KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

March 30, 1999

Ms. Brenda Pohlmann
Remedial Action Program Supervisor
Nevada Department of Conservation and Natural Resources
Division of Environmental Protection
555 E. Washington, Suite 4300
Las Vegas, Nevada 89101-1049

Dear Ms. Pohlmann:

Thank you for your letter of March 11, 1999. We understand the Division generally approves our Perchlorate Design Assessment for Remedial Action submitted on February 9, 1999.

Kerr-McGee recognizes the urgency to proceed and therefore plans to do the following:

1. Interception of on-site groundwater containing perchlorate and injection of Lake Mead water, which began last December, will continue.

2. Field work to further characterize hydrologic conditions between the Kerr-McGee site and the Pittman Lateral is scheduled to be initiated the week of April 15, 1999. The work includes pump tests, analysis of groundwater samples, and testing to ensure amenability of biological perchlorate reduction. The work should be complete and analytical results evaluated by mid-July 1999. Issues regarding discharge of water from the pumping tests must be resolved before testing can begin but are not expected to impact the test schedule.

3. Based on results from the above hydrologic studies and assuming resolution of treated water disposition issues, detailed engineering for an on-site biological perchlorate reduction facility will be initiated. Detailed engineering and construction of the facility will require about 15 months to complete.

Key to coming to an agreement on a Remedial Action Plan is an acceptable solution to disposition of treated water from a biological perchlorate destruction facility. The agency suggestion that Kerr-McGee manage reinjection of treated water to "ensure that it will not migrate to Las Vegas Wash" does not appear hydrologically feasible for the large volumes of water being considered. Based upon our discussions in Henderson, Nevada, on March 25, 1999, we await the response from the Division to the presentation by Parsons Engineering on behalf of Henderson Industrial Site Steering Committee.

Kerr-McGee is committed to act responsibly and cooperate fully with local, state, and federal officials in determining and performing appropriate remedial actions. Please contact me at (702) 651-2200 if you have questions or comments.

Sincerely,

Susan Crowley
Staff Environmental Specialist

By certified mail
Brenda Pohlman

From: Mayer.Kevin @ epam 1 .gov
To: Brenda Pohlmann
Subject: Thank you for the Letter

===NOTE==========3/16/99=11:18am==========

Brenda - I appreciate the letter that NDEP sent to K-M. You were very much in keeping with the approach we agree with, and have agreed with for a year or more. I spoke with Ed Coppola, who is hoping to set up the biological system with K-M, and I think I gave the impression that I am being extremely demanding and unreasonable.

Good luck with Senator Reid and Bruce Babbitt on the 29th. I will let you know if I find out what it is all about. No one has come screaming to me to write an updated perchlorate briefing paper so it is probably not focused on our favorite anion.

I have had a conversation with Roy Irwin of the Nat. Park Service about perchlorate in Lake Mead. He wants to stay abreast of this issue, especially ecological effects.

Kevin

PAUL R. WATKINS (1909 - 1973)
DANA LATHAM (1898 - 1974)

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March 19, 1999

PRIVILEGED AND CONFIDENTIAL/
SETTLEMENT DISCUSSIONS AND JOINT DEFENSE

David Tundermann, Esq.
Parsons Behle & Latimer
One Utah Center
201 South Main St., Ste. 1800
Salt Lake City, UT 84145-0898

Re: Henderson Insurance Issues

Dear David:

This letter responds to the proposal for Montrose's participation in an insurance policy delivered by Dan Stewart and Basic Management, Inc. ("BMI") at our meeting on March 4, 1999, in Henderson. During this meeting, BMI proposed that Montrose provide approximately $2.4 million to fund a share of an insurance policy for certain costs and liability insurance from AIG Environmental with respect to soil-related matters in the BMI Common Areas. According to the information provided to date by BMI, the premium for this proposed policy was approximately $24 million, plus an additional $8 million in costs related to insurance and BMI's implementation of its preferred remedy.

Montrose has reviewed this proposal, and the specimen policies, and has given them serious consideration. We believe that prospective insurance obtained from the market has an important role to play in resolving this matter such that BMI could proceed with its preferred remedy. However, Montrose does not believe the present proposal and policies fairly represents our mutual interests in this matter, for the following reasons:

1. *The proposal is not a "walk-away," and the proposed insurance is not sufficient.* Although BMI used this term frequently, this proposal is not a "walk-away" from liability. Neither the NDEP nor the EPA have evidenced any willingness to release the participants from their liabilities. Further, in the absence of a comprehensive groundwater proposal, the potential first-party and third-party claims are likely to incorporate elements of both soils and groundwater, thereby making a "soils-only" policy of limited value. While we recognize that AIG is willing to include groundwater in the policy, it would not commit to do so without the possibility of an increased risk transfer premium. The remedial component of the premium is also unknown, and there is no proposal for allocating this large, unknown cost.

Montrose believes, in the absence of a final proposal on the groundwater, it is premature to make any commitment with respect to soils. Further, given (a) the uncertainties presently surrounding what is likely to be required for groundwater, (b) the very preliminary status of the peer review process on groundwater, (c) the lack of a technical consensus within the group on groundwater issues, (d) the absence from participation of other important PRPs (regarding both soils and groundwater issues) and (e) the absence of definitive analysis of the radionuclide issues with respect to both soils and groundwater (along with the absence of a background level consensus generally), Montrose believes that the remedial selection phase is not yet ripe, and consequently, the proposed settlement is not yet ripe.

Finally, the insurance policy is itself insufficient protection, for at least two reasons. First, the specimen policy provided by AIG simply does not provide the coverage represented to be included by both AIG and Sedgwick, and in many cases, seems inconsistent with the purported coverage. In short, the insureds would not get the coverage that they are being promised, which is most troubling. It may be possible that AIG intends to address many of these issues in endorsements to the policy, but specimens of those endorsements have not been made available. Based on the policy language provided to date, Montrose does not believe this policy is worth purchasing without major changes that fundamentally alter the provisions in the policy. Whether AIG has any willingness to consider such changes is an open question, but we wonder whether it is even productive to engage in that expensive process given the specimens.

It would be naive in the extreme to assume that the parties can just "turn this over to the lawyers for wordsmithing." The issues presented by the policy are much more fundamental from our perspective. What the insureds would buy, in fact, is the words of the policy and nothing could be more critical to an evaluation of the proposal than the policy language. Montrose has spent many years litigating against insurers on environmental issues, including against affiliates of both AIG and Kemper. Such litigation is expensive and time-consuming, and our experience has been that the carriers will use every opportunity to avoid paying large claims. The policy specimens we have been provided contain many of the provisions and language that have been the subject of such litigation, and as a result, Montrose is quite skeptical that these

policies will ever provide the first- and third-party coverage that the broker has represented to the group.

Having made that point, Montrose does believe that a policy of this nature has some value. However, Montrose does not believe that many of the "coverages" are essential to long-term management of the site, and Montrose would probably not purchase all of them even if Montrose were purchasing such insurance at one of its sites for which such insurance was appropriate. Much of the stated purpose of the policy is to protect subsequent owners, lenders and developers, with whom the named insureds must share the policy limits. Thus, the policy value (to the extent there is any) is substantially diluted by this structure.

Second, such a policy by itself is insufficient financial protection. The BMI shareholders stand to gain substantial economic benefits in the short term, allowing that entity to dissolve and distribute the proceeds to its shareholders, leaving only Basic Environmental Company ("BEC") to manage the future fallout at this site. The risks, however, are likely to arise long after the development proceeds have disappeared. Thus, any final settlement should include both (1) acceptable joint and several indemnities and full releases from the BMI, its relevant affiliates and their shareholders (net of insurance proceeds) for the matters that BMI considers we are all "walking away" from, and (2) some agreed-upon form of title and other disclosures to reduce our collective exposure from future owners and occupants of these properties. As the parties discuss the details, and as the remedial selection process continues, there may be additional items that are appropriate to consider.

2. *The premises underlying the proposal are irrelevant to Montrose.* Underlying the proposal are the twin premises that (1) the mixed-use development proposal is the right result for this property, and (2) the parties should base their allocation on Alternative 5, which facilitates the development. Montrose remains unpersuaded on the first premise, and rejects the second. Montrose believes that development of the property into the mixed use envisioned by BMI will, in the long run, create enhanced risks for the members of the Steering Committee. In the case of BMI shareholders, which stand to realize tens of millions of dollars in economic benefits, perhaps this risk is offset by the prospect of financial gain. For Montrose, there is no comparable offset.

Montrose rejects the second premise. From our perspective, any allocation should be based on the most cost-effective remedy that achieves the remedial action objective ("RAO"). Based on our review of the draft RAS, that is either Alternative 2 or an appropriately-costed Alternative 3, which have modest costs associated with them. Under no scenario (other than BMI's development plan) is Alternative 5 cost-effective. BMI has suggested that these Alternatives are infeasible because they are unlikely to be accepted by the City of Henderson, or because even if selected, the "lost opportunity" should be considered as part of the cost.

From Montrose's perspective, if this were our property, either Alternative 2 or an appropriately-costed Alternative 3 would be the remedy selected in the RAS. The City of Henderson has no approval rights over the selected remedy, particularly since it is also a PRP at the site. Moreover, once the RAO is achieved, the NDEP should be indifferent. If BMI pursued this plan with its usual vigorous efforts, we have every confidence that the regulators would be persuaded, as state regulators have accepted similar plans numerous times elsewhere, including at other sites in which Montrose has been involved.

As to "lost opportunity" damages, Montrose rejects that notion completely. The disposal activities involved were encouraged by BMI, that the pond areas and landfill were known by the parties for over 20 years to have received industrial wastes, long after the expiration of any applicable limitations periods. BMI itself promoted the disposal of wastes on its property, as did its predecessors-in-interest, who actively promoted this property in part because of the waste disposal facilities. Such a claim is not recognizable under CERCLA, and would be a matter of state law in any case. While BMI may have a different view, Montrose will not accept any proposal that requires it to provide any such compensation.

3. *Montrose's counter-proposal.* Based on the foregoing, Montrose believes that its fair share (considering the interests of all of the relevant PRPs at the site) is approximately 10% of either Alternative 2 or an appropriately-costed Alternative 3, the most cost-effective remedies, or some modest variations on these alternatives. At present, Montrose estimates that this amount would be between $500,000 and $600,000. This proposal is conditioned upon receiving an acceptable insurance policy, full releases and indemnities from the BMI and affiliate shareholders and relevant entities, appropriate title and other disclosures appropriate in the context of the proposed development, and a groundwater solution that is reasonably acceptable.

Montrose perceives an environmental insurance policy as having a marginal value, but one that is likely (for Montrose) to be more than offset by the increased risk brought by the proposed development. If not for BMI's proposed development, the group would not be considering purchasing such a policy, and certainly would not be doing so at this time. The driving force behind obtaining the policy, and the timing of the policy, is BMI's development proposal, rather than the underlying environmental facts. Those facts support Alternative 2 or an appropriately-costed Alternative 3 as the appropriate remedy, which would not require any insurance policy to implement. Thus, Montrose believes it can protect its interests adequately by supporting these appropriate, cost-effective remedies without the policy, should that be necessary, as it has done at many other sites. However, Montrose remains willing to have a dialogue and discuss this counterproposal at our next meeting.

By copy of this letter to the Legal Subcommittee, I am requesting that they forward this letter (or its substance) to their clients as and to the extent they deem appropriate. Due to a minor family medical problem that has recently arisen, I will not be able to attend the

March 24, 1999 meeting, but intend to attend the NDEP meeting on March 25th. I apologize for any inconvenience, but expect to have one of my partners attend in my place. Please call me or Frank Bachman a call if you have questions before the meeting on March 24, 1999.

Very truly yours,

Joel H. Mack

cc: Frank Bachman
Henderson Legal Subcommittee

PETER G. MORROS
Director

STATE OF NEVADA
KENNY C. GUINN
Governor

ALLEN BIAGGI
Administrator

(702) 486-2850

FAX (702) 486-2863

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL PROTECTION

(Las Vegas Office)

555 E. Washington, Suite 4300

Las Vegas, Nevada 89101-1049

March 11, 1999

Ms. Susan M. Crowley
Staff Environmental Specialist
Kerr McGee Chemical LLC
P.O. Box 55
Henderson, NV 89009

RE: Perchlorate Design Assessment for Remedial Action

Dear Ms. Crowley:

The Nevada Division of Environmental Protection (NDEP) has received your Perchlorate Design Assessment for Remedial Action which was submitted to this office on February 9, 1999. This document outlines your proposed plan for a four-part remedial action for perchlorate both on and off-site of the Kerr McGee Chemical LLC facility in Henderson. Based on a review of this document and a meeting held on March 3, 1999, the Division has the following comments.

The Division concurs with the continued interception of perchlorate-impacted groundwater beneath the facility and use of the 11-acre basin for temporary storage and evaporation. The estimated removal of 1200 lbs/day of perchlorate from the shallow groundwater system is very encouraging.

Additionally, the Division understands that biological perchlorate reduction has proven to be the most effective remedial technology currently available. To that end, your plan proposes to initiate engineering and design work for a biological reduction process for groundwater currently intercepted on-site. The Division is very concerned with perchlorate-impacted groundwater that has migrated off of the Kerr McGee property and is beyond the reach of the interception system currently in place. For that reason, the Division believes that engineering and design work for interception and treatment of perchlorate-impacted groundwater at the Pittman Lateral should be initiated prior to focusing on treatment of the water intercepted and contained in the on-site impoundment. As we discussed on March 3, 1999, an option to consider would be location of a perchlorate reduction facility on-site to treat water intercepted at the Pittman Lateral. This would allow for a more immediate removal of perchlorate from the system as close to the Las Vegas Wash as possible.

The Division is aware that there are concerns with the potential discharge of water which has been treated for perchlorate but may contain elevated levels of TDS and other contaminants. In order to expedite perchlorate removal, the Division will consider a discharge plan that involves reinjection of

treated groundwater at an up gradient location as long as Kerr McGee can demonstrate hydraulic control over this water and can ensure that it will not migrate to Las Vegas Wash.

Lastly, the Division strongly encourages initiation as soon as possible of the activities proposed for completing the understanding of the hydrologic system between the Kerr McGee facility and the Pittman Lateral such as additional pump tests. A complete understanding of the subsurface hydrology will allow for a more effective treatment once a remedial technology is selected and installed.

A revised Remedial Action plan which addresses the issues presented in this letter should be submitted for our review and approval by April 5, 1999. The plan should contain a schedule which shows interception of perchlorate impacted water at the Pittman Lateral no later than the third quarter of 1999.

Please feel free to contact me at (702) 486-2857 if you have any questions concerning this matter.

Sincerely,

Brenda Pohlmann

Brenda Pohlmann
Remedial Action Program Supervisor
Las Vegas Bureau of Corrective Actions

BLP:blp

cc: Doug Zimmerman, Chief, Bureau of Corrective Actions
Kevin Mayer, USEPA, 75 Hawthorne Street, H-6-4, San Francisco, CA 94105
Kay Brothers, Southern Nevada Water Authority, 1001 S. Valley View Blvd., Las Vegas, NV 89153

3/3/99 Ken McGee Meeting

Everett Spore Susan Crowley Brenda Pohlman

Pat Corbett Doug Zimmerman

Doug wants to see work as close to the wash as possible. Averaging 55-60 gpm into ponds.
NDEP will help w/ obtaining a UIC permit, even if water still contains high TDS if reinjected in an upgradient area

Monitoring at injection line + another line just north + wells north of that for water levels. Haven't gotten analytical back yet but data are not showing affect yet. Need time for water to infiltrate through vadose zone to wells.

ARA has done 5 or 6 batch tests on water from Pittman Lateral. Have seen degradation down to below detection.

Need to talk ~~about~~ to MWD about Colorado River data.

Would like to see at least some portion of ClO_4 plume being remediated initially and then more complete capture when rest of BMI comes on-line.

NDEP concurs with proposal #3 - should be initiated ASAP.

3:30-450 gpm flow estimated at Pittman Lateral

Jan. 7, 1999

~~FKX Meeting~~ Thurs. morning — Susan Crowley, Pat Corbett, Kim Zikmund, B. Pollman, Doug Z.

Pond started up Dec. 30 from extraction line at ≈ 60 gpm. Lake Mead water going into trenches at ≈ 32 gpm. Permit modified to allow up to 100 gpm. Will monitor downgradient - already doing it because of original Consent Order.

Pat says removing 3/4 ton/day - concentration

- Jaci Batista working w/ SNWA to analyze frozen ClO_4 samples obtained from CCSan District. SNWA also working w/ chemist who has rad lab to look at radiation in samples.

- ICET cell still not showing a lot of promise. Looking seriously at ARA's bioremediation technology. Can take numbers down to 18 ppb or less. Seeing about a 16 hour residence time.

- Define amount of water-bearing zone
  AP + Gibson vacant lot surrounded by new business park
  Across from Ford Dealership
  One on BMI land
  Looking for Z component

  Will do corehole - continuous to check for water bearing zone. Will construct nested wells 4 Will go down ≈ 200' Has a jumbo rig on site will seal off upper zone

- Thickness of perchlorate
- Verify paleochannel theory - using KMCC map

  Up to 4 wells at each of the three locations.
  Looked at treatment technologies

- Was new well installed near Hatcher - still don't know where its coming from.

- Already drilling 10 days on / 4 off
  rig from Fontana Will be there
  Will have Wed. field meeting

BASIC MANAGEMENT, INC.
P.O. BOX 2065
HENDERSON, NV 89012

FAX # (702) 565-9489

DATE: 02/11/99	TIME: 9:30 am

TO: NAME:	FIRM NAME:	FAX NUMBER:
1. Bob Kelso	NV Division of Environmental	(775) 687-6396
2	Protection	
3.		
4.		
5.		
6.		
7.		

FROM: Robin Bain by dow.

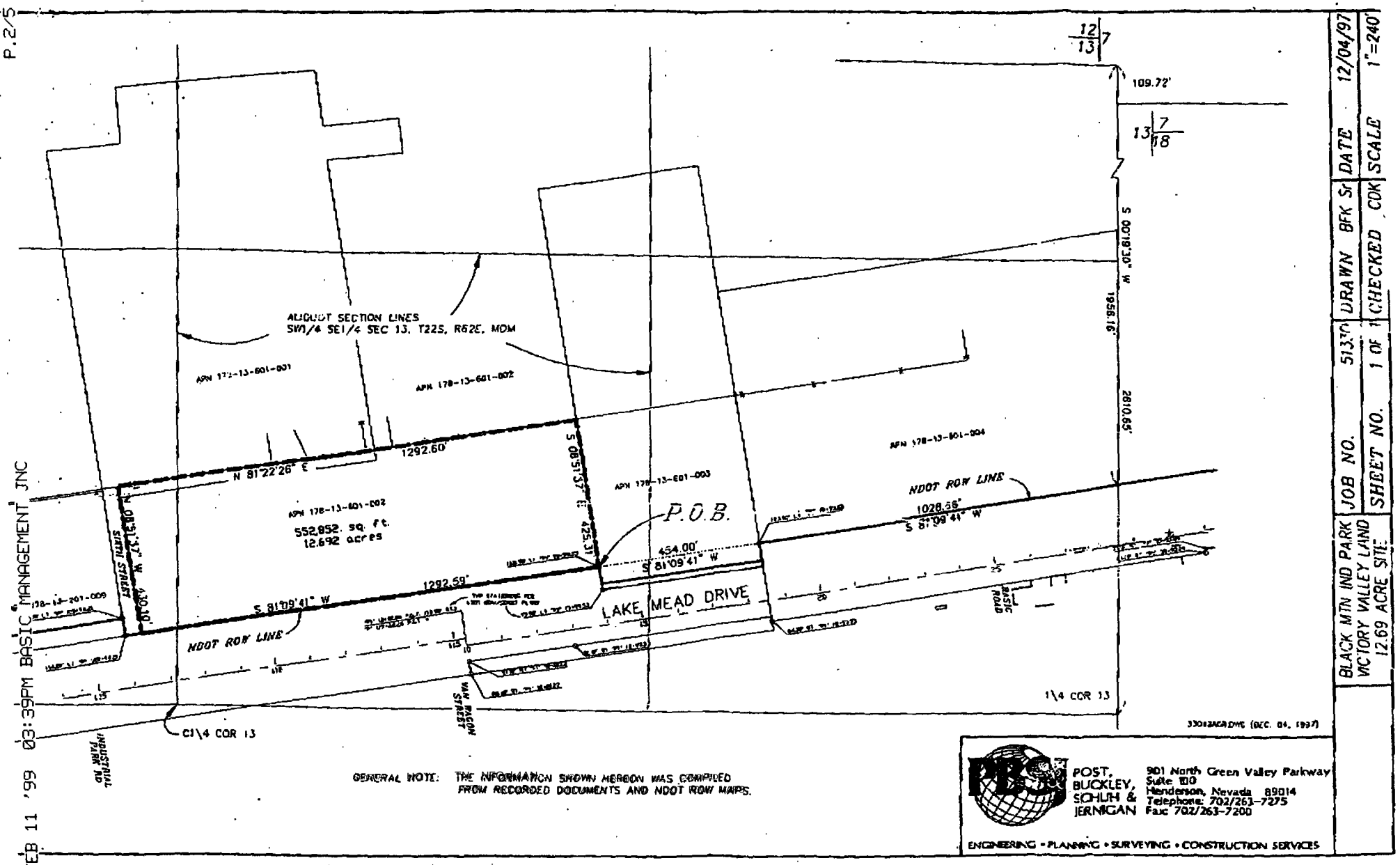
RE: Two (2) faxes re: Exclusion Request for Southern KMCC Property

TOTAL NUMBER OF PAGES INCLUDING THIS COVER LETTER: 8

COMMENTS:

Original sent by 1st Class Mail	Orig. Sent by certified mail	Orig. Sent by Fed. Ex.	Not sending orig. X

IF YOU DO NOT RECEIVE ALL PAGES INDICATED, PLEASE CALL (702) 565-6485



GENERAL NOTE: THE INFORMATION SHOWN HEREON WAS COMPILED FROM RECORDED DOCUMENTS AND NDOT ROW MAPS.

