 9 (11/2000): 18 ppb
- **Future Standard:** Maximum Contaminant Level?
- Discharge from new perchlorate treatment plant back to LVW:
  - \* If concentration at outlet is 10 ppm, 95 lbs/day to LVW (NPDES permit requirement)
  - \* If concentration at outlet is 1 ppm, 9.5 lbs/day to LVW (KMCC goal)

## Todd Croft

---

**From:** Doug Zimmerman  
**Sent:** Thursday, March 14, 2002 5:08 PM  
**To:** Todd Croft  
**Subject:** FW: Meeting on the 20th

Doug Zimmerman  
Chief  
Bureau of Corrective Actions  
Nevada Division of Environmental Protection  
333 W. Nye Lane  
Carson City, NV 89706  
(775) 687-4670, extension 3127  
(775) 687-6396 FAX  
dzimmerm@govmail.state.nv.us

-----Original Message-----

**From:** Kaplan.Mitch@epamail.epa.gov [mailto:Kaplan.Mitch@epamail.epa.gov]  
**Sent:** Monday, March 04, 2002 1:35 PM  
**To:** Doug Zimmerman  
**Subject:** Re: Meeting on the 20th

Hello again Doug- Larry reminded me of two there topics that are probably going to come up during our discussions.

1) Is there a quick an relatively inexpensive remedy for the apparent design oversight of not being able to run the treatment plant and the temporary ion exchange treatment system at Las Vegas Wash at the same time due to pressure limitations in the pipeline?

2) Does KMCC have data regarding perchlorate that may be trapped in sediments and ground water (bank storage) near Las Vegas Wash? The presence of this perchlorate may have been demonstrated during the construction of the erosion control structures from February to June 2000 when perchlorate concentrations in Las Vegas Wash did appear to go up.

Thanks Doug

Mitch Kaplan

Doug Zimmerman  
<dzimmerm@govmail.st  
Kaplan/R9/USEPA/US@EPA  
ate.nv.us>  
20th  
03/04/02 10:35 AM

**To:** Mitch  
**cc:**  
**Subject:** Meeting on the

Mitch- To complete my out of state travel request I need an "official" invitation from EPA. Could you send me a brief e-mail requesting that Todd

and I join EPA staff to el. SS percolate remediation ISS. Thanks

Doug Zimmerman  
Chief  
Bureau of Corrective Actions  
Nevada Division of Environmental Protection  
333 W. Nye Lane  
Carson City, NV 89706  
(775) 687-4670, extension 3127  
(775) 687-6396 FAX  
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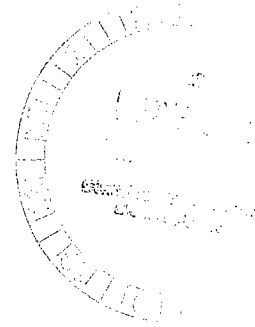


**KERR-McGEE CHEMICAL LLC**

POST OFFICE BOX 66 - HENDERSON, NEVADA 89009

March 5, 2002

Todd Croft  
Supervisor  
Nevada Division of Environmental Protection  
555 E. Washington, Suite 4300  
Las Vegas, NV 89101



Dear Mr. Croft:

Subject: Perchlorate Remediation – Monthly Progress Report

Kerr-McGee Chemical LLC (Kerr-McGee) entered into an Administrative Order on Consent (AOC) with Nevada Division of Environmental Protection (NDEP) in October 2001. In that AOC, Kerr-McGee agreed to provide regular reports describing the progress towards construction completion for the ion exchange / catalytic destruction plant. Progress on AOC-defined work to be performed is provided below.

**Slurry Wall (II.2.A)**

Construction of the slurry wall, downgradient of the on-site chromium recovery line wells was completed prior to October 31, 2001. The current on-site extracted groundwater volume remains about 50 to 55 gpm. Approximately 261 tons of perchlorate have been removed from the environment from the on-site groundwater well collection field.

**Athens Road Groundwater Extraction (II.2.B)**

The concrete tank, which will function as a lift station for the Athens Road area, has been placed and associated earthwork is complete. Construction of the wall around lift station 3 is underway.

Piping construction work continues with the last remaining pipeline being the transfer line from lift station 3 to lift station 2.

The City of Henderson Council approved the lease (with Kerr-McGee) for the Athens Road well field. A "Memorandum of Lease" is under development to finish out the process. The City has allowed construction to take place while the lease process is underway.