POST, BUCKLEY, SCHUH & JERNIGAN
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Fax: 702/263-7200
ENGINEERING • PLANNING • SURVEYING • CONSTRUCTION SERVICES

BLACK MTN IND PARK	DRAWN BFK Sr
VICTORY VALLEY LAND	CHECKED COK
12.69 ACRE SITE	
JOB NO. 513.70	DATE 12/04/97
SHEET NO. 1 OF 1	SCALE 1"=240'

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 · HENDERSON, NEVADA 89009

May 14, 1998

Mr. Robert Kelso
Supervisor Remediation Branch
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89706-0866

Dear Mr. Kelso:

Subject: Exclusion Request for Black Mountain Industrial Center - KMC Property

Kerr-McGee Chemical LLC(KMC) requests a no further action determination and a written assurance regarding future liability for a portion of KMC's property (the Property) within Clark County, Nevada, also within the limits of the City of Henderson. The Property is more fully described in the legal description, which is attached as Exhibit A and incorporated by this reference. KMC also requests release of the Property from the terms, requirements, and obligations of the Consent Agreement entered into by the NDEP respecting the Kerr-McGee Chemical Corporation Henderson facility, dated August 12, 1996.

KMC's request is based on an assessment of the Property, the Environmental Conditions Assessment (ECA), Kerr-McGee Chemical Corporation, Henderson, Nevada (Kleinfelder, Inc., April 15, 1993). In addition, NDEP has previously issued a no further action determination (to the City of Henderson) on a parcel immediately adjacent to the Property. The adjacent parcel is included in the Warm Springs right-of-way. KMC believes the ECA report and the characterization of the adjacent parcel, with its subsequent NDEP release, provide an adequate characterization of the environmental conditions relating to the Property which this exclusion request covers and fulfills the environmental assessment requirements of the NDEP's letter to Basic Management, Inc, dated March 8, 1994. The letter states, "if the environmental assessment for a particular parcel indicates no public health or environmental problems are present, the Division will issue a letter indicating development may proceed on the property." KMC desires to allow development of the property and requests a letter stating that no further actions are necessary with respect to the Property, certifying that development may proceed without environmental restriction and assuring third parties that the NDEP will not seek to hold them liable for any environmental conditions on the Property.

If you have any questions please call me at (702) 651-2234. Thank you for your consideration and assistance.

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

Attachment
By certified mail
cc: PSCorbett
PBDizikes
RHJones
RANapier
TWReed
Gregory W. Schlink, BMI
SThornhill

SMC\EXCLUSION REQUEST SNAP KM.DOC

BOUNDARY DESCRIPTION
FOR
BLACK MOUNTAIN INDUSTRIAL CENTER
KER MCGEE - 4.99 ACRES

A PORTION OF APN 178-12-601-001, BEING A PORTION OF SECTION 12, TOWNSHIP 22 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA, MORE PARTICULARLY DESCRIBED AS FOLLOWS.

BEGINNING AT THE NORTHWEST CORNER OF THE SOUTH HALF (S ½) OF THE NORTHWEST QUARTER (NW ¼) OF SAID SECTION 12; THENCE SOUTH 89°53'06" EAST, ALONG THE NORTH LINE OF THE SOUTH HALF (S ½) OF THE NORTHWEST QUARTER (NW ¼) OF SAID SECTION 12, A DISTANCE OF 770.16 FEET TO THE NORTHWEST CORNER OF ASSESSOR'S PARCEL 178-12-601-002; THENCE DEPARTING SAID NORTH LINE, ALONG THE EAST LINE OF SAID PARCEL 178-12-601-002, SOUTH 09°19'23" EAST, A DISTANCE OF 547.01 FEET; THENCE NORTH 57°48'55" WEST, A DISTANCE OF 90.97 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 15050.00 FEET; THENCE ALONG SAID CURVE TO THE LEFT, THROUGH A CENTRAL ANGLE OF 3°32'03" AN ARC LENGTH OF 928.30 FEET; THENCE NORTH 00°29'56" EAST, A DISTANCE OF 34.48 FEET TO THE POINT OF BEGINNING.

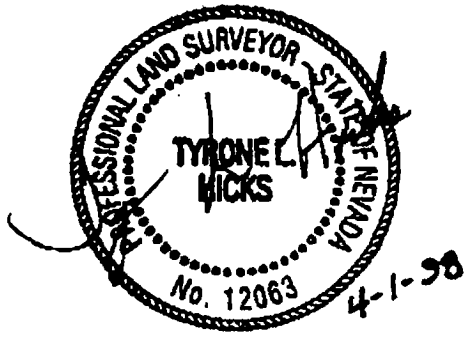
SAID PARCEL CONTAINING APPROXIMATELY 4.99 ACRES.

BASIS OF BEARINGS

THE BASIS OF BEARING FOR THIS LEGAL DESCRIPTION IS GRID NORTH AS DEFINED BY THE NEVADA COORDINATE SYSTEM OF 1983 (NC83) EAST ZONE (2701).

NOTE:

THE ABOVE BOUNDARY DESCRIPTION DOES NOT REPRESENT A LEGAL PARCEL OF LAND PER NEVADA REVISED STATUTES, CHAPTER 278, UNTIL SUCH A TIME A SUBDIVISION MAP IS RECORDED.



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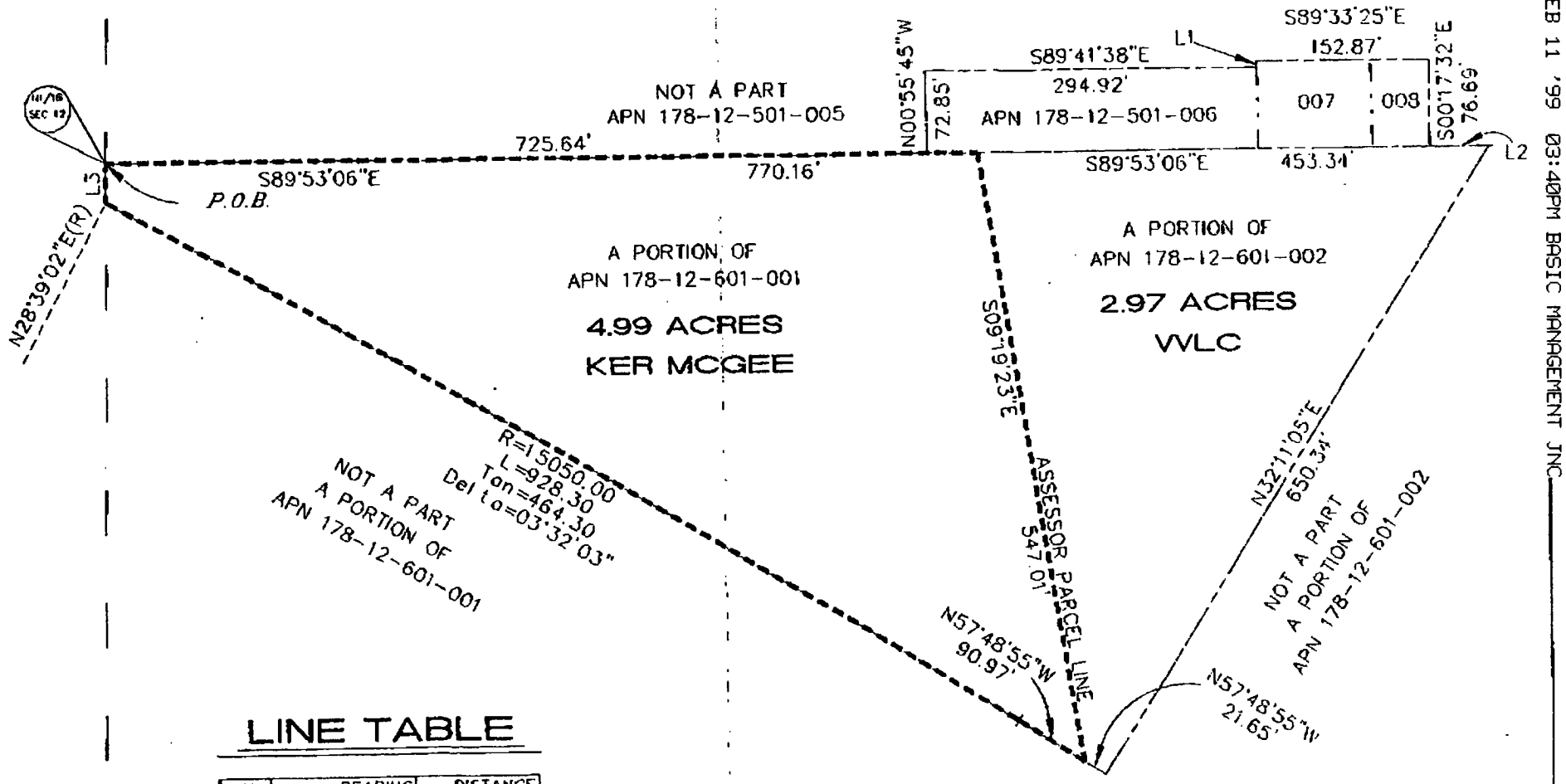
March 31, 1998 - bfk sr.

EXHIBIT TO ACOMPANY LEGAL DESCRIPTION

A PORTION OF SECTION 12,
TOWNSHIP 22 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA



LINE TABLE

No.	BEARING	DISTANCE
L1	S00°55'45"E	5.71'
L2	S89°53'06"E	50.95'
L3	N00°29'56"E	34.48'

N

NOT TO SCALE:

SHEET 1 of 1

BASIC MANAGEMENT, INC.
P.O. BOX 2065
HENDERSON, NV 89012

FAX # (702) 565-9489

DATE: 02/11/99	TIME: 9:30 am

TO: NAME:	FIRM NAME:	FAX NUMBER:
1. Bob Kelso	NV Division of Environmental	(775) 687-6396
2	Protection	
3.		
4.		
5.		
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7.		

FROM: Robin Bain by dau

RE: Two (2) faxes re: Exclusion Request for Southern KMCC Property

TOTAL NUMBER OF PAGES INCLUDING THIS COVER LETTER: 8

COMMENTS:

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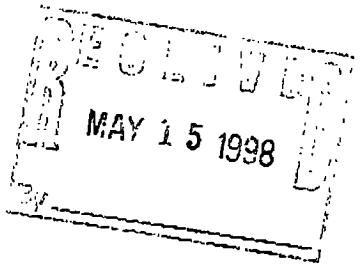
KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

May 14, 1998



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Supervisor Remediation Branch
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89706-0866

Dear Mr. Kelso:

Subject: Exclusion Request for Black Mountain Industrial Center - KMC Property

Kerr-McGee Chemical LLC(KMC) requests a no further action determination and a written assurance regarding future liability for a portion of KMC's property (the Property) within Clark County, Nevada, also within the limits of the City of Henderson. The Property is more fully described in the legal description, which is attached as Exhibit A and incorporated by this reference. KMC also requests release of the Property from the terms, requirements, and obligations of the Consent Agreement entered into by the NDEP respecting the Kerr-McGee Chemical Corporation Henderson facility, dated August 12, 1996.

KMC's request is based on an assessment of the Property, the Environmental Conditions Assessment (ECA), Kerr-McGee Chemical Corporation, Henderson, Nevada (Kleinfelder, Inc., April 15, 1993). In addition, NDEP has previously issued a no further action determination (to the City of Henderson) on a parcel immediately adjacent to the Property. The adjacent parcel is included in the Warm Springs right-of-way. KMC believes the ECA report and the characterization of the adjacent parcel, with its subsequent NDEP release, provide an adequate characterization of the environmental conditions relating to the Property which this exclusion request covers and fulfills the environmental assessment requirements of the NDEP's letter to Basic Management, Inc, dated March 8, 1994. The letter states, "if the environmental assessment for a particular parcel indicates no public health or environmental problems are present, the Division will issue a letter indicating development may proceed on the property." KMC desires to allow development of the property and requests a letter stating that no further actions are necessary with respect to the Property, certifying that development may proceed without environmental restriction and assuring third parties that the NDEP will not seek to hold them liable for any environmental conditions on the Property.

If you have any questions please call me at (702) 651-2234. Thank you for your consideration and assistance.

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

Attachment
By certified mail
cc: PSCorbett
PBDizikes
RHJones
RANapier
TWReed
Gregory W. Schlink, BMI
SThornhill

SMC\EXCLUSION REQUEST SNAP KM.DOC

EXHIBIT A

BOUNDARY DESCRIPTION
FOR
BLACK MOUNTAIN INDUSTRIAL CENTER
KER MCGEE - 4.99 ACRES

A PORTION OF APN 178-12-601-001, BEING A PORTION OF SECTION 12, TOWNSHIP 22 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA, MORE PARTICULARLY DESCRIBED AS FOLLOWS.

BEGINNING AT THE NORTHWEST CORNER OF THE SOUTH HALF (S ½) OF THE NORTHWEST QUARTER (NW ¼) OF SAID SECTION 12; THENCE SOUTH 89°53'06" EAST, ALONG THE NORTH LINE OF THE SOUTH HALF (S ½) OF THE NORTHWEST QUARTER (NW ¼) OF SAID SECTION 12, A DISTANCE OF 770.16 FEET TO THE NORTHWEST CORNER OF ASSESSOR'S PARCEL 178-12-601-002; THENCE DEPARTING SAID NORTH LINE, ALONG THE EAST LINE OF SAID PARCEL 178-12-601-002, SOUTH 09°19'23" EAST, A DISTANCE OF 547.01 FEET; THENCE NORTH 57°48'55" WEST, A DISTANCE OF 90.97 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 15050.00 FEET; THENCE ALONG SAID CURVE TO THE LEFT, THROUGH A CENTRAL ANGLE OF 3°32'03" AN ARC LENGTH OF 928.30 FEET; THENCE NORTH 00°29'56" EAST, A DISTANCE OF 34.48 FEET TO THE POINT OF BEGINNING.

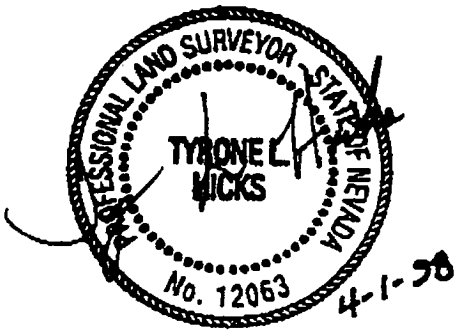
SAID PARCEL CONTAINING APPROXIMATELY 4.99 ACRES.

BASIS OF BEARINGS

THE BASIS OF BEARING FOR THIS LEGAL DESCRIPTION IS GRID NORTH AS DEFINED BY THE NEVADA COORDINATE SYSTEM OF 1983 (NC83) EAST ZONE (2701).

NOTE:

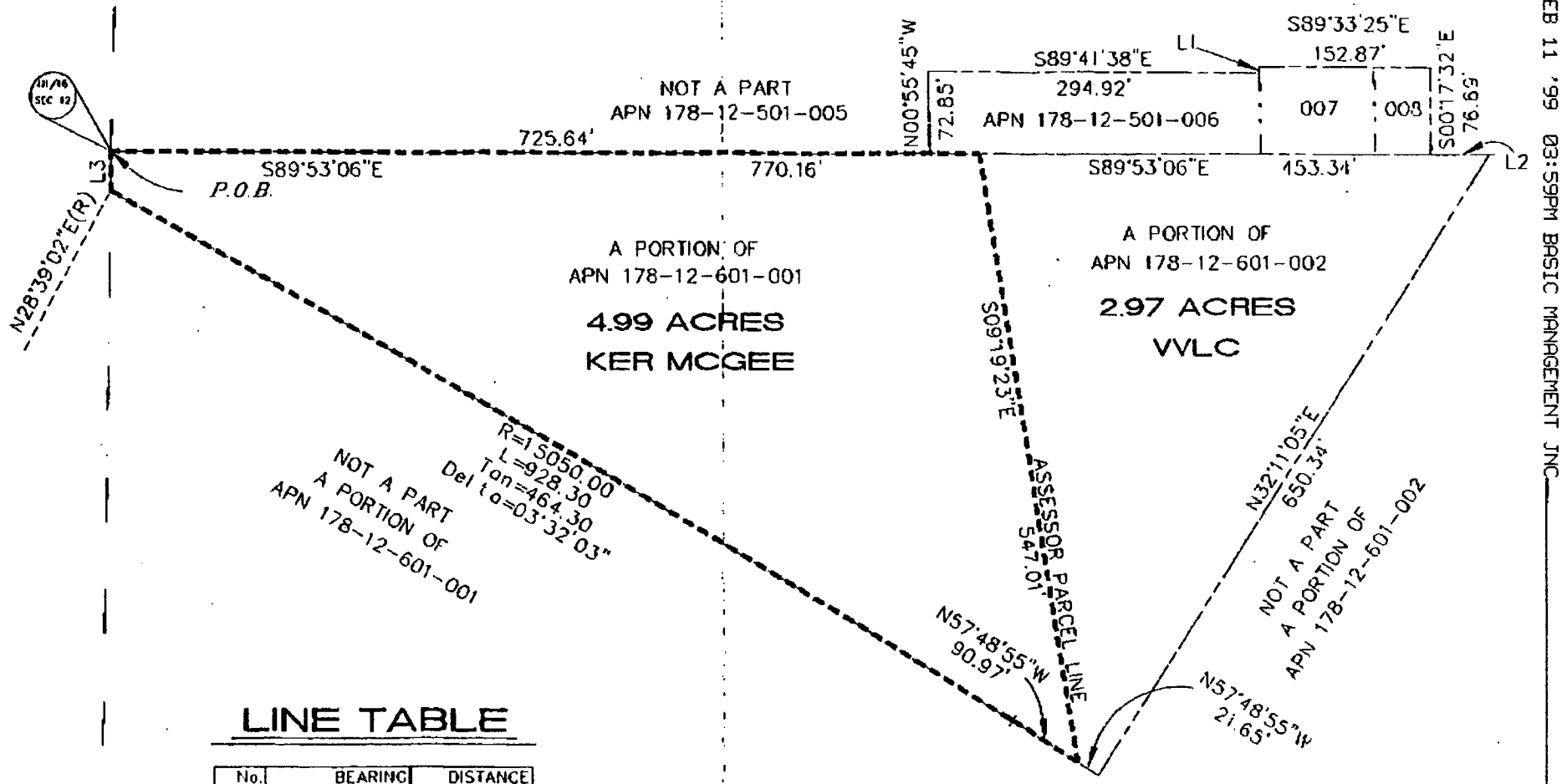
THE ABOVE BOUNDARY DESCRIPTION DOES NOT REPRESENT A LEGAL PARCEL OF LAND PER NEVADA REVISED STATUTES, CHAPTER 278, UNTIL SUCH A TIME A SUBDIVISION MAP IS RECORDED.



C:\LEGALS\1230G30KM.LGL
March 31, 1998 - bfk sr.

EXHIBIT TO ACOMPANY LEGAL DESCRIPTION

A PORTION OF SECTION 12,
TOWNSHIP 22 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA



LINE TABLE

No.	BEARING	DISTANCE
L1	S00°55'45"E	5.71'
L2	S89°53'06"E	50.95'
L3	N00°29'56"E	34.48'

N

NOT TO SCALE:

SHEET 1 of 1

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

February 5, 1999

Ms. Brenda Pohlmann
Remediation Branch Supervisor
Nevada Division of Environmental Protection
555 E. Washington, Suite 4300
Las Vegas, NV 89101

Dear Ms. Pohlmann:

Subject: Perchlorate Design Assessment for Remedial Action

Attached please find two copies of Kerr-McGee Chemical LLC's report, "Perchlorate Design Assessment for Remedial Action."

Kerr-McGee is committed to act responsibly and cooperate fully with local, state, and federal officials in determining appropriate remedial actions. Please feel free to contact me at (702) 651-2200 if you have any questions related to this information. Thank you.

Sincerely,

SM Crowley

Susan M. Crowley
Staff Environmental Specialist

Enclosures (2)
By certified mail

cc: LKBailey
PSCorbett
ALDooley
WOGreen
RHJones
EMSpore
TWReed
JReichenberger
JBWorthington
Robert Kelso (NDEP)
Doug Zimmerman (NDEP)
Jeanne-Marie Bruno (Metro Water District Of Southern California)
Barry Conaty (City of Henderson)
Pat Mulroy (Southern Nevada Water Authority)
Kevin Mayer (EPA Region IX)

C:\DATA\DOCS\SMC\LTR\REMEDY REPORT CV LTR.DOC

Perchlorate Design Assessment for Remedial Action

Kerr-McGee Chemical LLC

Henderson, Nevada

February 5, 1999

Prepared by:

Kerr-McGee Chemical LLC

8000 West Lake Mead Drive

Henderson, NV 89015

OVERVIEW

With the development of a new measurement technique (parts per billion levels), and detection of perchlorate at parts per billion levels in the Colorado River Basin during 1997, Kerr-McGee Chemical LLC (Kerr-McGee) began to address the perchlorate issue with the Nevada Department of Environmental Protection (NDEP). In August 1997, Kerr-McGee conducted extensive hydrogeologic characterization of the perchlorate in the shallow alluvial aquifer on the Kerr-McGee site. Concurrently, Kerr-McGee engineers began to identify possible perchlorate treatment technologies, and as an active member of the Perchlorate Study Group (PSG), Kerr-McGee sponsored independent toxicology studies to be used by EPA in setting appropriate health based standards for perchlorate.

A thorough understanding of the three aspects of the perchlorate issue is critical to identify successful remedial actions. These are:

Characterization – Onsite /Offsite
Treatment Technology, and
Toxicology –Perchlorate health based Standards

Kerr-McGee has worked to develop a better understanding in all three aspects of the perchlorate issue. As of 1997, there was no data relating to the perchlorate transport mechanism to the Las Vegas Wash, and there were no known or available perchlorate treatment or destruction technologies. No federal or national standard(s) existed for remedial actions or for perchlorate levels in drinking water.

Although there has been substantial progress made over the past year, investigations continue that add to our knowledge of perchlorate. This report summarizes our understanding of the perchlorate issues, and identifies an appropriate design for remedial action based upon the current information. Kerr-McGee believes the understanding of perchlorate issues will continue to grow as our collective knowledge of perchlorate expands.

A summary of Kerr-McGee's perchlorate reports to the NDEP include:

Reference	Date	Title
(1)	October 1, 1997	Groundwater Investigation for Perchlorate Impact at KMCLLC Henderson Nevada (On-site)

(2)	January 16, 1998	KMCLLC Perchlorate Characterization Project: Historical Review Report/Sampling Plan (Phase I Off-site)
(3)	July 15, 1998	KMCLLC Perchlorate Characterization Report (Phase II Off-site)/Supplement 10/19/98.
(4)	November 30, 1998	Henderson On-Site Groundwater Perchlorate Treatment Technology Review
(5)	December 30, 1998	Henderson Off-site Groundwater Perchlorate Treatment Technology Review

These submittals [Items (1) – (5)] are referenced throughout this report. This extensive characterization and evaluation of treatment technologies for perchlorate in groundwater has provided additional options for remedial actions. Kerr-McGee has invested about $3 million to date on characterization, treatment technology, and containment basin construction. Additionally, Kerr-McGee has contributed to the $ 2 million fund to support additional toxicology studies sponsored by the Perchlorate Study Group and the Department of Defense .

CHARACTERIZATION

Originally sited and operated by the U.S. Government as a magnesium production facility, the BMI complex operated from 1942 – 1944 in support of the war effort. In 1945, Western Electrochemical Company (WECCO) acquired a lease from the government and began producing chlorates, perchlorates, and manganese dioxide at this location. The U.S. Navy owned and operated a portion of this facility for the production of perchlorate from 1951 until 1962. Subsequent mergers followed, and Kerr-McGee ultimately acquired the plant by merger in 1967.

Kerr-McGee has worked with the NDEP to assess perchlorate in the shallow alluvial aquifer on the Kerr-McGee site (Phase I). Additional work (Phase II) was done to: 1) identify the subsurface pathway of the perchlorate containing groundwater moving downgradient from the facility, and 2) quantify the presence of perchlorate in the alluvial groundwater system.

In October 1997, Kerr-McGee submitted the analytical results of 47 on-site groundwater monitoring wells (1). Analyses were performed to evaluate perchlorate concentrations at the Henderson site. These results confirmed the perchlorates in the alluvial aquifer were not due to current operations but represent past practices at this manufacturing site.

The on-site sampling established the concentration gradient and identified a decline in perchlorate concentrations toward the north boundary of the facility. Concentrations of perchlorate move with the groundwater flow to the north. At the facility boundary, concentrations were about 1500 mg/l perchlorate. This work provided an understanding of the properties of the perchlorates on-site in the alluvial aquifer (1).

To extend the knowledge of perchlorates in the alluvial aquifer, beginning in January 1998 Kerr-McGee conducted a thorough review of historical hydrologic information in the area of the manufacturing site and Las Vegas Wash (2). Mapping, based upon the evaluation of the existing and historical subsurface information, pinpointed areas suitable for additional assessment north and northeast of the facility. Additional groundwater sampling and analyses were proposed in a Phase II work plan submitted to NDEP (2).

The Phase II groundwater perchlorate investigation report described the drilling and evaluation of 69 additional soil borings and 27 monitor wells. A pump test was also conducted. The work identified the subsurface pathway of perchlorate-impacted groundwater moving downgradient from the Kerr-McGee facility and quantified the perchlorate presence in the alluvial groundwater system.

Pump test results in the alluvial channel at the Pittman Lateral indicated a groundwater velocity of up to 4000 ft/year and a perchlorate concentration range of 100 to 300 mg/l. Perchlorate concentrations in the alluvial groundwater system range from about 1500 mg/l along the northern boundary of the Kerr-McGee property to around 100 mg/l north of the City of Henderson's sewage treatment plant Rapid Infiltration Basins (RIBs). At the northern point below the RIBs, the plume is diluted by infiltration of RIBs' treated water and fans out into a broad trend just south of the Las Vegas Wash (3).

In the original pump test, organic contaminants were encountered in the alluvial groundwater at the Pittman Lateral and possibly downgradient. However, subsequent pump testing and sampling did not confirm the presence of the organics. A higher total dissolved solids (TDS) concentration plume was also encountered west of the perchlorate plume. At the Pittman Lateral, the perchlorate plume begins to merge with the higher TDS plume.

The Henderson Industrial Site Steering Committee (HISSC) is made up of current and past operators of the BMI properties. The HISSC has been assessing environmental conditions on

the common areas previously used for waste disposal of production effluent. High TDS values in the alluvial aquifer have resulted in a recent NDEP request to the HISSC member companies (including Kerr-McGee) to address this issue. Kerr-McGee is working with NDEP and the other HISSC companies to meet this request. While the perchlorates do add to the TDS, they contribute less than 2-3% of the total TDS near the Las Vegas Wash. Additional sampling is currently being conducted by the HISSC to characterize this TDS plume.

Kerr-McGee has characterized the perchlorate in the alluvial aquifer both on-site and off-site of the company's property (1-3). Past operations of AMPAC and the U.S. Navy also contributed to the perchlorate levels. Kerr-McGee has contacted both parties regarding their contributions to the perchlorates present in the Las Vegas Wash and Colorado River system. Any Consent Agreement relating to perchlorate remedial activities would need to consider all responsible parties. Kerr-McGee will continue to work with all parties to reach satisfactory resolution of these off-site issues.

TREATMENT TECHNOLOGY

In August 1997, Kerr-McGee began work to evaluate technologies which could:

- Provide storage of perchlorate groundwater.
- Separate perchlorate from groundwater.
- Destroy perchlorate in groundwater.

In August 1997, there were no commercially demonstrated technologies to remove or destroy perchlorate. While several separation technologies showed promise, only one technology has yet demonstrated potential for commercial scale perchlorate destruction: biochemical reduction of perchlorate. Both laboratory and pilot scale units have been investigated and the units have treated the alluvial groundwater containing perchlorates from the Kerr-McGee site.

Based upon work performed to date, biochemical destruction of perchlorate appears to be the most effective (yields the lowest perchlorate concentrations) and is among the lower cost alternatives. The complete results of treatment technology reviews were recently submitted to NDEP (4,5).

Aerojet has done additional biochemical reduction testing in California. This included bench scale tests that have demonstrated the ability of the Aerojet technology to tolerate the higher perchlorate and salt concentrations present in Kerr-McGee's on-site groundwater. Aerojet has recently commissioned (mid-December 1998) and is operating a large (several thousand gallon per minute) plant in California to treat low concentration perchlorate groundwater.

Kerr-McGee will continue to review the technology(s) available to treat and destroy perchlorates. Work is on-going and interest in treatment technology for perchlorates has developed in both private and public sectors.

PERCHLORATE STANDARDS

In July, 1997, no official Federal perchlorate standards existed for drinking water. California adopted an Environmental Protection Agency (EPA) provisional standard of 18 ug/l in water. Until mid-1997, no analytical technique existed to identify perchlorates at the ug/l (parts per billion) level in the ground or surface water.

The Environmental Protection Agency (EPA) is working to identify an appropriate Reference Dose for perchlorates. The Perchlorate Study Group (PSG), which includes aerospace, manufacturers, and users of perchlorates, had petitioned EPA in the mid 1990's to develop such standards for perchlorates. The PSG, in conjunction with the Department of Defense, has sponsored independent laboratory studies to better determine perchlorate health effects.

With these additional studies and the information already available on perchlorate health effects, the EPA recently issued an internally peer reviewed Reference Dose for perchlorates. The Reference Dose will be reviewed by an independent panel of experts, and their comments will go back to EPA for consideration in setting the final Reference Dose. The final Reference Dose will be used to set a Maximum Concentration Level (MCL) for perchlorates in drinking water. The initial Reference Dose number from EPA translates into a recommended water concentration limit of 32 ug/l. Although not final, the internally reviewed EPA Reference Dose provides an early indication for perchlorate mitigation/remediation.

REMEDIAL ACTIONS

In 1998, Kerr-McGee completed the construction of an 11-acre retention basin to store the impacted groundwater recovered from the on-site chromium treatment system (see Figure 1). In December 1998, this 11-acre retention basin began receiving impacted groundwater. The recovery wells and chromium treatment system have been in operation since the 1980's and effectively capture the on-site alluvial groundwater and site contaminants (including perchlorates). At current pumping rates, this containment system is removing approximately 1200 lbs/day of perchlorate from the alluvial groundwater below the facility.

Based upon the perchlorate delineation and technology assessment work already performed, Kerr-McGee proposes a four-part remedial action which incorporates the work already performed and is based upon the information currently available. This four-part program includes:

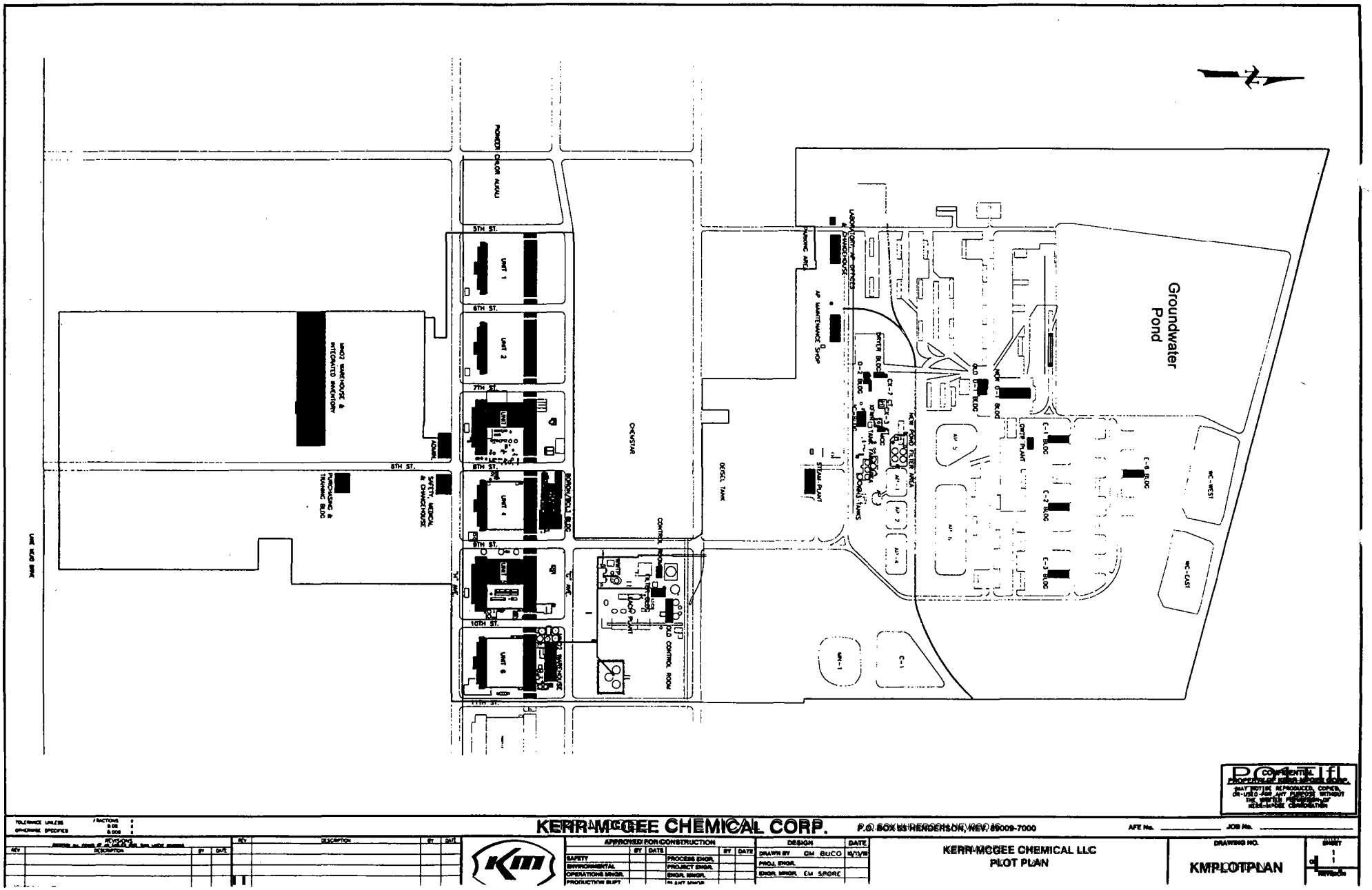
1. Kerr-McGee will continue interception of the perchlorate impacted groundwater beneath the Kerr-McGee facility utilizing the existing interception well line and temporary storage in the 11-acre basin. Lake Mead water will be injected downgradient of the interception well line as part of the interception/recharge system. The recharge of Lake Mead water not only allows Kerr-McGee to remove 1200 lbs/day of perchlorate from the alluvial groundwater system, it also stabilizes the flow characteristics, improves the quality of the aquifer, and facilitates monitoring of the clean front as it progresses northward.
2. Kerr-McGee recommends biological perchlorate reduction as the most appropriate treatment technology considering the health-based preliminary standards for perchlorate, the regional groundwater perchlorate characterization and the technology alternatives review. Upon approval of this approach, Kerr-McGee will initiate engineering and design work for a biological perchlorate reduction process for groundwater currently intercepted on-site (currently stored in the 11-acre basin). However, design work cannot be finalized without NDEP authorization of a permitted discharge (UIC or NPDES). Use of the biological perchlorate reduction is also predicated upon Kerr-McGee procuring contracts with nutrient suppliers.
3. Kerr-McGee believes that proposing perchlorate remediation at an off-site location before completing additional testing would not be productive. Therefore, to better understand hydrological systems between the Kerr-McGee facility and the Pittman

Lateral, Kerr-McGee will conduct continuous pumping and confirmatory biological perchlorate destruction tests on groundwater in that area. Initial biological treatment tests have proven successful in destroying perchlorate, but long term testing is required to understand potential variability of water flows and potential adverse impacts of organics or other constituents in the water. Also, Kerr-McGee is seeking to maximize perchlorate recovery while minimizing the capture of other higher conductivity water in the area. Additional pumping tests will be performed on at least two wells for about one week each. Pumping rates will likely average about 50 gpm, with instantaneous rates exceeding 100 gpm. As in previous pump tests, the water will be sampled then discharged into the concrete storm water bypass leading to the lower BMI ponds. No surface discharge to the Las Vegas Wash would be allowed. Daily composite samples would be split for laboratory analysis and for shipment to Applied Research Associates (ARA). ARA would confirm the amenability of the samples for perchlorate biodegradation. Samples of treated water containing bio-mass will be analyzed. Completion of the test work and subsequent analyses would likely require about 90 days.

4. Kerr-McGee will also consider utilizing the on-site perchlorate reduction process to treat an off-site groundwater source, provided further testing confirms; a) that off-site conditions do not adversely effect the biological process, b) that hazardous constituents are not present, and c) that NDEP provides a permitted discharge authorization (UIC or NPDES) not withstanding the probable presence of TDS.

In summary, Kerr-McGee will operate the chromium recovery / treatment system and impound the impacted groundwater in the 11-acre basin. Kerr-McGee will also evaluate the effects of this cleanup on the alluvial groundwater system. Upon NDEP approval of the approach, Kerr-McGee will begin engineering and design work for a biological remediation process for the contained groundwater and will evaluate the biological remediation process amenability of an off-site source. The above four-part proposal is conditioned on the NDEP authorization of a permitted discharge (UIC or NPDES) of the treated water (water with the perchlorate removed), and on Kerr-McGee, NDEP and other potential responsible parties negotiating an acceptable consent agreement. The engineering and construction of the perchlorate treatment system is estimated to take 15 months from the time NDEP's approval of this approach is received, assuming discharge issues can be resolved.

FIGURE 1



KERR-MCGEE CHEMICAL CORP. P.O. BOX 55 HENDERSON, NEV. 89009-7000

TOLERANCE UNLESS OTHERWISE SPECIFIED: FRACTIONS ±, .00 ±, .000 ±

AFE No. _____ JOB No. _____

REVISIONS				DESCRIPTION	BY	DATE
REV	DESCRIPTION	BY	DATE			

APPROVED FOR CONSTRUCTION	BY	DATE		BY	DATE
SAFETY			PROCESS ENGR.		
ENVIRONMENTAL			PROJECT ENGR.		
OPERATIONS MNGR.			ENGR. MNGR.		
PRODUCTION SUPT.					

DESIGN	DATE
DRAWN BY CM BUCO	8/13/98
PROJ. ENGR.	
ENGR. MNGR. CM SPORC	

KERR-MCGEE CHEMICAL LLC
PLOT PLAN

DRAWING NO. KMPLOTPLAN

SHEET 1 OF 1

REVISION

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

January 27, 1999

Ms. Valerie King
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89706-0851

Dear Ms. King:

Subject: UIC Permit # NEV94218 Permit – Fourth Quarter 1999

This report is required by and prepared specifically for the State of Nevada Division of Environmental Protection (NDEP). It presents the observed results of measurements required to be performed by the NDEP. It is not intended as an assertion of the accuracy of any instrument, readings, or analytical results, nor is it an endorsement of the suitability of any analytical measurement procedure.

Kerr-McGee Chemical LLC (KMCLLC) maintains an Underground Injection Control (UIC) Permit #NEV94218 for groundwater remediation at the Henderson, Nevada facility. KMCLLC has recently received approval from the NDEP for modification of its UIC Permit to allow the introduction of Lake Mead water into the injection/recharge trenches. This introduction started December 30, 1998. Pursuant to Section I.A.3, a sample of the Lake Mead water injectate was collected and analyzed for December, 1998. Please see Attachment 1 for analytical information. Note that due to the abbreviated nature of the December use of Lake Mead water as injectate, perchlorate analysis is not available at the time. These analyses typically required 4 to 6 weeks. This information will be submitted as it is received.

Section I.A.3 also requires quarterly groundwater monitoring, which will begin in the first quarter of 1999.

Please feel free to call Susan Crowley at (702) 651-2234 if you have any questions regarding this request. Thank you.

Sincerely,

Patrick S. Corbett
Plant Manager

Attachment
By certified mail

cc: SMCrowley
G Davis
ALDooley
WOGreen
MJPorterfield
Doug Zimmerman, NDEP
Brenda Pohlmann, NDEP

C:\DATA\DOCS\SMC\LTR\UIC PEMIT 4TH98.DOC

ATTACHMENT 1

Lake Mead Water
Analytical Information

NEL LABORATORIES
Reno • Las Vegas
Phoenix • Burbank

Las Vegas Division
4208 Arcata Way, Suite A • Las Vegas, NV 89030
(702) 657-1010 • Fax: (702) 657-1577
1-888-368-3282

CLIENT: Kerr-McGee Chemical Corporation
8000 West Lake Mead Drive
Henderson, NV 89015
ATTN: Mark Porterfield

PROJECT NAME: GWTP-UIC
PROJECT NUMBER: NA

NEL ORDER ID: L9901126

Attached are the analytical results for samples in support of the above referenced project.

Samples were received by NEL in good condition, under chain of custody on 1/15/99.

Samples were analyzed as received.

Should you have any questions or comments, please feel free to contact our Client Services department at (702) 657-1010.