Development of the operations and maintenance manual for the well collection fields (including the Athens Road well field) continues.

**Las Vegas Wash and Seep (II.2.C)**

The groundwater wells in the seep area have been installed and pumping began in the last quarter 2001. Toward our commitment to capture thirty-five million gallons of groundwater from the seep area wells, as of February 28 thirty-three million gallons of water from the seep area (with an average February concentration of 65 ppm perchlorate) had been transferred to the GW-11 pond. Approximately 13.22 tons of perchlorate have been removed from the environment from the seep area groundwater well collection field.

The temporary ion-exchange process continues to run treating surface water from the seep area. NPDES permit limits have been met for this operation. Approximately 119 tons of perchlorate have been removed from the environment from the seep stream capture and treatment.

Todd Croft  
March 5, 2002  
Page 2

**Pipeline from Las Vegas Wash to Kerr-McGee Facility (II.2.D)**

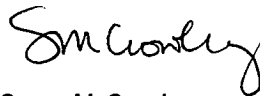
The pipeline to transfer water from the seep area to the Kerr-McGee facility was completed prior to October 31. This included, as well, installation of lift station 2, which provides a booster pump to finish the 210-foot water lift. Lift station 2 continues to be served by a large electrical generator, until an electrical power feed (supplied by Nevada Power) is completed. Work on the power supply continued into March 2002.

**New Ion Exchange / Catalytic Destruction Plant (II.2.E)**

Activity continues on the 825 gpm perchlorate remediation plant. Operator training began in February and continues into March. During February, construction was focused on the ion exchange and the perchlorate destruction module areas, including the brine heaters and the associated reactors for perchlorate destruction. We have now advanced from the construction phase to the start-up phase of the project. Salt (sodium chloride for the brine regeneration process) was delivered and is now stored, awaiting start-up. The ISEP-IX perchlorate removal columns were loaded with resin and are awaiting start-up. Testing, including remaining hydro-testing, of the process equipment will be primary focus during March. As modified in December 20<sup>th</sup> correspondence from Doug Zimmerman, the schedule for treating perchlorate-containing water is March 29<sup>th</sup>.

Please feel free to contact me at (702) 651-2234 if you have any questions related to this information. Thank you.

Sincerely,



Susan M. Crowley  
Staff Environmental Specialist

By FAX and certified mail

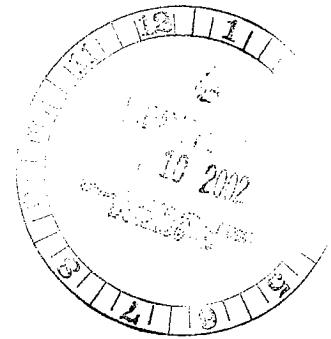
cc: LKBailey  
PSCorbett  
WOGreen  
KAHasbrouck  
E Krish  
TWReed  
JTSmith, Covington and Burling  
FRStater  
WKTaylor  
R Waters  
Rick Simon, ENSR  
Brenda Pohlmann, NDEP  
Doug Zimmerman, NDEP  
Marshall Davis, Metro Water District Of Southern California  
Barry Conaty, City of Henderson  
Pat Mulroy, Southern Nevada Water Authority  
Mitch Kaplan, EPA Region IX



**KERR-McGEE CHEMICAL LLC**

POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

January 4, 2002



Mr. Todd Croft, Supervisor  
Nevada Division of Environmental Protection  
555 E. Washington, Suite 4300  
Las Vegas, NV 89101

Dear Mr. Croft:

Subject: Perchlorate Remediation – Monthly Progress Report

Kerr-McGee Chemical LLC (Kerr-McGee) entered into an Administrative Order on Consent (AOC) with Nevada Division of Environmental Protection (NDEP) in October 2001. In that AOC, Kerr-McGee agreed to provide regular reports describing the progress towards construction completion for the ion exchange / catalytic destruction plant. Progress on AOC-defined work to be performed is provided below.

### **Slurry Wall (II.2.A)**

Construction of the slurry wall, downgradient of the on-site chromium recovery line wells was completed prior to October 31, 2001. The current on-site extracted groundwater volume is about 53.5 gpm. While this volume can be due to multiple causes, we believe the increase is at least partially due to improved capture. Approximately 233 tons of perchlorate have been removed from the environment from the on-site groundwater well collection field.