Stan Van Wagenen
Laboratory Manager

1/25/99
Date

CERTIFICATIONS:

	Reno	Las Vegas	S. California		Reno	Las Vegas	S. California
Arizona	AZ0520	AZ0518	AZ0583	Idaho	Certified	Certified	
California	1707	2002	2264	Montana	Certified	Certified	
US Army Corps of Engineers	Certified	Certified	Certified	Nevada	NV033	NV052	CA084
				L.A.C.S.D.			10228

NEL LABORATORIES

CLIENT: Kerr-McGee Chemical Corporation
PROJECT NAME: GWTP-UIC
PROJECT NUMBER: NA

CLIENT ID: GWTP-UIC
DATE SAMPLED: 1/15/99
NEL SAMPLE ID: L9901126-01

TEST: Metals
MATRIX: Drinking Water

PARAMETER	RESULT mg/L	REPORTING LIMIT	D. F.	METHOD	DIGESTED	ANALYZED
Aluminum	ND	0.025 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Antimony	ND	0.001 mg/L	1	EPA 200.8	1/21/99	1/21/99
Arsenic	ND	0.001 mg/L	1	EPA 200.8	1/21/99	1/21/99
Barium	0.096	0.0025 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Beryllium	ND	0.0025 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Boron	0.13	0.01 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Cadmium	ND	0.002 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Calcium	76	0.25 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Chromium	ND	0.005 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Copper	ND	0.0025 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Iron	0.15	0.05 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Lead	ND	0.001 mg/L	1	EPA 200.8	1/21/99	1/21/99
Magnesium	27	0.25 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Manganese	0.038	0.0025 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Mercury	ND	0.0002 mg/L	1	EPA 245.1	1/19/99	1/19/99
Nickel	ND	0.02 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Potassium	4.4	1. mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Selenium	0.0024	0.001 mg/L	1	EPA 200.8	1/21/99	1/21/99
Silver	ND	0.005 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Sodium	86	0.25 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Thallium	ND	0.0005 mg/L	1	EPA 200.8	1/21/99	1/21/99
Zinc	0.90	0.05 mg/L	0.5	EPA 200.7	1/18/99	1/19/99

D.F. - Dilution Factor

ND - Not Detected

NEL LABORATORIES

CLIENT: Kerr-McGee Chemical Corporation
PROJECT NAME: GWTP-UIC
PROJECT NUMBER: NA

CLIENT ID: **Method Blank**
DATE SAMPLED: NA
NEL SAMPLE ID: L01126-Hg-BLK

TEST: **Metals**

PARAMETER	RESULT mg/L	REPORTING LIMIT	D. F.	METHOD	DIGESTED	ANALYZED
Mercury	ND	0.0002 mg/L	1	EPA 245.1	1/19/99	1/19/99

D.F. - Dilution Factor

ND - Not Detected

NEL LABORATORIES

CLIENT: Kerr-McGee Chemical Corporation
PROJECT NAME: GWTP-UIC
PROJECT NUMBER: NA

CLIENT ID: **Method Blank**
DATE SAMPLED: NA
NEL SAMPLE ID: L01126i-BLK

TEST: **Metals**

PARAMETER	RESULT mg/L	REPORTING LIMIT	D. F.	METHOD	DIGESTED	ANALYZED
Aluminum	ND	0.025 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Barium	ND	0.0025 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Beryllium	ND	0.0025 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Boron	ND	0.01 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Cadmium	ND	0.002 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Calcium	ND	0.25 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Chromium	ND	0.005 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Copper	ND	0.0025 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Iron	ND	0.05 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Magnesium	ND	0.25 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Manganese	ND	0.0025 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Nickel	ND	0.02 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Potassium	ND	1. mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Silver	ND	0.005 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Sodium	ND	0.25 mg/L	0.5	EPA 200.7	1/18/99	1/19/99
Zinc	ND	0.05 mg/L	0.5	EPA 200.7	1/18/99	1/19/99

D.F. - Dilution Factor

ND - Not Detected

NEL LABORATORIES

CLIENT: Kerr-McGee Chemical Corporation
PROJECT NAME: GWTP-UIC
PROJECT NUMBER: NA

CLIENT ID: **Method Blank**
DATE SAMPLED: NA
NEL SAMPLE ID: L01126M-BLK

TEST: **Metals**

PARAMETER	RESULT mg/L	REPORTING LIMIT	D. F.	METHOD	DIGESTED	ANALYZED
Antimony	ND	0.001 mg/L	1	EPA 200.8	1/21/99	1/21/99
Arsenic	ND	0.001 mg/L	1	EPA 200.8	1/21/99	1/21/99
Lead	ND	0.001 mg/L	1	EPA 200.8	1/21/99	1/21/99
Selenium	ND	0.001 mg/L	1	EPA 200.8	1/21/99	1/21/99
Thallium	ND	0.0005 mg/L	1	EPA 200.8	1/21/99	1/21/99

D.F. - Dilution Factor

ND - Not Detected

NEL LABORATORIES

CLIENT: Kerr-McGee Chemical Corporation
PROJECT NAME: GWTP-UIC
PROJECT NUMBER: NA

CLIENT ID: GWTP-UIC
DATE SAMPLED: 1/15/99 4:03:
NEL SAMPLE ID: L9901126-01

TEST: **Volatile Organic Compounds by EPA 8260B, Dec. 1996**
METHOD: EPA 8260
MATRIX: Drinking Water
DILUTION: 1

EXTRACTED: 1/20/99
ANALYZED: 1/20/99
ANALYST: SEJ

PARAMETER	Result µg/L	Reporting Limit	PARAMETER	Result µg/L	Reporting Limit
Acetone	ND	25. µg/L	2,2-Dichloropropane	ND	10. µg/L
Benzene	ND	5. µg/L	1,1-Dichloropropene	ND	5. µg/L
Bromobenzene	ND	5. µg/L	cis-1,3-Dichloropropene	ND	5. µg/L
Bromochloromethane	ND	5. µg/L	trans-1,3-Dichloropropene	ND	5. µg/L
Bromodichloromethane	ND	5. µg/L	Ethylbenzene	ND	5. µg/L
Bromoform	ND	5. µg/L	Hexachlorobutadiene	ND	5. µg/L
Bromomethane	ND	5. µg/L	2-Hexanone	ND	25. µg/L
2-Butanone	ND	25. µg/L	Iodomethane	ND	5. µg/L
n-Butylbenzene	ND	5. µg/L	Isopropylbenzene	ND	5. µg/L
sec-Butylbenzene	ND	5. µg/L	p-Isopropyltoluene	ND	5. µg/L
tert-Butylbenzene	ND	5. µg/L	Methylene chloride (Dichloromethane)	ND	5. µg/L
Carbon disulfide	ND	5. µg/L	4-Methyl-2-pentanone	ND	25. µg/L
Carbon tetrachloride	ND	5. µg/L	MTBE	ND	5. µg/L
Chlorobenzene	ND	5. µg/L	Naphthalene	ND	10. µg/L
Chloroethane	ND	5. µg/L	n-Propylbenzene	ND	5. µg/L
Chloroform	ND	5. µg/L	Styrene	ND	5. µg/L
Chloromethane	ND	5. µg/L	1,1,1,2-Tetrachloroethane	ND	5. µg/L
2-Chlorotoluene	ND	5. µg/L	1,1,2,2-Tetrachloroethane	ND	5. µg/L
4-Chlorotoluene	ND	5. µg/L	Tetrachloroethene (PCE)	ND	5. µg/L
Dibromochloromethane	ND	5. µg/L	Toluene	ND	5. µg/L
1,2-Dibromo-3-chloropropane (DBCP)	ND	5. µg/L	1,2,3-Trichlorobenzene	ND	5. µg/L
1,2-Dibromoethane (EDB)	ND	5. µg/L	1,2,4-Trichlorobenzene	ND	5. µg/L
Dibromomethane	ND	5. µg/L	1,1,1-Trichloroethane (1,1,1-TCA)	ND	5. µg/L
1,2-Dichlorobenzene (o-DCB)	ND	5. µg/L	1,1,2-Trichloroethane (1,1,2-TCA)	ND	5. µg/L
1,3-Dichlorobenzene (m-DCB)	ND	5. µg/L	Trichloroethene (TCE)	ND	5. µg/L
1,4-Dichlorobenzene (p-DCB)	ND	5. µg/L	Trichlorofluoromethane (Freon 11)	ND	10. µg/L
Dichlorodifluoromethane (Freon 12)	ND	5. µg/L	1,2,3-Trichloropropane	ND	5. µg/L
1,1-Dichloroethane (1,1-DCA)	ND	5. µg/L	1,2,4-Trimethylbenzene	ND	5. µg/L
1,2-Dichloroethane (1,2-DCA)	ND	5. µg/L	1,3,5-Trimethylbenzene	ND	5. µg/L
1,1-Dichloroethene (1,1-DCE)	ND	5. µg/L	Vinyl chloride	ND	5. µg/L
cis-1,2-Dichloroethene	ND	5. µg/L	o-Xylene	ND	5. µg/L
trans-1,2-Dichloroethene	ND	5. µg/L	m,p-Xylene	ND	5. µg/L
1,2-Dichloropropane	ND	5. µg/L			
1,3-Dichloropropane	ND	5. µg/L			

QUALITY CONTROL DATA:

Surrogate	% Recovery	Acceptable Range
4-Bromofluorobenzene	102	86 - 115
Dibromofluoromethane	106	86 - 118
Toluene-d8	101	88 - 110

ND - Not Detected

NEL LABORATORIES

CLIENT: Kerr-McGee Chemical Corporation
PROJECT NAME: GWTP-UIC
PROJECT NUMBER: NA

CLIENT ID: **Method Blank**
DATE SAMPLED: NA
NEL SAMPLE ID: 9901201W60-BLK

TEST: **Volatile Organic Compounds by EPA 8260B, Dec. 1996**
MATRIX: Drinking Water

EXTRACTED: 1/20/99
ANALYZED: 1/20/99

PARAMETER	Result µg/L	Reporting Limit	PARAMETER	Result µg/L	Reporting Limit
Acetone	ND	25 µg/L	1,1-Dichloropropene	ND	5 µg/L
Benzene	ND	5 µg/L	cis-1,3-Dichloropropene	ND	5 µg/L
Bromobenzene	ND	5 µg/L	trans-1,3-Dichloropropene	ND	5 µg/L
Bromochloromethane	ND	5 µg/L	Ethylbenzene	ND	5 µg/L
Bromodichloromethane	ND	5 µg/L	Hexachlorobutadiene	ND	5 µg/L
Bromoform	ND	5 µg/L	2-Hexanone	ND	25 µg/L
Bromomethane	ND	5 µg/L	Iodomethane	ND	5 µg/L
2-Butanone	ND	25 µg/L	Isopropylbenzene	ND	5 µg/L
n-Butylbenzene	ND	5 µg/L	p-Isopropyltoluene	ND	5 µg/L
sec-Butylbenzene	ND	5 µg/L	Methylene chloride (Dichloromethane)	ND	5 µg/L
tert-Butylbenzene	ND	5 µg/L	4-Methyl-2-pentanone	ND	25 µg/L
Carbon disulfide	ND	5 µg/L	MTBE	ND	5 µg/L
Carbon tetrachloride	ND	5 µg/L	Naphthalene	ND	10 µg/L
Chlorobenzene	ND	5 µg/L	n-Propylbenzene	ND	5 µg/L
Chloroethane	ND	5 µg/L	Styrene	ND	5 µg/L
Chloroform	ND	5 µg/L	1,1,1,2-Tetrachloroethane	ND	5 µg/L
Chloromethane	ND	5 µg/L	1,1,2,2-Tetrachloroethane	ND	5 µg/L
2-Chlorotoluene	ND	5 µg/L	Tetrachloroethene (PCE)	ND	5 µg/L
4-Chlorotoluene	ND	5 µg/L	Toluene	ND	5 µg/L
Dibromochloromethane	ND	5 µg/L	1,2,3-Trichlorobenzene	ND	5 µg/L
1,2-Dibromo-3-chloropropane (DBCP)	ND	5 µg/L	1,2,4-Trichlorobenzene	ND	5 µg/L
1,2-Dibromoethane (EDB)	ND	5 µg/L	1,1,1-Trichloroethane (1,1,1-TCA)	ND	5 µg/L
Dibromomethane	ND	5 µg/L	1,1,2-Trichloroethane (1,1,2-TCA)	ND	5 µg/L
1,2-Dichlorobenzene (o-DCB)	ND	5 µg/L	Trichloroethene (TCE)	ND	5 µg/L
1,3-Dichlorobenzene (m-DCB)	ND	5 µg/L	Trichlorofluoromethane (Freon 11)	ND	10 µg/L
1,4-Dichlorobenzene (p-DCB)	ND	5 µg/L	1,2,3-Trichloropropane	ND	5 µg/L
Dichlorodifluoromethane (Freon 12)	ND	5 µg/L	1,2,4-Trimethylbenzene	ND	5 µg/L
1,1-Dichloroethane (1,1-DCA)	ND	5 µg/L	1,3,5-Trimethylbenzene	ND	5 µg/L
1,2-Dichloroethane (1,2-DCA)	ND	5 µg/L	Vinyl chloride	ND	5 µg/L
1,1-Dichloroethene (1,1-DCE)	ND	5 µg/L	o-Xylene	ND	5 µg/L
cis-1,2-Dichloroethene	ND	5 µg/L	m,p-Xylene	ND	5 µg/L
trans-1,2-Dichloroethene	ND	5 µg/L			
1,2-Dichloropropane	ND	5 µg/L			
1,3-Dichloropropane	ND	5 µg/L			
2,2-Dichloropropane	ND	10 µg/L			

QUALITY CONTROL DATA:

Surrogate	% Recovery	Acceptable Range
4-Bromofluorobenzene	100	86 - 115
Dibromofluoromethane	104	86 - 118
Toluene-d8	101	88 - 110

ND - Not Detected

NEL LABORATORIES

LIENT: Kerr-McGee Chemical Corporation
ROJECT ID: GWTP-UIC/NA
ROJECT #: NA

CLIENT ID: GWTP-UIC
DATE SAMPLED: 1/15/99
NEL SAMPLE ID: L9901126-01

EST: **Inorganic Non-Metals**
LATRIX: Drinking Water

ARAMETER	RESULT	REPORTING LIMIT	D. F.	METHOD	UNITS	ANALYZED
lkalinity - Bicarbonate	140	25.	1	SM 2320 B	mg/L	1/21/99
lkalinity - Carbonate	ND	25.	1	SM 2320 B	mg/L	1/21/99
lkalinity - Hydroxide	ND	25.	1	SM 2320 B	mg/L	1/21/99
lkalinity, Total	140	25.	1	SM 2320 B	mg/L	1/21/99
hloride	72	5.	50	EPA 300.0	mg/L	1/19/99
yanide, WAD	ND	0.02	1	SM 4500-CN I	mg/L	1/20/99
luoride	0.43	0.4	1	SM 4500-F C	mg/L	1/19/99
itrate, as N	ND	0.2	1	EPA 300.0	mg/L-N	1/15/99
H	7.50	2.	1	EPA 150.1	pH Units	1/15/99
H Temperature	14.7	1.	1	EPA 150.1	°C	1/15/99
ulfate	210	5.	50	EPA 300.0	mg/L	1/19/99
otal Dissolved Solids	510	25.	1	SM 2540 C	mg/L	1/18/99
otal Phosphorous	0.010	0.01	1	SM 4500-P E	mg/L-P	1/18/99

.F. - Dilution Factor
D - Not Detected

NEL LABORATORIES

LIENT: Kerr-McGee Chemical Corporation
ROJECT ID: GWTP-UIC/NA
ROJECT #: NA

CLIENT ID: **Method Blank**
DATE SAMPLED: NA
NEL SAMPLE ID: 990115ICDW-BLK

EST: **Non-Metals**

ARAMETER	RESULT	REPORTING LIMIT	D. F.	METHOD	UNITS	ANALYZED
romide	ND	0.2	1	EPA 300.0	mg/L	1/15/99
hloride	ND	0.1	1	EPA 300.0	mg/L	1/15/99
luoride	ND	0.1	1	EPA 300.0	mg/L	1/15/99
itrate, as N	ND	0.2	2	EPA 300.0	mg/L-N	1/15/99
itrite, as N	ND	0.1	1	EPA 300.0	mg/L-N	1/15/99
ılfate	ND	0.1	1	EPA 300.0	mg/L	1/15/99

.F. - Dilution Factor

D - Not Detected

NEL LABORATORIES

CLIENT: Kerr-McGee Chemical Corporation
PROJECT ID: GWTP-UIC/NA
PROJECT #: NA

CLIENT ID: Method Blank
DATE SAMPLED: NA
NEL SAMPLE ID: 990118TDS-BLK

TEST: Non-Metals

PARAMETER	RESULT	REPORTING LIMIT	D. F.	METHOD	UNITS	ANALYZED
otal Dissolved Solids	ND	25	1	SM 2540 C	mg/L	1/18/99

D.F. - Dilution Factor

ND - Not Detected

NEL LABORATORIES

LIENT: Kerr-McGee Chemical Corporation
ROJECT ID: GWTP-UIC/NA
ROJECT #: NA

CLIENT ID: **Method Blank**
DATE SAMPLED: NA
NEL SAMPLE ID: 990118TP-BLK

EST: **Non-Metals**

ARAMETER	RESULT	REPORTING LIMIT	D. F.	METHOD	UNITS	ANALYZED
otal Phosphorous	ND	0.01	1	SM 4500-P E	mg/L-P	1/18/99

).F. - Dilution Factor

ID - Not Detected

NEL LABORATORIES

'LIENT: Kerr-McGee Chemical Corporation
'ROJECT ID: GWTP-UIC/NA
'ROJECT #: NA

CLIENT ID: **Method Blank**
DATE SAMPLED: NA
NEL SAMPLE ID: 990119ICAQ-BLK

'EST: **Non-Metals**

'ARAMETER	RESULT	REPORTING LIMIT	D. F.	METHOD	UNITS	ANALYZED
ìromide	ND	0.2	1	EPA 300.0	mg/L	1/19/99
:hloride	ND	0.1	1	EPA 300.0	mg/L	1/19/99
luoride	ND	0.1	1	EPA 300.0	mg/L	1/19/99
litrate, as N	ND	0.1	1	EPA 300.0	mg/L-N	1/19/99
litrite, as N	ND	0.1	1	EPA 300.0	mg/L-N	1/19/99
ulfate	ND	0.1	1	EPA 300.0	mg/L	1/19/99

).F. - Dilution Factor

ID - Not Detected

NEL LABORATORIES

LIENT: Kerr-McGee Chemical Corporation
ROJECT ID: GWTP-UIC/NA
ROJECT #: NA

CLIENT ID: **Method Blank**
DATE SAMPLED: NA
NEL SAMPLE ID: 990120CNWAD-BLK

EST: **Non-Metals**

ARAMETER	RESULT	REPORTING LIMIT	D. F.	METHOD	UNITS	ANALYZED
yanide, WAD	ND	0.02	1	SM 4500-CN I	mg/L	1/20/99

).F. - Dilution Factor

'D - Not Detected

NEL LABORATORIES

LIENT: Kerr-McGee Chemical Corporation
ROJECT ID: GWTP-UIC/NA
ROJECT #: NA

CLIENT ID: **Method Blank**
DATE SAMPLED: NA
NEL SAMPLE ID: 990121ALK-BLK

EST: **Non-Metals**

ARAMETER	RESULT	REPORTING LIMIT	D. F.	METHOD	UNITS	ANALYZED
lkalinity - Bicarbonate	ND	25	1	SM 2320 B	mg/L	1/21/99
lkalinity - Carbonate	ND	25	1	SM 2320 B	mg/L	1/21/99
lkalinity - Hydroxide	ND	25	1	SM 2320 B	mg/L	1/21/99
lkalinity, Total	ND	25	1	SM 2320 B	mg/L	1/21/99

).F. - Dilution Factor

ID - Not Detected

NEL LABORATORIES
Reno • Las Vegas
Phoenix • Irvine

Las Vegas Division • 4208 Arcata Way, Ste. A • Las Vegas, NV 89030
(702) 657-1010 • FAX: (702) 657-1577 • 1-888-368-3282

CHAIN OF CUSTODY

Company: Kerr-McGee Attn.: M Porterfield
Address: P.O. Box 55
Henderson, NV 89009
Phone No.: 651-2200 Fax No.: 651-2310
Billing Address: Expected Due Date: 1/22

Requested Turnaround: X 5 Day (Normal) ___ 48 Hr. ___ 24 Hr. ___ Other

Project Name: GWTP-UIC Project No.:
P.O. No.: Sampled By: Joel

Sample Date/Time	Sample ID	N.E.L. Identification	# of Containers	Matrix (Box #1)	Preservative (Box #2)	Expected Concentration (Box #3)	VOC - 8260	Perchlorate	Profile I								pH (for lab use only)	Remarks
1/15/99 1315	GWTP-UIC	L9901126-01	7	DW		U	X	X	X									Perchlorate to Mont. Watson along w/ Level 4 report
																		Received 8 containers
																		[initials] 1/15/99 15:45

Custody Seal intact? Y N (None) Temp. 8°C
Condition when received (good)

Box #1: DW - Drinking Water, WW - Waste Water, RW - RCRA Water, OL - Oil, SG - Sludge, SO - Soil, SD - Solid, AQ - Aqueous, A - Air

Box #2: A. HCl, B. HNO_3, C. H_2SO_4, D. NaOH, E. Ice Only, F. Other ____, G. Not Preserved

Box #3: H - High, M - Medium, L - Low, U - Unknown

	Relinquished by (Print)	(Signature)	Date/Time	Received by (Print)	(Signature)	Date/Time
1	Mark Porterfield	M Porterfield	1/15/99 1500	Ric Castaneda	[signature]	1/15/99 15:05
2	Ric Castaneda	[signature]	1/15/99 15:45	M. Galvan	[signature]	1/15/99 1545
3						
4						

ALLEN Gaddy

Chlorate Recovery Mud | IN | OUT

Kerr-McGee | 1:50 |

Rick ~~STATER~~ STATER –

Karen Kelly – Shift foreman

Kerr-McGEE Chemical Corporation
Henderson ~~FACILITY~~
Electrolytic ~~Products~~ Division

Photo

Betty

1 - ~~Tank~~ Cleanout area

2. - ~~HZ~~ waste storage ~~Pad~~

Calcium mag. & sulfate 2 yds

1 Truck per 2 or 3 months

TABLE I

CHLORATE RECOVERY MUD

TYPICAL ANALYSIS

Constituent	
Calcium Salts	
$CaSO_4$	6%*
$Ca(OH)_2$	4%
Sodium Salts	
$NaClO_3$	22%
NaCl	1%
Moisture	43%
Carbon	33%
Silica as SiO_2	190 mg/kg
Chromium (Total)	1800 mg/kg
Chromium (VI)	1000 mg/kg

*Percentages are by weight

TABLE 2

SUMMARY OF LANDFILL MONITORING DATA

January 1987

Well #	Designation	Constituent	Concentration*
M-5	Upgradient	pH	6.5
		Spcd	9800
		TOC	63
		TOX	42
M-6	Downgradient	pH	7.0
		Spcd	1700
		TOC	13
		TOX	6.5
M-7	Downgradient	pH	6.9
		Spcd	8200
		TOC	38
		TOX	7.4
H-28	Downgradient	pH	7.4
		Spcd	8900
		TOC	6.4
		TOX	6.0

*Units: pH = Std units
specific conductance = umhos/cm
TOC = Mg/L
TOX = Mg/L

Kerr McGee

Kerr McGee manufactures industrial chemicals including sodium chlorate, ammonium perchlorate, potassium perchlorate, manganese dioxide, boron trichloride, boron tribromide and elemental boron.

November, 1980 - Original Part A

SO1 25lbs/yr F001
SO1 " F003
SO1 " F005
T04/D80 900tons/yr D007
TO1/D83 3000tons/yr D007
TO1/D83 2,000,000 lbs/yr D002
S04 6000 tons/yr D002
SO4 100,000 lb/yr D007

July 14, 1982 - Revised Part A application

D83 - process design capacities of the surface impoundments P-1 and S-1 were corrected from 960,000 gallons to 2,660,000 gallons

TO1-process tank used for nuetralization of a corrosive liquid was incorrectly listed and has been deleted in the revised Part A .

TO4-deleted chlorate filtration unit

SO4-deleted lined surface impoundments P-2 and P-3 received dilute solutions from sodium chlorate and perchlorate electrolytic cell buildings and recycled to chlorate process.

SO4/D83-deleted AP-1,AP-2,AP-4 preliminary in house testing indicated these might contain high levels(EP toxic) of chromium. DRI later tested liquid and sludge and determined all eight metals were below EP toxic test limits.

Revised Part A

SO1 25lbs/yr F001
SO1 " F003
S01 " F005
D80 900tons/yr D007
D83 3000tons/yr D007

August 23,1982-Hazardous waste disposal closure and post closure plans and cost estimates for each plan.

November 8, 1983- letter from State of Nevada DEP to Kerr McGee with comments on Closure/Post Closure plan and deficiencies in Kerr McGee groundwater monitoring program.
Comments on the groundwater monitoring program originated from EPA contractor review on 9/28/83.

December 12, 1983-Letter from Kerr McGee to Nevada DEP responding to comments by the State on Closure plan

March 21, 1984- Nevada DEP Finding of Violation and Order -violation of interim statis requirements regarding storage of hazardous waste in waste piles. Kerr McGee was storing chlorate waste in a basement and calling it a tank.

April 12,1984 - Closure plan submitted for surface impoundments Liquid sent to the surface impoundments is produced during the production of potassium perchlorate. Chromate bearing wastes constitute the key component of RCRA wastes.

June 15, 1984 - Closure plan submitted for landfill sources of wastes sent to landfill are filter cake solids produced during sodium chlorate production step.

OCT 25, 1984 - CLOSURE/POST-CLOSURE PLAN APPROVED

Comments

No Part B apllication was ever submitted by this facility

EPA has not received a copy of the closure plan for the landfill at this time. A copy of the closure plan for the surface impoundments was received on April 13, 1984.

9/6/85 → CERTIFICATION RECEIVED FOR S-1 IMPOUNDMENT APPROVED 10/3/85

9/11/85 → CERTIFICATION RECEIVED 9/6/85 FOR P-1 IMPOUND. APPROVED 10/24/85

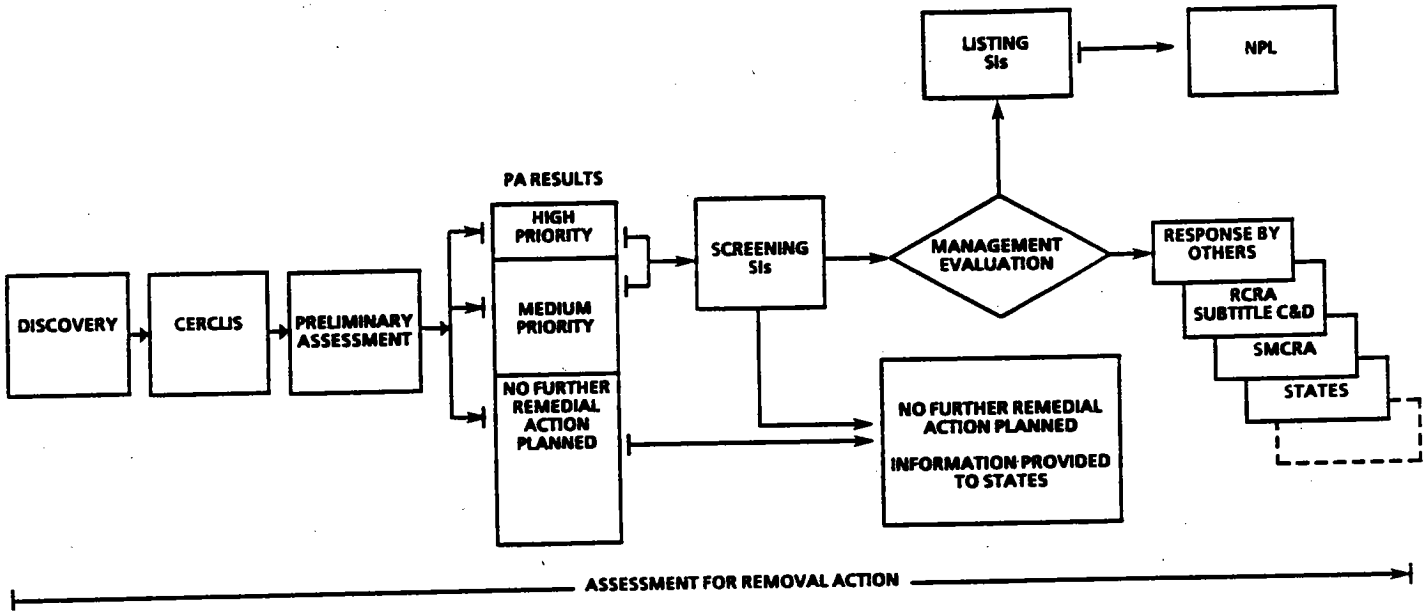
10/24/85 → CERTIFICATION RECEIVED 10/24/85 FOR LANDFILL

4/4/85 → last waste to landfill

by Jan 23, 83

Figure 1

PRE-REMEDIAL STAGE OF SUPERFUND PROCESS



The present issue of the *Bulletin* is based on information that is provided in greater detail in the *Federal Register*. It will briefly describe the proposed HRS revisions that affect multiple pathways and individual pathways and then discuss how the changes might affect data collection procedures. The suggested approach involves separating data collection into the following elements: background data collection, site/environs reconnaissance, and sampling. It is important to keep in mind that some of the information listed under background data collection and site/environs reconnaissance will be gathered during a PA; however, these data will then be refined and augmented during the SSI, with limited environmental samples collected as well. During the LSI, all *appropriate* pathways will be evaluated, and the suggested approach will provide the data needed for a complete HRS package.

Each of the three data collection elements is discussed below.

- **Background Data Collection Activities**—This will encompass obtaining and reviewing available reports, maps, and photographs for "desktop" information that is needed for the HRS. Examples include U.S. Geological Survey (USGS) maps and reports to obtain hydrogeologic and stream flow data, Soil Conservation Service (SCS) soil-type maps, information from file searches, data on fishery resources, data on nearby drinking water sources and usage, aerial photography to assist in "site" definition as well as determining land uses and recreation areas surrounding the site, and census reports to obtain population figures.
- **Site/Environs Reconnaissance**—The data collection activities for site/environs reconnaissance will include determining source dimensions, source containment, site accessibility, and the locations of nearby receptors or targets; confirming nearby land uses and recreational water use; and characterizing drainage areas and surface water bodies (flow type, stream bed morphology, etc.) if gauging station information is not available.
- **Sampling Strategy**—The SSI sampling strategy should be appropriate to support the recommendation that a site move forward to an LSI or be designated as "no further remedial action planned." As stated previously, the purpose of sampling during the SSI is to identify the types of contaminants present, to assess whether a release of hazardous substances has occurred, and to look for evidence of actual human and environmental exposure to contaminants. The LSI sampling strategy should be sufficient to

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

January 12, 1999

Mr. Robert Kelso
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89710

Dear Mr. Kelso:

Subject: KMC Environmental Conditions Investigation Quarterly Report

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

Activities Conducted 10/01/98 to 12/31/98

A public meeting was held December 1998. The BMI Common Areas were the primary topic, however, KMC had information available and answered public questions related to their own Phase II activities.

In June 1998, NDEP approval, with conditions, was received for the *"Phase II Environmental Conditions Assessment Located at Kerr-McGee Chemical Corporation, Henderson, Nevada,"* August 1997 report. November 9, 1998, information was supplied to respond to the conditions, inclusive of the KMC Supplemental Phase II Work Plan. NDEP approval of the Supplemental Phase II Work Plan was received in December 1998.

KMC continued BMI Common Areas investigative work in cooperation with other HISSC members.

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

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

cc: PSCorbett
ALDooley
WOGreen
RHJones
TWReed
R. Simon (ENSR)
J. Smith (Covington & Burling)
T. Whalen (NDEP)
D. Zimmerman (NDEP)

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(311)

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Parcel 1 is legal for North end of Plant

Naval Industrial Reserve Ordnance Plant,
DOD #473 and National Industrial Reserve Plant,
DOD #217, - N-Nev-415
(American Potash & Chemical Corporation)

QUITCLAIM DEED

THIS INDENTURE, made the 15th day of March, 1962, between the UNITED STATES OF AMERICA, acting by and through the Administrator of General Services, under and pursuant to the powers and authority contained in the provisions of the Federal Property and Administrative Services Act of 1949 (63 Stat. 377), as amended, and regulations and orders promulgated thereunder, hereinafter called GOVERNMENT, and AMERICAN POTASH AND CHEMICAL CORPORATION, a corporation duly organized and existing under the laws of the State of Delaware, hereinafter called GRANTEE,

WITNESSETH: That the GOVERNMENT, for and in consideration of the sum of TEN DOLLARS ($10.00), receipt of which is hereby acknowledged, and other good and valuable consideration, has remised, released and forever quitclaimed, and by these presents does remise, release and forever quitclaim, unto the said GRANTEE, and to its successors and assigns, that certain property being a portion of what is commonly known as the Basic Magnesium Project in the County of Clark, State of Nevada, and more particularly described as follows:

PARCEL NO. 1.

Beginning at the Section corner common to Sections 1, 2, 11 and 12, Township 22 South, Range 62 East, M.D.B.&M.; thence North 1° 16' 15" West 1314.14 feet along the West line of Section 1; thence leaving said West line South 89° 36' 55" East 1252.59 feet more or less to the Southwesterly line of Athol Avenue as shown on the Plat of Sierra Vista City, recorded in Book 2 of Plats, page 5, Clark County, Nevada records; thence South 42° 27' 00" East 41.39 feet along said Southwesterly line; thence leaving said Southwesterly line South 0° 47' 53" East 1285.42 feet to a point on the South line of said Section 1; thence South 89° 31' 45" East 1269.30 feet along said South line to the Quarter corner common to said Sections 1 and 12; thence leaving said South line South 0° 53' 32.5" West 1317.21 feet; thence South 89° 33' 08" East 753.00 feet to a point on the West boundary of Eleventh Street projected; thence South 8° 51' 37" East 767.34 feet along said West boundary to a point on the North fence line of B.MP; thence leaving said West boundary North 63° 17' 49" West 387.59 feet along said North fence line to an angle point therein; thence continuing along said fence line North 84° 13' 42.5" West 3118.39 feet to the West line of Section 12; thence North 2° 07' 00" East 1615.32 feet along said West line to the point of beginning, containing 151.3689 acres, more or less.

PARCEL NO. 2.

Beginning at the Southwest corner of Section 12, Township 22 South, Range 62 East Mt. Diablo Base and meridian; thence North 51° 52' 46.5" East 1571.58 feet to the true point of beginning:

Thence North 8° 51' 37" West 2635.00 feet to a point on the North fence line of Basic Magnesium Plant; thence South 84° 13' 42.5" East 2418.12 feet along said fence line to an angle point therein; thence continuing along said fence line South 63° 17' 49" East 387.59 feet to a point on the West line of Eleventh Street projected;

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Naval Industrial Reserve Ordnance Plant,
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&

thence South 8° 51' 37" East 1798.74 feet along said West line to a point from which the Southeast corner of Section 12 bears South 44° 25' 17" East 2059.78 feet; thence South 81° 08' 23" West 2654.99 feet to the true point of beginning, containing 138.9621 acres more or less.

TOGETHER WITH all of the GOVERNMENT'S rights, title and interest in and to that certain easement granted by Stauffer Chemical Company of Nevada, a Nevada Corporation, to the United States of America by easement deed dated December 10, 1952, recorded May 27, 1953, as document No. 405819, in Book 70 of Deeds, at page 386, Official Records of Clark County Nevada.

SUBJECT TO rights of way, restrictions, reservations and easements existing or of record.

SAID PROPERTY transferred hereby was duly determined to be surplus, and was assigned to the General Services Administration for disposal pursuant to the Federal Property and Administrative Services Act of 1949 (63 Stat. 377), as amended, and applicable rules, orders and regulations.

TO HAVE AND TO HOLD, all and singular, the said premises, with the improvements thereon, unto the said GRANTEE, its successors and assigns subject to the following covenants, restrictions, conditions and reservations of the:

NATIONAL SECURITY CLAUSE

Whereas, the Secretary of Defense pursuant to section 4 (1) of the National Industrial Reserve Act of 1948 (Pub. Law 883, 80th Cong.) has designated the premises hereby conveyed a part of the National Industrial Reserve for the production of Ammonium Perchlorate at an annual capacity of two (2) million pounds per month and in the event of mobilization at the rate of three (3) million pounds per month, production to be attained within four (4) months after notification, and, whereas, pursuant to section 4 (4) of that act, it has authorized their disposal subject to a National Security Clause formulated in accordance with that Act; now therefore, in consideration of their respective obligations under this instrument, the parties hereto, for themselves, their heirs, successors, and assigns, do hereby enter into the terms, covenants, and conditions hereinafter set forth which shall, together with this paragraph be collectively known and referred to as the National Security Clause.

ARTICLE I. - Definitions. For purposes of this Clause the following definitions will apply:

(a) The term "premises" means the property transferred by this instrument.

(b) The term "assigned function" means the function for which the premises have been designated a part of the National Industrial Reserve or for which they may be hereafter redesignated under Article IX hereof.

(c) The term "production equipment" means all property, other than property transferred by this instrument, at any time in or appurtenant to the premises which is necessary to their assigned function or to their current operations.

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(d) The term "facilities" means the sum total of the premises and the production equipment.

ARTICLE II. Maintenance. The Grantee hereby covenants and agrees that it will maintain the facilities in such a manner that they can be placed, within a period of 120 days, in a condition adequate to perform the assigned function of the premises.

In addition, the Grantee covenants and agrees,

(a) That it will maintain in accordance with sound practice in the industry, normal wear and tear excepted, that part of the facilities necessary for the assigned function of the premises which is actively being used in its current operations;

(b) That it will not make any alterations to the facilities which would impair performance of the assigned function of the premises, unless each such alteration can be restored in a period of 60 days or less and the sum total thereof restored in 120 days or less; and

(c) That it will not dispose of any production equipment, or any machinery and equipment transferred as a part of the premises by this instrument, the disposal of which would impair performance of the assigned function of the premises, unless the items so disposed of are immediately replaced with equivalent items.

PROVIDED, however, That the provisions of this Article shall not apply to timber structures and their appurtenances for more than 10 years from the date hereof, or to machinery and equipment for more than 10 years from the date hereof; and provided further, that nothing herein contained shall prevent the Grantee from relocating any machinery or equipment within the premises for the purpose of improving operating efficiency or increasing productive capacity so long as the standards of care set forth above are continually observed.

ARTICLE III. Defaults --(a) Inspections. The Grantee and the Government mutually covenant and agree that the latter may, after reasonable prior written notice to the Grantee, inspect the facilities for the purpose of determining whether the Grantee is in default on its obligations under this Clause.

(b) Determinations of default. If, as a result of such inspections, the Government adjudges the Grantee in default, it shall furnish the latter a written statement setting forth in detail the grounds on which the allegations are based, following which the Grantee shall have thirty days to submit evidence to the contrary. If in the light of the evidence so presented, the Government still holds that the Grantee is in default, it shall then advise the latter of the specific defaults to be corrected and the periods of time in which each correction must be completed, such periods to be as reasonable as possible.

(c) Repairs by the Government. In the event the Grantee fails to correct its defaults in the times stated, the Government shall then have the right to enter the premises for the purpose of correcting the defaults; and the Grantee, or its sureties, will reimburse the Government for all costs incurred by the Government in making such corrections. The Government, or any contractor employed by the Government for the purpose, shall have such right of access to the premises or any part thereof as may be necessary to permit such repairs or replacements.

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(American Potash & Chemical Corporation)

ARTICLE IV. Government utilization -- (a) Negotiation of contract. The Grantee and the Government mutually covenant and agree that, whenever the Government considers the productive capacity of the facilities necessary for national security purposes, they will jointly undertake to negotiate a contract for the Grantee to furnish from the facilities the materials or services for which the premises are designated a part of the National Industrial Reserve.

(b) Repossession. The Grantee hereby covenants and agrees that, in the event the Government determines such a contract is not feasible, or that the Grantee is not qualified to furnish the materials or services required, or that a mutually satisfactory contract cannot be negotiated, the Grantee will turn over to the Government full possession of the premises together with all structures, improvements, easements, rights-of-way, and other interests appurtenant thereto (including all rights-of-way over and across other property of the Grantee necessary or convenient to the operation or use of the facilities) for such time as the Government deems necessary for national security purposes. The Grantee further agrees that it will lease to the Government, upon the latter's request and for a period co-extensive with the Government's repossession of the premises, any or all of the production equipment owned or controlled by the Grantee. The Government's rights to such possession and usage, together with its right to lease properties of the Grantee hereunder, shall vest on the date set by it in written notice to the Grantee, which date shall be not less than 15 days from the date of notice thereof, and shall expire on the termination date of this National Security Clause as provided for in Article XI below.

(c) Withdrawal by the Grantee. The Grantee hereby covenants and agrees that, upon the date set for transfer of the premises to the Government, it will immediately undertake to restore such alterations made by it and to remove such improvements, fixtures, machinery and other equipment installed by it as the Government may direct, such undertakings to be completed in the shortest possible time, but in no event to exceed 120 days from the date of repossession unless otherwise agreed upon between the Grantee and the Government. Thereafter, the Grantee shall have no further right to enter the premises during the period of Government possession except with the prior consent of the latter. During any period of Government possession, the premises may be used, occupied, or operated for or on behalf of the Government by any government department, agency, agent or by any tenant, contractor, or subcontractor of the Government.

ARTICLE V. Compensation. The Government hereby covenants and agrees that, upon any repossession under IV (b) above, it will pay the Grantee:

(a) At the time of repossession. (i) Fair and reasonable compensation for all losses, not including loss of profits, incurred by the Grantee or its assignees in respect of work in process in the premises which cannot be completed because of repossession by the Government.

(ii) Fair and reasonable costs incurred by the Grantee or its assigness in complying with Article IV (c).

(b) During each period of possession. (i) Fair and reasonable compensation for the use of the premises as agreed on by the parties hereto at a rate not in excess of prevailing rental for similar properties.

(ii) Fair and reasonable compensation for the use of any production equipment as agreed on by the parties hereto as a rate not in excess of prevailing rental for similar properties.

(c) Upon termination of each period of possession. Fair and reasonable costs incident to reinstallation of machinery and equipment removed from the premises and restoration of the premises to their condition on the date of repossession by the Government, reasonable depreciation excepted.

Any failure of the parties to reach agreement as to what amounts are fair and reasonable under this Article shall be deemed a dispute of fact within the meaning of Article XIII hereof.

ARTICLE VI. Insurance. The Grantee hereby covenants and agrees that the proceeds of any insurance which is required of the Grantee by the terms of this instrument, or any other agreement between it and the Government, to be placed on the premises or any part thereof will be applied, upon damage to or destruction of the premises by fire or other insurable casualty, to a restoration of the property, unless the Grantee is expressly released from such obligation by the Government.

ARTICLE VII. Subsequent Transfers. The Grantee hereby covenants and agrees not to sell, lease, mortgage, or otherwise encumber the facilities without expressly making such sale, lease, mortgage, or encumbrance subject to the provisions of this National Security Clause for the remainder of its term.

ARTICLE VIII. Parties. The Grantee and the Government mutually agree that the latter, in exercising its rights and carrying out its obligations under this National Security Clause, shall act through the Secretary of Defense or such departments, agencies, or individuals as he may designate, which may include, without limitation, the Assistant Secretaries of Defense (S and L) and (P and I), Board, the Departments of the Army, Navy, or Air Force, or the General Services Administration. References in this National Security Clause to the Government shall be deemed to refer as appropriate to the Secretary of Defense or such departments, agencies, or individuals as he may designate.

ARTICLE IX. Redesignation of purpose and use of premises. The Government hereby covenants and agrees that, upon a petition by the Grantee for a change in the assigned function of the premises, it will re-evaluate the defense potential of the premises, both for the purposes for which they are designated for inclusion in the National Industrial Reserve and those for which it is requested they be redesignated, and will, if it deems the interests of national security are best served thereby, and upon tender by the Grantee of whatever consideration may be requested, change their designation to that requested by the Grantee. Conversely, the Government may, on its own initiative, recommend a redesignation to the Grantee which, if acceptable to the latter, shall be put into effect. Redesignations under this paragraph may be made only by written instrument and may not be requested by the Grantee more often than once in 6 months.