### **Athens Road Groundwater Extraction (II.2.B)**

Seven piezometers (the ARP-series) were constructed in an east-west line about 300 feet downgradient from the Athens Road well field (ART wells). The piezometers, ranging in depth from 29 feet to 51 feet, are fully screened in the alluvium aquifer. Background water samples and water levels were collected from all wells in the Athens Road area. Analytical results are pending.

PC-70, one of the extraction wells for the Athens Road well field, was vandalized despite the presence of security detail in the area. Repair or replacement of this well is scheduled for January 2002.

The Henderson City Council approved a resolution allowing Kerr-McGee to bid on a lease of the Athens Road area property needed for the well field corridor, the Athens Road area lift station, the transfer line to the Pabco Road lift station and the piezometer corridor. Kerr-McGee provided a bid within the specified time. Subsequently the City

learned that the resolution required re-posting before the City Council and therefore, the process will be repeated. The refreshed bid package will be provided to the Henderson City Clerk in early January. The City of Henderson has allowed construction to take place while the lease development proceeds.

The concrete tank, which will function as a lift station for the Athens Road area, has been received, placed into its excavation and the area has been partially backfilled. Penetrations of the pre-formed concrete tank for the ART-5, 6 and 7 were installed prior to backfilling. The remainder of the penetrations will be completed as the well transfer lines are laid in.

Development of the operations and maintenance manual for the well collection fields (including the Athens Road well field) continues.

#### **Las Vegas Wash and Seep (II.2.C)**

The groundwater wells in the seep area have been installed and pumping (at about 300 gpm) began on October 31, 2001. As of December 31, 24.2 million gallons of water from the seep area had been transferred to the GW-11 pond. During December, water transferred to GW-11 had an average concentration of about 85ppm perchlorate. Approximately 11 tons of perchlorate have been removed from the environment from the seep area groundwater well collection field.

The temporary ion-exchange process continues to run, treating surface water from the seep area. NPDES permit limits have been met for this operation. Approximately 111 tons of perchlorate have been removed from the environment from the seep stream capture and treatment.

#### **Pipeline from Las Vegas Wash to Kerr-McGee Facility (II.2.D)**

The pipeline to transfer water from the seep area to the Kerr-McGee facility was completed prior to October 31, including about 14,000 feet of pipeline. This also included installation of lift station 2, which provides a booster pump to finish the 210-foot water lift. Lift station 2 continues to be served by a large electrical generator until an electrical power feed (supplied by Nevada Power) is completed. Work on the power supply continued into December 2001.

#### **New Ion Exchange / Catalytic Destruction Plant (II.2.E)**

Construction continues on the 825 gpm perchlorate remediation plant. Engineering is nearly complete with the final stage transitioning from office design engineering to field engineering in support of construction. The PLC base programming is complete. Development of the operations and maintenance manual is complete (about 30 volumes) and the manuals are being distributed.

During December, construction was focused on completion of the ISEP unit, on the soft water make-up system and the brine make-up system. The Authority to Construct (ATC) for the brine heaters was signed by Department of Air Quality Management

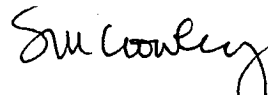
Todd Croft  
January 4, 2002  
Page 3

(DAQM) on December 31 and forwarded to Kerr-McGee. While delivery of the brine heater burners is not expected until the end of January, installation of the heaters themselves will begin in early January. Work was also accomplished in the PDM area, oriented toward bulk material installation. Civil work was completed in preparation for receipt of the ammonia delivery system equipment.

As modified in December 20<sup>th</sup> correspondence from Doug Zimmerman, the schedule for treating perchlorate-containing water is March 29.

Please feel free to contact me at (702) 651-2234 if you have any questions related to this information. Thank you.

Sincerely,



Susan M. Crowley  
Staff Environmental Specialist

By FAX and certified mail

cc: LKBailey  
PSCorbett  
WOGreen  
KAHasbrouck  
E Krish  
TWRreed  
JTSmith, Covington and Burling  
FRStater  
WKTaylor  
R Waters  
Rick Simon, ENSR  
Brenda Pohlmann, NDEP  
Doug Zimmerman, NDEP  
Marshall Davis, Metro Water District Of Southern California  
Barry Conaty, City of Henderson  
Pat Mulroy, Southern Nevada Water Authority  
Mitch Kaplan, EPA Region IX



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