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ARTICLE X. Modification or amendment of the National Security Clause. The Government hereby covenants and agrees that, upon a petition by the Grantee for a reconsideration of the particular applicability of any of the terms, conditions, reservations or restrictions of the National Security Clause, the Government will, if it deems the interests of national security are best served thereby, modify or amend the Clause to the degree it sees fit upon tender by the Grantee of whatever consideration may be requested. Conversely, the Government may, on its own initiative, recommend modifications or amendments to the Grantee, which, if acceptable to the latter, shall be put into effect.

ARTICLE XI. Termination or revocation of the National Security Clause. The Government and the Grantee mutually covenant and agree that their respective obligations under this National Security Clause, except those of the Grantee to reimburse the Government under Article III, or of the Government to furnish compensation under Article V, and except as may be otherwise specified herein, shall terminate 10 years following the date of this instrument or, in the event the Government is in possession at that time in accordance with Article IV (b), upon release of possession by the Government to the Grantee: PROVIDED, HOWEVER, That the Government, at its own election, or upon a petition by the Grantee, may reconsider the necessity for continuing all or any part of the Clause in effect and shall, in the event it determines such necessity no longer exists, and upon tender by the Grantee or whatever consideration may be requested, revoke the Clause, in whole or in part, by executing and delivering to the Grantee a release, quitclaim deed, or whatever instrument is necessary to remove the encumbrance of the Clause, or of a part thereof, from the facilities.

ARTICLE XII. Covenants. It is the intention of both the Grantee and the Government that these covenants shall run with the land and bind subsequent purchasers of the premises hereby conveyed: PROVIDED, HOWEVER, That the Grantee shall not be liable for any violation of said covenants by subsequent owners of the premises.

ARTICLE XIII. Disputes. Disputes on questions of fact which cannot be resolved by agreement of the parties shall be decided by the Secretary of Defense or the instrumentality duly and expressly designated by him, whose decision shall be final and conclusive. In connection with any proceeding under this Article, the Grantee shall be afforded an opportunity to be heard and to offer evidence in support of its own case. Pending final decision of a dispute hereunder, the Grantee shall proceed diligently with the performance of its obligations under the Clause.

ARTICLE XIV. Recordation. The Grantee shall forthwith cause this instrument to be duly recorded and shall furnish satisfactory evidence of such to the Government.

ARTICLE XV. Saving provision. The Grantee and the Government mutually covenant and agree that nothing in this Clause shall be construed as affecting obligations of the Grantee under any other provisions of this instrument, except that, in any cases of inconsistency or ambiguity, the provisions of this National Security Clause shall, to the extent that they impose greater obligations on the Grantee, be deemed controlling.

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DOD #473 and National Industrial Reserve Plant,
DOD #217, - N-Nev-415
(American Potash and Chemical Corporation)

IN WITNESS WHEREOF, the GOVERNMENT has caused these presents to be executed as of the day and year first above written.

UNITED STATES OF AMERICA
Acting by and through the
ADMINISTRATOR OF GENERAL SERVICES

By_____
Fred H. Johnston
Chief, Real Property Division
Utilization and Disposal Service
General Services Administration
Region 9, San Francisco, California

STATE OF CALIFORNIA)
(ss:
City and County of San Francisco)

On this_____day of_____, 1962, before me, Sigrid E. Anderson, a Notary Public in and for the City and County of San Francisco, State of California, personally appeared FRED H. JOHNSTON, known to me to be the Chief, Real Property Division, Utilization and Disposal Service, General Services Administration, Region 9, San Francisco, California, and acknowledged that he executed the within instrument on behalf of the United States of America, acting by and through the Administrator of General Services.

WITNESS my hand and official seal.

_____
Sigrid E. Anderson
Notary Public
in and for the City and County of
San Francisco, State of California

My Commission Expires: March 4, 1965

(S E A L)

SEAL AFFIXED

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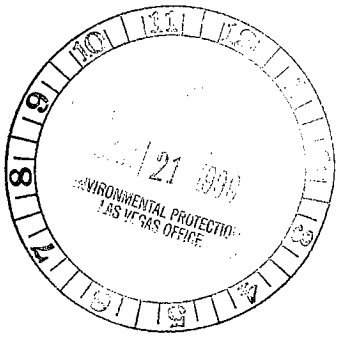
KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

January 11, 1999



Ms. Brenda Pohlmann
Remediation Branch Supervisor
Nevada Division of Environmental Protection
555 E. Washington, Suite 4300
Las Vegas, NV 89101

Dear Ms. Pohlmann:

Subject: Perchlorate Monthly Activity Status

Following is the current status of Kerr-McGee Chemical LLC's (KMC) activities regarding the perchlorate issue:

- **Off-Site Characterization** - KMC prepared a Historical Information Report related to off-site subsurface geological characterization and submitted this for NDEP review and approval January 16, 1998. This review included a Sampling Plan describing additional field activities necessary to more fully characterize the area between the KMC facility and the Las Vegas Wash. NDEP comments were received March 1998, and activities associated with the Sampling Plan were completed. A report, including the results of the additional drilling, was submitted to NDEP on July 15, 1998. An additional pump test was completed on Well PC-70 in the Pittman Lateral area. This pump test yielded information which has allowed for better quantification of the hydrogeologic characteristics of the Pittman Lateral area. A report summarizing the PC-70 pump test information has been submitted under separate cover to NDEP.

- **On-Site Groundwater Holding Pond** - KMC constructed an 11-acre retention basin to retain perchlorate-impacted groundwater until a suitable perchlorate treatment technology has been determined. Groundwater from the KMC facility, already intercepted to remediate for chromium, is being placed into the basin until a treatment technology for perchlorate is developed. PE certification of the basin's construction per the drawings will be provided to NDEP. Modifications of the Henderson facility UIC Permit and NPDES Permit, both to include use of the pond, has been completed.

- As indicated above, a modification of the Henderson **Underground Injection Control (UIC) Permit** has been completed. The modification was needed to allow use of an 11-acre retention basin to retain perchlorate-impacted groundwater as source control until a suitable treatment technology has been determined. Groundwater from the KMC facility, already intercepted to remediate for chromium, is being placed into the pond until a treatment technology for perchlorate is developed. At that time, the groundwater is intended for reinjection. The permit modification allows that, as the intercepted groundwater is placed into the 11-acre retention basin for holding, an equal amount of Lake Water be injected into the recharge trenches to replace the water which is diverted to the basin. The pond is in use, and Lake Mead water is being fed to the recharge trenches.

- A request to modify the Henderson NPDES Permit has also been approved by NDEP. Inclusion of the 11-acre basin was needed.

- Counsel for KMC and NDEP continue to discuss an appropriate legal structure for on-going perchlorate related activities.

- KMC has initiated an investigation into remedial alternatives for reduction of perchlorate concentrations in water. A report summarizing on-site groundwater treatability studies was submitted to NDEP in November 1998. A final design assessment is being developed.

KMC is committed to act responsibly and cooperate fully with local, state, and federal officials in determining appropriate remedial actions. Please feel free to contact me at (702) 651-2200 if you have any questions related to this information. Thank you.

Sincerely,

SM Crowley

Susan M. Crowley
Staff Environmental Specialist

By certified mail
cc: PSCorbett
EMSpore
TWReed
WOGreen
RHJones
LKBailey
ALDooley
Robert Kelso (NDEP)
Doug Zimmerman (NDEP)
Jeanne-Marie Bruno Metro Water District Of Southern California
Barry Conaty, City of Henderson
Pat Mulroy, Southern Nevada Water Authority
Kevin Meyer, EPA Region IX

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TELEPHONE 32-2-549-5230
FACSIMILE 32-2-502-1598

January 11, 1999

The Honorable Richard Danzig
Secretary of the Navy
U.S. Department of the Navy
The Pentagon
Room 4E724
Washington, D.C. 20350

Re: Henderson Nevada, BMI Complex
Environmental Response Costs

Dear Mr. Secretary:

At the request of Kerr McGee Chemical LLC ("Kerr McGee"), I am providing notice to the United States Navy regarding an environmental issue at the BMI Complex in Henderson, Nevada, for which the United States Navy would appear to have direct and unequivocal responsibility. This letter is without prejudice to other environmental claims that Kerr McGee and other companies historically active at the BMI Complex may have with respect to other activities of agencies and departments of the United States government at Henderson.

This environmental issue arises from the 1997 discovery in groundwater and in Lake Mead of detectable quantities of perchlorate. The attached April 17, 1998, response by Kerr McGee to an information request from the United States Environmental Protection Agency outlines the history of perchlorate manufacture at the Henderson, Nevada facility. The company's research shows that the United States Navy owned and operated a portion of this facility for production of perchlorate at Henderson up until 1962 and that naval personnel were present at the site to supervise production. This property was relinquished by the United States to the American Potash and Chemical

Corporation on March 15, 1962 pursuant to a quitclaim deed (copy attached). The deed contains a "National Security Clause" designating the premises relinquished as part of the "National Industrial Reserve" for production of ammonium perchlorate at a rate of 2 million pounds per month. Kerr McGee acquired the same facilities in 1967 by way of merger with American Potash.

Available production records indicate that approximately 50,000 tons of ammonium perchlorate and more than 10,000 tons of potassium perchlorate were produced at the Henderson facility in the period of direct operations by the Navy (1951-62). Moreover, the operations of the United States Navy at Henderson occurred in a period before adoption of modern environmental regulations that caused Kerr McGee to become a "zero discharge" facility in the 1970s. Since the plume of perchlorate in groundwater may reflect loss of perchlorate from manufacturing operations and related waste effluents at the Henderson facility, the United States Navy may fairly be requested to participate in further investigation and, if appropriate, remediation of this perchlorate plume.

Kerr McGee has committed to the State of Nevada promptly to investigate economically and technically feasible measures of remediation to abate the perchlorate levels in groundwater beneath and adjacent to the Henderson facility. It has already expended hundreds of thousands of dollars on this effort and confronts significant additional costs in the year ahead. Accordingly, we would like to initiate immediate discussions with the Department of the Navy regarding an appropriate role for the Navy in the conduct of these endeavors. To date, the Environmental Protection Agency has foregone assertion of authority over this site under CERCLA in deference to the State of Nevada, but we understand that the Agency continues to monitor this situation closely.

On behalf of Kerr McGee, I would be grateful for a prompt response advising how best to proceed in involving the United States Navy in these ongoing response activities.

Sincerely,

John T. Smith II

Attachments
cc: Doug Zimmerman
Nevada Division of Environmental Protection

bcc: Joel Mack
Susan Stewart

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April 17, 1998

VIA FEDERAL EXPRESS

John Kemmerer
Chief, Superfund Site
Cleanup Branch
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, CA. 94105-3901

Dear Mr. Kemmerer:

This letter responds to your request of March 11, 1998, to Patrick Corbett of Kerr-McGee Chemical LLC (KMCLLC), successor via merger to Kerr-McGee Chemical Corporation, seeking information pursuant to Section 104(e) of CERCLA and Section 3007 of RCRA regarding production and use of perchlorate-containing chemicals. KMCLLC has endeavored to answer each of your questions to the best of its ability, based upon information that could be obtained in the time allowed for KMCLLC to respond.

We are continuing research on the historical ownership and operations of KMCLLC's Henderson, Nevada facility, including the role of the federal government in the period 1945-62. For instance, it appears that during this period the United States Navy played a significant role in ownership and operation of a plant for production of ammonium perchlorate and that a senior naval officer was assigned to this facility until 1962. KMCLLC reserves the right to amend or supplement its answers based upon the fruits of ongoing research.

1. What year did production of perchlorate-containing chemicals begin?

At Henderson, Nevada, production of potassium perchlorate began in 1945, and production of ammonium perchlorate began on a pilot scale basis in 1948, with full commercial scale production beginning in 1951. Also, production of sodium perchlorate began in 1945 for use as a precursor in production of potassium perchlorate.

2. What entities have owned/operated the plant? Please provide the dates when ownership or operating control changed.

KMCLLC's Henderson facility was originally owned and constructed by the Defense Plant Corporation (DPC) acting for the U.S. government in 1941. From August 1942 until November 1944, the plant was operated by Basic Magnesium Incorporated on behalf of the U.S. government to manufacture magnesium that was used in aircraft production. The magnesium plant closed in November 1944, and the federal Reconstruction Finance Corporation (RFC) assumed control of the plant from the DPC. The RFC relinquished custody of the plant to the federal War Assets Administration in October 1946. In June 1949, most of this overall industrial complex was transferred to the Colorado River Commission (CRC), an instrumentality of the State of Nevada. As noted below, the CRC conveyed a portion of the site to Western Electro Chemical Company (WECCO) in 1952. The United States apparently retained or regained ownership of a substantial portion (290.33 acres) for which it did not relinquish ownership finally until March 1962, when this acreage was conveyed to the American Potash and Chemical Corporation (AP&CC).

WECCO was the first privately owned company to operate on the site that was to become the KMCLLC facility. It operated at the site from approximately 1945 through 1955. In May 1945, WECCO contracted with the DPC for the production of perchlorates for the U.S. Department of the Navy. Operations began by June or July 1945, but ceased right after the war's end in August 1945. Subsequently, WECCO resumed operations under a lease from the RFC in February 1946. WECCO acquired portions of the site from the CRC in May 1952.

As previously noted, the U.S. Navy remained active at the site until 1962. Apparently, the Navy spent $8 million to construct an ammonium perchlorate plant at the site in an area separate from the WECCO-owned chlorate and perchlorate units that were converted from the WW II plant, and it was this plant that was used by KMCLLC to produce ammonium perchlorate. WECCO, and then AP&CC, operated this plant under contract for the Navy, which apparently retained ownership and a supervisory role through a Navy Captain assigned to the site. It is likely that this plant occupied the 290.33 acres for which the United States finally relinquished ownership in 1962.

In 1955, WECCO was merged with AP&CC, and the merged entity continued the production of chlorates and perchlorates. KMCLLC acquired the present facility from AP&CC in 1967 by means of a merger.

3. Which specific perchlorate-containing compounds were manufactured?

Sodium perchlorate, potassium perchlorate, ammonium perchlorate, and magnesium perchlorate.

4. What was the total annual production of perchlorate-containing compounds at the plant in Henderson, Nevada? What was the annual production of each specific perchlorate-containing compound?

See Attachment 1. Figures are not readily available for potassium perchlorate production or ammonium perchlorate production between 1945-1951. Also, as previously noted, sodium perchlorate manufacture began in 1945 as a precursor to the production of potassium perchlorate. No separate production figures exist for such precursor sodium perchlorate. KMCLLC began manufacture of sodium perchlorate for end uses in 1968.

5 & 6. What were the end uses of the perchlorate-containing compounds and what was the approximate percentage of production sold for each of the end uses?

a. Sodium perchlorate -- precursor to potassium and ammonium perchlorate, and explosives.

b. Potassium perchlorate -- solid rocket fuel oxidizer, flares, and pyrotechnics.

c. Ammonium perchlorate -- solid rocket fuel oxidizer, explosives, chemicals and pyrotechnics.

d. Magnesium-perchlorate -- military batteries.

End-use information for 1997 is deemed to be reasonably reflective of historical uses. In 1997, 87% of production went for use as rocket fuel; 8% for

use in explosives, and 5% as a chemical feedstock. Historic use in flares and pyrotechnics would have been relatively small.

7. Please provide the name and address of each entity to whom perchlorate-containing compounds were shipped each year from the Kerr-McGee facility (more than 500 pounds in any year)?

See Attachment 2. The customer names and addresses furnished reflect KMCLLC shipments from 1978 through the present. Customer records antedating 1978 are not readily available. Normal retention of such sales data by KMCLLC is 10 years.

8. Please identify the locations of other perchlorate-containing chemical production facilities owned, operated or previously owned or operated by Kerr-McGee in the United States?

There have been none.

9. Please provide answers to the above questions (1-7) for any other Kerr-McGee facilities producing or previously producing perchlorate-containing compounds.

There are none.

10. EPA has been informed that production of perchlorate-containing compounds in the U.S. is limited to Kerr-McGee and WECCO in Cedar City, Utah (formerly the PEPCON facility in Henderson, Nevada). Please confirm to the best of your knowledge, whether this information is accurate. If you do have knowledge of perchlorate-containing compound production plants in the United States, other than those owned or operated by Kerr-McGee or WECCO, please provide the names, locations and years of operation, if known.

EPA is correct that production of perchlorate-containing compounds in the U.S. is currently limited to the Henderson facility and the Cedar City, Utah facility operated by American Pacific. In addition to the former PEPCON facility in Henderson, which operated from 1958 to 1988, Kerr McGee knows of four

other facilities that have produced perchlorate compounds. (The dates for production at these facilities are estimates.). They are:

1. Western Electro Chemical Company, 1941-48, Los Angeles, California.

2. Hooker Chemicals (now Oxychem), approximately 1940-75, Niagara Falls, New York.

3. HEF, Inc. -- Hooker Chemical & Foote Mineral (now Eka Nobel), 1958-65, Columbus, Mississippi.

4. Pennsalt (Pennwalt), now Elf Atochem, 1958-65, Portland, Oregon.

* * * *

Again, KMCLLC intends to supplement this response with any additional information that its ongoing research may reveal. Please let me know if EPA has any questions about the information furnished in this response.

Sincerely,

John T. Smith II

Attachments (2)

cc: Douglas Zimmerman, NDEP -- By Federal Express

ATTACHMENT 1

Perchlorate Chemical Production - Henderson,NV 1951-1997

4033

YEAR	PRODUCT			
	SODIUM PERCHLORATE	AMMONIUM PERCHLORATE	MAGNESIUM PERCHLORATE	POTASSIUM PERCHLORATE
1951	-	379	-	3,077
1952	-	1,218	-	3,605
1953	-	1,571	-	3,562
1954	-	3,974	-	158
1955	-	3,239	-	651
1956	-	3,738	-	490
1957	-	3,427	-	336
1958	-	6,746	-	309
1959	-	10,888	-	378
1960	-	5,600	-	150
1961	-	10,279	-	122
1962	-	8,511	-	206
1963	-	11,220	-	117
1964	-	9,240	-	222
1965	-	3,841	-	-
1966	-	6,511	-	161
1967	-	8,456	-	304
1968	113	5,893	-	465
1969	71	6,001	12	535
1970	375	7,692	6	516
1971	142	3,835	-	344
1972	61	7,576	180	463
1973	75	6,781	247	526
1974	62	6,163	249	768
1975	41	4,443	42	266
1976	142	5,152	(8)	763
1977	416	5,857	-	949
1978	333	5,151	-	762
1979	804	6,542	-	830
1980	1,383	6,282	-	524
1981	1,567	6,174	-	386
1982	942	7,075	-	359
1983	841	8,531	-	(2)
1984	1,366	12,366	-	-
1985	1,878	14,116	-	-
1986	1,259	14,758	-	-
1987	1,061	14,053	-	-
1988	1,346	15,368	-	-
1989	262	18,033	-	-
1990	279	19,478	-	-
1991	356	10,803	-	-
1992	472	7,179	-	-
1993	734	8,920	-	-
1994	829	10,919	-	-
1995	681	6,010	-	-
1996	684	4,214	-	-
1997	735	5,303	-	-

ATTACHMENT 2

Perchlorate Company Names/Addresses

"Ship to:"	Name/address
Alabama	
Huntsville	Thiokol Corporation Plant closed. Current address of related division--PO Box 707, Brigham City, UT 84302-0707
Parrish	Boren Ireco (formerly Gulf & Thermex), 5425 Hwy 269, Parrish, Ala 35560
Redstone	U. S. Army, Redstone Arsenal, Al 35898-5330
Bessemer	Hercules, Inc. Now Alliant Tech –see Utah Division address
Arkansas	
E. Camden	Atlantic Research Corp., PO Box 1036, Camden, AR 71701
E. Camden	Mining Services International, address not available
Woodbury	Hitech Inc., PO Box 3112, East Camden, AR 71701
Midland	SECO Inc., Austin Powder, 25800 Science Park Dr., Cleveland, O 44122
Arizona	
Goodyear	Unidynamics, 102 S. Litchfield Rd., Goodyear, AZ 85338
Mesa	Talley Defense Systems, Inc., PO Box 849, Mesa, AZ 85211
Tempe	Aerodyne Corp., PO Box 725, Tempe, AZ 85281
Chandler	Aerodyne Corp., PO Box 725, Tempe, AZ 85281
Phoenix	Universal Propulsion, 25401 N. Central Ave., Phoenix, AZ 85027
California	
Aliso Viejo	G. G Industies, PO Box 8065, Laguna Hills, CA 92654
Auburn	Mason Holodyne, 90 Pinecrest Dr., Applegate, CA 95703
Barstow	Roy's Gun and Lock, address not available
Barstow	Mojave Pyrotechnic, address not available
China Lake	Naval Air Warfare Center, 671 Nimitz, China Lake, CA 93555
Edwards AFB	Edwards AFB, CA 93523
Gardena	T.O.P.T.H., 2848 E. 208th St., Long Beach CA 90810

Colorado	
Englewood	Gateway Safety Products, address n/a
Penrose	Estes Industries, PO Box 227, Penrose, CO 81240
Whitewater	KSI Inc., 1471 Blair Rd. Whitewater, CO 81527
Colo. Springs	Vulcan Systems, PO Box 6099, Colorado Springs, CO 80934
Florida	
Brooksville	Thermex Energy, 13601 Preston Rd., Suite 900 West, Dallas, Tx 75240
Hollywood	CCT, address n/a
Eglin	Eglin AFB, Eglin, FL 32542
Georgia	
Byron	ICI Americas (formerly Pyrotechnic Specialties), PO Box 819, Valley Forge, PA 19482
Idaho	
Pocatello	Firefox Enterprises, 11612 North Nelson Lane, Pocatello, Idaho 83202
Illinois	
Marion	Olin Corp., PO Box 278, Marion IL 62959
Chicago	Harold Dunbar Paper Co., address n/a
South Beloit	Lakeside Fusee, address n/a
Danville	World Fireworks, address n/a
Danville	Star Fireworks, address n/a
Edwardsville	Propellex, PO Box 387, Edwardsville, IL 62025
Joliet	Talley Defence Systems, PO Box 849, Mesa, AZ 85211
Indiana	
Peru	Olin Corp., RR 6 Box 542, Peru, IN 46970
Kingsbury	Melrose Fireworks, PO Box 302, Kingsbury, In 46345
Kingsbury	Aerial Dynamics, PO Box 304, Kingsbury, IND 46345
Kingsbury	Kingsbury Industries, address n/a
Kansas	
Hallowell	Thermex (formerly Gulf Oil), 13601 Preston Rd., Suite 900 W., Dallas TX 75240
Hallowell	Slurry Explosives (formerly El Dorado), PO Box 348, Columbus, KS 66725

Kansas cont.	
Herrington	Hodgdon Powder/ Pyrodex Corp., address n/a
Louisiana	
New Orleans	Burlett Chemicals, address n/a
Michigan	
Ishperming	Ireco Inc., 11th Floor Crossroads Tower, Salt Lake City, U 84144
Mississippi	
Foxsworth	Rebel Fireworks, Inc., address not available
Maryland	
Indian Head	Naval Surface Warfare Center, 202 Strauss Ave., Indian Head, MD 20640
Elkton	Thiokol Corp., PO Box 241, Elkton, MD 21922
Elkton	New Jersey Fireworks, Mfg., address n/a
Cumberland	Alliant Tech (formerly Hercules, Inc.), current address W. Va.
Easton	Samuel Jackson Fusee Co., address n/a
Silver Springs	Naval Surface Warfare Center, 10901 New Hampshire Ave., Silver Springs, MD 20903
Minnesota	
Biwabik	Thermex Energy, 13601 Preston Rd., Suite 900 W., Dallas, TX 75240
Biwabik	Nitrochem Energy Corp., PO Box B, Biwabik, Minn 55708
Gilbert	Cook Slurry, Cook Associates, 2026 Beneficial Life Tower, 3650 State St., SLC, Utah 84111
Foley	Aerial Arts, 18355 165th St NE, Foley, Minn 56329
Missouri	
Joplin	Atlas Powder, PO Box 87, Joplin, MO 64801
Joplin	ICI, PO Box 819, Valley Forge, PA 19482
Atlas	Atlas Powder, PO Box 87, Joplin, MO 64801
New Jersey	
Newfield	Shieldalloy Corp., 12 West Blvd., PO Box 768, Newfield, NJ 08344-0768
South Plainfield	Hummel Croton, Inc., PO Box 250, So. Plainfield, NJ 07080
Boonton	Standard RWY Fusee Co., address n/a

New Jersey cont.	
Orange	H. Reisman Corp., 3?? Crane St., Orange, NY 07051
Newark	Fairmount Chemical, address n/a
Nevada	
Sparks	Hi Shear Industries, 2830 W. Lomita Blvd., Torrance CA 90505
Las Vegas	Aerotech/ISP, 1955 S. Palm, Suite 5, Las Vegas, NV 89104
Lockwood	Largo Marsino, Defense Supply, 204 Edison Way, Reno, NV 89502
Fernley	BOKMA Resources, PO Box 590, Fernely, NV 89408
New Mexico	
Roswell	Longhorn Mfg. Co., address not available
New York	
Brooklyn	Witco Chemical Corp., 700 Court St., Brooklyn, NY 11231
Delanson	Fireworks by Grucci, One Grucci Lane, Brookhaven, NY 11719
North Carolina	
McCleansville	Gulf Oil, Po Box 183, McCleansville, NC 27301
Riegelwood	Wright Chemical, Atlas Powder, PO Box 271, Tamaqua, PA 18252
North Dakota	
Fargo	Starr Display Fireworks, PO Box 9574, Fargo, ND 58106
Kindred	Dakota Pyrotechnic, 16250 57th S. E., Kindred, ND 58051
Harwood	Starr Display Fireworks, PO Box 9574, Fargo, ND 58106
Ohio	
Columbus	G. F. Smith Chemicals, PO Box 245, Powell, Ohio 43065
Cincinnati	Fanaco Inc., address n/a
Steubenville	Barium & Chemicals, address n/a
Fostoria	Standard RWY Fusee Co., address n/a
Marietta	Servo Dynamics, see Corpus Christi address
Lisbon	Hilltop Energy Inc., An/Gel International, 33 C. St., Salt Lake City, U 84103

Pennsylvania	
Hatfield	Aerial Arts, 18355 163st N.E. Foley, Minn. 56329
Telford	Service Chemical Inc., address n/a
Tamaqua	Atlas Powder Co., PO Box 271, Tamaqua, PA 18252
Mt. Carmel	Explo-Tech, Inc., An/Gel Int., 33 C. St., SLC, U 84103
Kittanning	KESCO Inc., PO Box 95. Adrian, Pa 16210-0095
South Carolina	
Columbia	Phillips Components, 6071 St. Andrews Rd., Columbia, SC 29212
Tennessee	
Toone	Kilgore Corp., Kilgore Drive, Toone, TN 38381
Louisville	Southwestern Energy, An/Gel International, 33 C. St, SLC, U 84103
Texas	
Karnack	Thiokol Corp. Plant closed—see address for Utah division
Corpus Christi	Servo Dynamics, Inc., Rt. 1, Box 132 E. Roddfield, Corpus Christi, TX 78414
McGregor	Alliant Tech (formerly Hercules, Inc.) Plant closed—see address for Utah division
Kennedale	Harrison Jet Guns, 6915 Hudson Village Creek Rd., Kennedale, TX 76060
Mansfield	Shaped Charge Specialties, address not available
Marshall	RTF Enterprises, address n/a
Rosharon	Slumberger, PO Box 1590, Rosharon, TX 77583
Houston	Thermex (formerly Gulf), 13601 Preston Rd., Suite 900 West, Dallas, TX 75240
Waco	M & M Chemical, 103 Stovall, Waco TX 76706
Utah	
Magna	Alliant Tech, PO Box 98, Magna UT 84044
Brigham City	Thiokol Corporation, PO Box 707, Bngham City, UT 84302
Logan	Fireworks West, address n/a
Lehi	Dyno Nobel (formerly Ireco), 11th Floor, Crossroads Tower, Salt Lake City, UT 84144
Lehi	Western States Energy, Atlas Powder, 15301 Dallas Parkway, Suite 1200, Dallas, TX [illegible]

Utah cont.	
Ogden	Defense General Supply, 8000 Jefferson Davis Hwy, Richmond, VA 23297
Ogden	A & B Chemical Co., 2931 Second Ave., Suite 100, Richmond, VA 23222
Utah County	Dyno Nobel, formerly Cook Associates, 2026 Beneficial Life Tower, Salt Lake City, UT 8411
Salt Lake City	Hanex Products, 466 W. 200 South, Salt Lake City, UT 84101
Virgina	
Richmond	2931 Second Ave., Richmond VA 23222
Gainesville	Atlantic Research, 5945 Wellington Rd., Gainesville, VA 22065
Pepper	Hercules, Inc. (see Alliant Tech Utah address)
Yorktown	Defense General Supply, 8000 Jefferson Davis Hwy, Richmond, VA 23297
Duffield	Paige Ireco (formerly Gibson Explosives), PO Box 33, Duffield, VA 24244
Washington	
Olympia	Ireco Inc. (formerly Pacific Powder), 628 Columbia NW, Suite 1-A, Olympia, WA 98501
West Virginia	
Rocket Center	Alliant Techsystems, 210 Star Route 956, Rocket Center, WV 26725
Newell	Newell Specialties, State Route 2, Newell, WV 26050
Romney	Appalachian Explosives, An/Gel Int., 33 C St., Salt Lake City, UT 84103
Wisconsin	
Delafield	Bartolottas Fireworks, PO Box 5, Genesee Depot, WI 53127
Wyoming	
Mills	Thermex (formerly Gulf), 13601 Preston Rd., Suite 900 West, Dallas, TX 75240

thence South 8° 51' 37" East 1798.74 feet along said West line to a point from which the Southeast corner of Section 12 bears South 44° 25' 17" East 2059.78 feet; thence South 81° 08' 23" West 2654.99 feet to the true point of beginning, containing 138.9621 acres more or less.

TOGETHER WITH all of the GOVERNMENT'S rights, title and interest in and to that certain easement granted by Stauffer Chemical Company of Nevada, a Nevada Corporation, to the United States of America by easement deed dated December 10, 1952, recorded May 27, 1953, as document No. 405819, in Book 70 of Deeds, at page 386, Official Records of Clark County Nevada.

SUBJECT TO rights of way, restrictions, reservations and easements existing or of record.

SAID PROPERTY transferred hereby was duly determined to be surplus, and was assigned to the General Services Administration for disposal pursuant to the Federal Property and Administrative Services Act of 1949 (63 Stat. 377), as amended, and applicable rules, orders and regulations.

TO HAVE AND TO HOLD, all and singular, the said premises, with the improvements thereon, unto the said GRANTEE, its successors and assigns subject to the following covenants, restrictions, conditions and reservations of the:

NATIONAL SECURITY CLAUSE

Whereas, the Secretary of Defense pursuant to section 4 (1) of the National Industrial Reserve Act of 1948 (Pub. Law 883, 80th Cong.) has designated the premises hereby conveyed a part of the National Industrial Reserve for the production of Ammonium Perchlorate at an annual capacity of two (2) million pounds per month and in the event of mobilization at the rate of three (3) million pounds per month, production to be attained within four (4) months after notification, and, whereas, pursuant to section 4 (4) of that act, it has authorized their disposal subject to a National Security Clause formulated in accordance with that Act; now therefore, in consideration of their respective obligations under this instrument, the parties hereto, for themselves, their heirs, successors, and assigns, do hereby enter into the terms, covenants, and conditions hereinafter set forth which shall, together with this paragraph be collectively known and referred to as the National Security Clause.

ARTICLE I. Definitions. For purposes of this Clause the following definitions will apply:

(a) The term "premises" means the property transferred by this instrument.

(b) The term "assigned function" means the function for which the premises have been designated a part of the National Industrial Reserve or for which they may be hereafter redesignated under Article IX hereof.

(c) The term "production equipment" means all property, other than property transferred by this instrument, at any time in or appurtenant to the premises which is necessary to their assigned function or to their current operations.

Naval Industrial Reserve Ordnance Plant,
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(American Potash and Chemical Corporation)
&

(d) The term "facilities" means the sum total of the premises and the production equipment.

ARTICLE II. Maintenance. The Grantee hereby covenants and agrees that it will maintain the facilities in such a manner that they can be placed, within a period of 120 days, in a condition adequate to perform the assigned function of the premises.

In addition, the Grantee covenants and agrees,

(a) That it will maintain in accordance with sound practice in the industry, normal wear and tear excepted, that part of the facilities necessary for the assigned function of the premises which is actively being used in its current operations;

(b) That it will not make any alterations to the facilities which would impair performance of the assigned function of the premises, unless each such alteration can be restored in a period of 60 days or less and the sum total thereof restored in 120 days or less; and

(c) That it will not dispose of any production equipment, or any machinery and equipment transferred as a part of the premises by this instrument, the disposal of which would impair performance of the assigned function of the premises, unless the items so disposed of are immediately replaced with equivalent items.

PROVIDED, however, That the provisions of this Article shall not apply to timber structures and their appurtenances for more than 10 years from the date hereof, or to machinery and equipment for more than 10 years from the date hereof; and provided further, that nothing herein contained shall prevent the Grantee from relocating any machinery or equipment within the premises for the purpose of improving operating efficiency or increasing productive capacity so long as the standards of care set forth above are continually observed.

ARTICLE III. Defaults --(a) Inspections. The Grantee and the Government mutually covenant and agree that the latter may, after reasonable prior written notice to the Grantee, inspect the facilities for the purpose of determining whether the Grantee is in default on its obligations under this Clause.

(b) Determinations of default. If, as a result of such inspections, the Government adjudges the Grantee in default, it shall furnish the latter a written statement setting forth in detail the grounds on which the allegations are based, following which the Grantee shall have thirty days to submit evidence to the contrary. If in the light of the evidence so presented, the Government still holds that the Grantee is in default, it shall then advise the latter of the specific defaults to be corrected and the periods of time in which each correction must be completed, such periods to be as reasonable as possible.

(c) Repairs by the Government. In the event the Grantee fails to correct its defaults in the times stated, the Government shall then have the right to enter the premises for the purpose of correcting the defaults; and the Grantee, or its sureties, will reimburse the Government for all costs incurred by the Government in making such corrections. The Government, or any contractor employed by the Government for the purpose, shall have such right of access to the premises or any part thereof as may be necessary to permit such repairs or replacements.

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ARTICLE IV. Government utilization -- (a) Negotiation of contract. The Grantee and the Government mutually covenant and agree that, whenever the Government considers the productive capacity of the facilities necessary for national security purposes, they will jointly undertake to negotiate a contract for the Grantee to furnish from the facilities the materials or services for which the premises are designated a part of the National Industrial Reserve.

(b) Repossession. The Grantee hereby covenants and agrees that, in the event the Government determines such a contract is not feasible, or that the Grantee is not qualified to furnish the materials or services required, or that a mutually satisfactory contract cannot be negotiated, the Grantee will turn over to the Government full possession of the premises together with all structures, improvements, easements, rights-of-way, and other interests appurtenant thereto (including all rights-of-way over and across other property of the Grantee necessary or convenient to the operation or use of the facilities) for such time as the Government deems necessary for national security purposes. The Grantee further agrees that it will lease to the Government, upon the latter's request and for a period co-extensive with the Government's repossession of the premises, any or all of the production equipment owned or controlled by the Grantee. The Government's rights to such possession and usage, together with its right to lease properties of the Grantee hereunder, shall vest on the date set by it in written notice to the Grantee, which date shall be not less than 15 days from the date of notice thereof, and shall expire on the termination date of this National Security Clause as provided for in Article XI below.

(c) Withdrawal by the Grantee. The Grantee hereby covenants and agrees that, upon the date set for transfer of the premises to the Government, it will immediately undertake to restore such alterations made by it and to remove such improvements, fixtures, machinery and other equipment installed by it as the Government may direct, such undertakings to be completed in the shortest possible time, but in no event to exceed 120 days from the date of repossession unless otherwise agreed upon between the Grantee and the Government. Thereafter, the Grantee shall have no further right to enter the premises during the period of Government possession except with the prior consent of the latter. During any period of Government possession, the premises may be used, occupied, or operated for or on behalf of the Government by any government department, agency, agent or by any tenant, contractor, or subcontractor of the Government.

ARTICLE V. Compensation. The Government hereby covenants and agrees that, upon any repossession under IV (b) above, it will pay the Grantee:

(a) At the time of repossession. (i) Fair and reasonable compensation for all losses, not including loss of profits, incurred by the Grantee or its assignees in respect of work in process in the premises which cannot be completed because of repossession by the Government.

(ii) Fair and reasonable costs incurred by the Grantee or its assignees in complying with Article IV (c).

(b) During each period of possession. (i) Fair and reasonable compensation for the use of the premises as agreed on by the parties hereto at a rate not in excess of prevailing rental for similar properties.

(ii) Fair and reasonable compensation for the use of any production equipment as agreed on by the parties hereto as a rate not in excess of prevailing rental for similar properties.

(c) Upon termination of each period of possession. Fair and reasonable costs incident to reinstallation of machinery and equipment removed from the premises and restoration of the premises to their condition on the date of repossession by the Government, reasonable depreciation excepted.

Any failure of the parties to reach agreement as to what amounts are fair and reasonable under this Article shall be deemed a dispute of fact within the meaning of Article XIII hereof.

ARTICLE VI. Insurance. The Grantee hereby covenants and agrees that the proceeds of any insurance which is required of the Grantee by the terms of this instrument, or any other agreement between it and the Government, to be placed on the premises or any part thereof will be applied, upon damage to or destruction of the premises by fire or other insurable casualty, to a restoration of the property, unless the Grantee is expressly released from such obligation by the Government.

ARTICLE VII. Subsequent Transfers. The Grantee hereby covenants and agrees not to sell, lease, mortgage, or otherwise encumber the facilities without expressly making such sale, lease, mortgage, or encumbrance subject to the provisions of this National Security Clause for the remainder of its term.

ARTICLE VIII. Parties. The Grantee and the Government mutually agree that the latter, in exercising its rights and carrying out its obligations under this National Security Clause, shall act through the Secretary of Defense or such departments, agencies, or individuals as he may designate, which may include, without limitation, the Assistant Secretaries of Defense (S and L) and (P and I), Board, the Departments of the Army, Navy, or Air Force, or the General Services Administration. References in this National Security Clause to the Government shall be deemed to refer as appropriate to the Secretary of Defense or such departments, agencies, or individuals as he may designate.

ARTICLE IX. Redesignation of purpose and use of premises. The Government hereby covenants and agrees that, upon a petition by the Grantee for a change in the assigned function of the premises, it will re-evaluate the defense potential of the premises, both for the purposes for which they are designated for inclusion in the National Industrial Reserve and those for which it is requested they be redesignated, and will, if it deems the interests of national security are best served thereby, and upon tender by the Grantee of whatever consideration may be requested, change their designation to that requested by the Grantee. Conversely, the Government may, on its own initiative, recommend a redesignation to the Grantee which, if acceptable to the latter, shall be put into effect. Redesignations under this paragraph may be made only by written instrument and may not be requested by the Grantee more often than once in 6 months.

ARTICLE X. Modification or amendment of the National Security Clause. The Government hereby covenants and agrees that, upon a petition by the Grantee for a reconsideration of the particular applicability of any of the terms, conditions, reservations or restrictions of the National Security Clause, the Government will, if it deems the interests of national security are best served thereby, modify or amend the Clause to the degree it sees fit upon tender by the Grantee of whatever consideration may be requested. Conversely, the Government may, on its own initiative, recommend modifications or amendments to the Grantee, which, if acceptable to the latter, shall be put into effect.

ARTICLE XI. Termination or revocation of the National Security Clause. The Government and the Grantee mutually covenant and agree that their respective obligations under this National Security Clause, except those of the Grantee to reimburse the Government under Article III, or of the Government to furnish compensation under Article V, and except as may be otherwise specified herein, shall terminate 10 years following the date of this instrument or, in the event the Government is in possession at that time in accordance with Article IV (b), upon release of possession by the Government to the Grantee: PROVIDED, HOWEVER, That the Government, at its own election, or upon a petition by the Grantee, may reconsider the necessity for continuing all or any part of the Clause in effect and shall, in the event it determines such necessity no longer exists, and upon tender by the Grantee or whatever consideration may be requested, revoke the Clause, in whole or in part, by executing and delivering to the Grantee a release, quitclaim deed, or whatever instrument is necessary to remove the encumbrance of the Clause, or of a part thereof, from the facilities.

ARTICLE XII. Covenants. It is the intention of both the Grantee and the Government that these covenants shall run with the land and bind subsequent purchasers of the premises hereby conveyed: PROVIDED, HOWEVER, That the Grantee shall not be liable for any violation of said covenants by subsequent owners of the premises.

ARTICLE XIII. Disputes. Disputes on questions of fact which cannot be resolved by agreement of the parties shall be decided by the Secretary of Defense or the instrumentality duly and expressly designated by him, whose decision shall be final and conclusive. In connection with any proceeding under this Article, the Grantee shall be afforded an opportunity to be heard and to offer evidence in support of its own case. Pending final decision of a dispute hereunder, the Grantee shall proceed diligently with the performance of its obligations under the Clause.

ARTICLE XIV. Recordation. The Grantee shall forthwith cause this instrument to be duly recorded and shall furnish satisfactory evidence of such to the Government.

ARTICLE XV. Saving provision. The Grantee and the Government mutually covenant and agree that nothing in this Clause shall be construed as affecting obligations of the Grantee under any other provisions of this instrument, except that, in any cases of inconsistency or ambiguity, the provisions of this National Security Clause shall, to the extent that they impose greater obligations on the Grantee, be deemed controlling.

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(American Potash and Chemical Corporation)

IN WITNESS WHEREOF, the GOVERNMENT has caused these presents to be executed as of the day and year first above written.

UNITED STATES OF AMERICA
Acting by and through the
ADMINISTRATOR OF GENERAL SERVICES

By_____
Fred H. Johnston
Chief, Real Property Division
Utilization and Disposal Service
General Services Administration
Region 9, San Francisco, California

STATE OF CALIFORNIA)
(ss:
City and County of San Francisco)

On this_____day of_____, 1962, before me, Sigrid E. Anderson, a Notary Public in and for the City and County of San Francisco, State of California, personally appeared FRED H. JOHNSTON, known to me to be the Chief, Real Property Division, Utilization and Disposal Service, General Services Administration, Region 9, San Francisco, California, and acknowledged that he executed the within instrument on behalf of the United States of America, acting by and through the Administrator of General Services.

WITNESS my hand and official seal.

_____
Sigrid E. Anderson
Notary Public
in and for the City and County of
San Francisco, State of California

My Commission Expires: March 4, 1965

(S B A 5)

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96101. 22052

282224

Parcel 1 is legal for North end of Plant

Naval Industrial Reserve Ordnance Plant,
DOD #473 and National Industrial Reserve Plant,
DOD #217, - N-Nev-415
(American Potash & Chemical Corporation)

QUITCLAIM DEED

THIS INDENTURE, made the 15th day of March, 1962, between the UNITED STATES OF AMERICA, acting by and through the Administrator of General Services, under and pursuant to the powers and authority contained in the provisions of the Federal Property and Administrative Services Act of 1949 (63 Stat. 377), as amended, and regulations and orders promulgated thereunder, hereinafter called GOVERNMENT, and AMERICAN POTASH AND CHEMICAL CORPORATION, a corporation duly organized and existing under the laws of the State of Delaware, hereinafter called GRANTEE,

WITNESSETH: That the GOVERNMENT, for and in consideration of the sum of TEN DOLLARS ($10.00), receipt of which is hereby acknowledged, and other good and valuable consideration, has remised, released and forever quitclaimed, and by these presents does remise, release and forever quitclaim, unto the said GRANTEE, and to its successors and assigns, that certain property being a portion of what is commonly known as the Basic Magnesium Project in the County of Clark, State of Nevada, and more particularly described as follows:

PARCEL NO. 1.

Beginning at the Section corner common to Sections 1, 2, 11 and 12, Township 22 South, Range 62 East, M.D.B.&M.; thence North 1° 16' 15" West 1314.14 feet along the West line of Section 1; thence leaving said West line South 89° 36' 55" East 1252.59 feet more or less to the Southwesterly line of Athol Avenue as shown on the Plat of Sierra Vista City, recorded in Book 2 of Plats, page 5, Clark County, Nevada records; thence South 42° 27' 00" East 41.39 feet along said Southwesterly line; thence leaving said Southwesterly line South 0° 47' 53" East 1285.42 feet to a point on the South line of said Section 1; thence South 89° 31' 45" East 1269.30 feet along said South line to the Quarter corner common to said Sections 1 and 12; thence leaving said South line South 0° 53' 32.5" West 1317.21 feet; thence South 89° 33' 08" East 753.00 feet to a point on the West boundary of Eleventh Street projected; thence South 8° 51' 37" East 767.34 feet along said West boundary to a point on the North fence line of B.MP; thence leaving said West boundary North 63° 17' 49" West 387.59 feet along said North fence line to an angle point therein; thence continuing along said fence line North 84° 13' 42.5" West 3118.39 feet to the West line of Section 12; thence North 2° 07' 00" East 1615.32 feet along said West line to the point of beginning, containing 151.3689 acres, more or less.

PARCEL NO. 2.

Beginning at the Southwest corner of Section 12, Township 22 South, Range 62 East Mt. Diablo Base and meridian; thence North 51° 52' 46.5" East 1571.58 feet to the true point of beginning:

Thence North 8° 51' 37" West 2635.00 feet to a point on the North fence line of Basic Magnesium Plant; thence South 84° 13' 42.5" East 2418.12 feet along said fence line to an angle point therein; thence continuing along said fence line South 63° 17' 49" East 387.59 feet to a point on the West line of Eleventh Street projected;

PETER G. MORROS, Director
ALLEN BIAGGI, *Administrator*
(702) 687-4670
TDD 687-4678
Administration
Water Pollution Control
Facsimile 687-5856
Mining Regulation and Reclamation
Facsimile 684-5259

STATE OF NEVADA
BOB MILLER
Governor

Waste Management
Corrective Actions
Federal Facilities
Air Quality
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 89706-0851

January 4, 1999

Patrick S. Corbett
Plant Manager
Kerr-McGee Chemical Corporation
P.O. Box 55
Henderson, NV 89009

RE: **Permit Modification: #UNEV94218, Kerr-McGee Chemical Corporation**

Dear Mr. Corbett:

Based upon the conversation with Ms. Susan Crowley, on December 29, 1998, the Division of Environmental Protection has modified the existing UIC permit to specify a maximum injection rate of 100 gpm, as opposed to 40 gpm. The injection rate should at no time exceed the cumulative extraction rate. Also modified were the wells specified for sampling.

Please note that the newly modified Underground Injection Control permit has included a schedule of compliance for the containment/remediation system that was requested in the November 6, 1998 letter from Allen Biaggi.

Also, NDEP has stipulated in the permit's schedule of compliance that Kerr-McGee provide total chromium and total perchlorate isometric concentration contour maps utilizing the most **recent** data available. These contour maps were provided in the December 9th package, however the data utilized was from May and August of 1997. Also, the analytical methods employed for sample analyses shall be specified. Please provide this information no later than January 15, 1999.

NDEP also requests that all wells associated with the project be listed in tabular format with the screened intervals and approximate depth to groundwater at each well. The well logs were provided, however, listing the wells in tabular format will provide the information in a more streamlined manner.

OVERVIEW

The KMCLLC facility, which is part of the BMI complex, is located approximately 13 miles southeast of Las Vegas in an unincorporated section of Clark County Nevada, and is completely surrounded by the incorporated area comprising the City of Henderson. Various companies at this site have produced inorganic chlorate and perchlorate chemicals since 1945. KMCLLC is in the second phase of a process to characterize perchlorate impact to the Quaternary alluvial groundwater system in the area between the KMCLLC facility and Las Vegas Wash. The objectives of the second phase of this program required the determination of both the subsurface pathway(s) and concentration of perchlorate in the water table regime downgradient from the facility to ultimate discharge into Las Vegas Wash. These objectives were accomplished with information gathered from the drilling and installation of 69 soil borings and 27 monitor wells. In addition, a pumping test was conducted and existing hydrologic studies were reviewed to evaluate the hydraulic characteristics of the main subsurface alluvial channel in the study area.

The results of the field assessment indicate that the main alluvial channel trends southwest – northeast from near the northern boundary of the KMCLLC facility downgradient to Las Vegas Wash. The channel ranges from 700 to 1000 feet wide with a maximum depth approaching 60 feet. A permeability of 50 gallons per day per square foot and a transmissivity of 1300 gallons per day per foot were calculated from the pumping test in this channel at the Pittman Lateral. During this test, an unknown organic compound was encountered in the groundwater which contributed a milky-white froth to the water and strong chemical odor.

Perchlorate concentrations in the alluvial groundwater study area range from 1500 mg/l at the northern KMCLLC facility boundary to around 100 mg/l between the City of Henderson Rapid Infiltration Basins (RIBs) and Las Vegas Wash. The perchlorate plume is deflected from the main alluvial channel just north of the KMCLLC property by a high conductivity plume which preferentially occupies the channel. The perchlorate plume eventually begins to merge with the higher conductivity plume at and downgradient from the Pittman Lateral.

KMCLLC believes that sufficient information has been collected from the field assessment to adequately characterize the subsurface geometry of the alluvial channel and the perchlorate plume trend. Based upon the results of this Phase II investigation, KMCLLC recommends that additional characterization be conducted to identify the organic contaminant encountered at the Pittman Lateral. This groundwater characterization will also include running treatability studies on the groundwater.

STATE OF NEVADA
BOB MILLER
Governor

PETER G. MORROS, Director
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Facsimile 684-5259

Waste Management
Corrective Actions
Federal Facilities
Air Quality
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Facsimile 687-6396

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL PROTECTION
333 W. Nye Lane, Room 138
Carson City, Nevada 89706-0851

TO: Henderson Industrial Site Steering Committee - Joel Mack
Basic Management, Incorporated - Greg Schlink
Stauffer Management Company - Lee Erickson
Pioneer Chlor Alkali Company, Inc. - Verrill Norwood
Montrose Chemical Corporation of California - Frank Bachman
Titanium Metals Corporation - Susan Stewart
Kerr-McGee Chemical LLC - Susan Crowley

RE: Public Meeting

I have enclosed, for your information, duplication and distribution, the following documents regarding the Public Meeting that we'll have in December:

- Notice of Public Meeting (This has been sent to the Las Vegas Review Journal and Henderson Home News for publication.)

- Public Comment Form

- Fact Sheet (No substantial changes were made in the "clean-up" of your submittal)

Sincerely,

Thomas A. Whalen, P.E.
Remediation Branch
Bureau of Corrective Actions

TAW:kmf

Attachments

ACCELERATED WORK TO ABATE, MITIGATE AND ELIMINATE

ENVIRONMENTAL CONTAMINANTS IN THE GROUNDWATER

EMANATING FROM THE BMI COMPLEX IN HENDERSON, NV

PROJECT WORK ORDER: Groundwater characterization

PURPOSE: The purpose of this work order is to provide a physical, chemical and radiological characterization of the groundwater flowing toward the Las Vegas Wash in the vicinity of the Pittman Lateral. This characterization is investigative in nauture and time is of the essence.

The last such characterization, albeit limited, was by the U.S. Environmental Protection Agency during the 1983/1984 timeframe. Results of sampling by Kerr-McGee Chemical LLC and others in this area is available. There are approximately 15 monitoring wells along the Pittman Lateral to be sampled and two monitoring wells along the Southern edge of the BMI Complex which may serve as background wells.

The plume(s) of interest contain organics, high-conductivity and perchlorate. The contaminants of interest in the groundwater include chromium, perchlorate, dissolved solids (salt), radionuclides, pesticides, organo-phosphates, organo-acids and benzene. The actual analytes are those expected to be introduced into the groundwater by the various liquid and solid waste management practices by the various companies that have and are operating at the BMI Complex. The field measurements of interest include pH and conductivity.

TIMEFRAME FOR PERFORMANCE: It is expected that a narrative and graphical report, containing data, analysis, summary and conclusions will be presented to NDEP no later than Monday, November 30, 1998 and a presentation will be made at a meeting of BMI companies in Las Vegas on Wednesday, December 2, 1998.

CONTRACTOR'S EXPERTISE: Technical expertise to be provided on this project includes an aqueous geochemist, a person with substantial expertise in contaminant fate and transport in groundwater, and a person with substantial experience in developing conceptual site models using US EPA's 1997 Directive and ASTM Standards.

NDEP POINT OF CONTACT: Thomas A. Whalen, P.E. in NDEP's Carson City Office (702)-687-4670 ext 3019.

TASKS: Some of the tasks on this project include a one day consultation to NDEP regarding the appropriate analytes and well data based upon a review of Phase I and Phase II submittals from the BMI Companies and discussion with the NDEP Point of Contact; contacting PEPCON & KMC LLC regarding use of their wells; mobilization, sampling and demobilization; submission of samples to appropriate laboratories for analysis including EPA's Las Vegas Lab for special perchlorate analysis; analytical data review and analysis; data summary; conclusions;

narrative report including appropriate graphics; and presentation to NDEP and at appropriate meetings of the BMI Companies.

POSSIBLE ANALYTES OF INTEREST

Stauffer/Pioneer

Benzene
Chloroform
Chlorobenzene
Dimethyldisulfide
Carbophenothion (Trithion)
Phosmet (Imidan)
Dimethylphosphorodithioic Acid (DMPT)
Diethylphosphorodithioic Acid (DEPT)
Monochlorobenzene Sulfonic Actid (MCBSA)
Benzene Sulfonic Acid
Phthalic Acid
Carbon Tetrachloride
Para-chlorobenzene sulfonicacid
Total Dissolved Solids
BHC - alpha isomer
BHC - delta isomer
BHC - gamma isomer (Lindane)
Phenol
Methylene Chloride
Hexachlorobenzene
Sodium hydroxide
Sodium hypochlorite
Iodine
Hydrochloric Acid
Phosphoric Acid
Thiol
Hydroxymethyl phthalimid
Iosheptane
Methanol
p-Chlorothiophenol
Thiolphenol
bis p-chlorophenyl sulfone
bis p-chlorophenyl disulfide
Phenyl sulfide
Phenyl disulfide
Phenyl sulfone
1,2 - dichlorobenzene
1,3 - dichlorobenzene

1,4 - dichlorobenzene
m- dichlorobenzene
p- dichlorobenzene
o- dichlorobenzene
trichlorobenzene
Chlorothioanisole
pp' DDE
op' DDT
pp' DDT

Kerr-McGee Chemical LLC

Nitrates
Chromium
Perchlorate
TDS

TIMET

Arsenic
Chromium (total)
Nitrate -nitrogen
Total Dissolved Solids
Manganese
Chloride
Sulfaate
Chloroform
Trichloroethene
Tetrachloroethene
Radium -226 & -228 in pCi/L
Beta emitters in mrems
Gross alpha in pCi/L
Radon in pCi/L
Uranium in micro grams/L and pCi/L

ANALYTICAL METHODS TO BE CONSIDERED

VOCs EPA 8260 + MTBE
Semi - vol 8270
Pesticides 8080
Aqueous TPH 8015M
Metals 6010
Perchloraate
Conductivity
Total Dissolved Solids -- Gross and trace chemistry to determine all the constituents

BTEX

MONITORING WELLS

From East to West along the Pittman Lateral

PC 10 KMC LLC -- contact Susan Crowley
PC 12 KMC
PC 17 KMC
MW K4 PEPCON -- contact Jeff Gibson
PC 18 KMC
PC 55 KMC
PC 19 KMC
L 635 The L series are old EPA wells, flush mount, 4" PVC, "in bad shape",
L 637 not maintained, full of silt and sediment, hard to find, Contact
L 639 Susan Crowley at KMC for location assistance.
L 641
L 645
L 651
L 653
MW Q (Twin) use shallow -- PEPCON

Background

BRW TIMET, no well construction log, contact Tony Garcia
H11 Stauffer/Pioneer, contact Chris Sylvia @ Pioneer

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

December 31, 1998

Ms. Brenda Pohlmann
Remediation Branch Supervisor
Nevada Division of Environmental Protection
555 East Washington, Suite 4300
Las Vegas, NV 89101

Dear Ms. Pohlmann:

Subject: Henderson Off-Site Groundwater Perchlorate Treatment Technology Review

Please find enclosed two copies of the Henderson Off-Site Groundwater Perchlorate Treatment Technology Review.

Kerr-McGee Chemical (KMC) will forward copies to Doug Zimmerman (Nevada Division Environmental Protection), Southern Nevada Water Authority, US EPA Region IX, Metropolitan Water District, and the City of Henderson.

Please feel free to call me at (702) 651-2234 or Keith Bailey at (405) 270-3651 if you have any questions regarding this information. KMC believes a meeting to review this information would be helpful. Please contact me at your earliest convenience to set a time. Thank you.

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

Enclosures

cc: Jeanne-Marie Bruno
Barry Conaty
Patrick S. Corbett
Alan Dooley
Kevin Mayer
Pat Mulroy
Tom Reed
Doug Zimmerman

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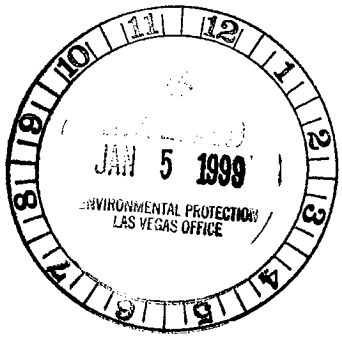

KERR-McGEE CHEMICAL LLC

HENDERSON OFF-SITE GROUNDWATER PERCHLORATE TREATMENT TECHNOLOGY REVIEW

Prepared

by

L. K. Bailey
and
E. M. Spore

Kerr-McGee Chemical LLC
8000 W. Lake Mead Dr.
Henderson, NV 89015

December 31, 1998

OVERVIEW

Kerr-McGee Chemical LLC (Kerr-McGee) submitted a report to the Nevada Division of Environmental Protection (NDEP) on November 30,1998 describing options for removing perchlorate from groundwater at the Kerr-McGee Henderson facility.[1] This report extends that technology investigation to consider remediation of water down-gradient of the Kerr-McGee facility, near the Pittman Lateral.

A subsequent report, due to NDEP in early 1999, will include a final design assessment for remedial action.

OFF-SITE GROUNDWATER DATA

Based on groundwater samples and pumping tests conducted during the groundwater perchlorate investigation program[2], water at the Pittman Lateral contains higher levels of total dissolved solids (TDS) than site water (about 15,000 mg/L versus roughly 12,000 mg/L on-site). Perchlorate levels at the Pittman Lateral are much lower (averaging about 200 mg/L perchlorate versus approximately 1500 mg/L on-site). See Appendix I for analytical information.

Capturing the perchlorate in groundwater passing through a vertical plane along the Pittman Lateral would likely require an initial pumping rate of about 400 gallons per minute (gpm). The pumping rate would likely decline with time as a cone of depression is established. This estimate is based on available hydrologic data and is only approximate. The figure will be refined as further information becomes available.

Additional data on potential organic constituents are included in Appendix I for the off-site water since some of the samples recovered had a moderate "pesticide" smell which differentiated them from site groundwater.

TECHNOLOGY SUMMARY

The technologies evaluated previously for treating on-site groundwater are generally applicable to waters at the Pittman Lateral. Biological degradation of perchlorate appears to be the most promising technical approach at this time. Kerr-McGee is continuing to evaluate several technologies. Initial concerns regarding organic constituents in the Pittman Lateral groundwater having a negative impact on bacteria were dispelled in laboratory biological remediation tests. A second concern related to higher TDS concentrations may prove more limiting to the bacteria. TDS levels above 20,000 mg/L are not recommended.

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[1] Letter from Susan Crowley to Brenda Pohlmann, "Henderson On-Site Groundwater Perchlorate Treatment Technology Review," November 30, 1998.
[2] Phase II Groundwater Perchlorate Investigation Report, Kerr-McGee Chemical LLC, July 15, 1998.

One promising approach identified as an offshoot of the groundwater test work is the prospect of in-situ perchlorate remediation. Three In-situ concepts have been proposed separately by two firms and a university. Two of the concepts suggest that injection of nutrients and possibly inoculum could biologically destroy perchlorate without the need for pumping groundwater to the surface. One firm's proposal involves injecting the discharge from an on-site perchlorate biological treatment facility. The third in-situ approach involves injection of reducing agents into groundwater to react with perchlorate. These in-situ approaches are only conceptual and have not yet been tested. They will require significant additional work before recommendations on commercial application can be made.

Evaporation, ion exchange, reverse osmosis and other perchlorate concentrating technologies may be applicable but produce perchlorate levels in the concentrated streams which are unsuitable for landfilling. The concentrated perchlorate streams may also be unsuitable for biological or electrochemical treatment due to high TDS levels.

It should be noted that for all of the technology evaluations performed, the final effluent concentration is a key factor. Equipment sizing, process effectiveness, and capital/operating costs all depend on the final effluent target. Since toxicology work has not yet resulted in a standard for perchlorate, selection of a process option is premature.

The following technology evaluation is organized into the same three sections utilized in presenting technologies for use in treating Kerr-McGee on-site groundwater:

Evaluation of Storage Technologies
Evaluation of Separation/Concentration Technologies
Evaluation of Destruction Technologies

EVALUATION OF STORAGE TECHNOLOGIES

Recovering 400 gpm of groundwater from a series of wells along the Pittman Lateral would pose a significant storage problem. Even considering evaporation losses (2.8 gpm/acre), the large volume of water would fill the newly constructed 11-acre pond on the Kerr-McGee site (70+ million gallons) in a little over four months.

Assuming 2.8 gpm evaporation per acre of pond surface, over 140 acres of ponds would be required to evaporate the entire 400 gpm stream. Solids buildup in such a pond would total about 13,000 tons per year.

Ponding would be costly and solids disposal would be difficult. Landfill operators have suggested that concentrations above 1 percent perchlorate would preclude residue landfilling. Concentration of groundwater constituents could result in generation of a waste stream which would be more difficult to treat.

Options for below ground containment, such as slurry walls, are not considered feasible for the 400 gpm flow.

EVALUATION OF SEPARATION/CONCENTRATION TECHNOLOGIES

As reported for treatment of on-site groundwater, several technologies are available for perchlorate separation: most are costly, and there is no demonstrated approach for dealing with the concentrated perchlorate streams they produce. As with potential evaporation pond solids, landfilling concentrated streams containing perchlorate does not appear practical based on contacts with area disposal facilities. These separation technologies, therefore, would likely be paired with one of the destruction approaches discussed in the next section.

Evaporation

As noted in the storage technology section, evaporation from pond surfaces is about 2.8 gpm/acre. This can be enhanced to about 3 gpm/acre with aeration sprays if misting and carryover can be suitably controlled. At 2.8 gpm/acre, evaporating the entire 400 gpm flow from the Pittman Lateral would require a pond area of over 140 acres.

Mechanical evaporation options have been tested on on-site groundwater. While the off-site water has a somewhat higher TDS level, the evaporator technology should be effective in yielding a concentrated wet sludge. Combined capital and operating costs for an evaporator system are likely lower than corresponding costs for a 140+ acre evaporation pond.

Evaporation concentrates nearly all constituents and may produce products which exceed regulatory limits. Tests on evaporation solids generated from Pittman Lateral water will be performed to determine whether they meet the Department of Transportation criteria for oxidizers. This could significantly increase handling and disposal costs.

Other Approaches

As with on-site groundwater, Reverse Osmosis and Ion Exchange are potential approaches for treatment of off-site water. Both are typically very costly. Calgon Carbon and their subsidiary Advanced Separation Technologies (AST) recently announced results of their San Gabriel Valley, California, demonstration involving continuous ion exchange.[3] Their ISEP® technology removed perchlorate from relatively low (about 75 ppb) starting concentrations to below the detection limit of 4 ppb. The ISEP process also removed about 60 percent of the nitrate along with sulfate and other constituents. AST is now evaluating whether the technology is suitable for the higher perchlorate and TDS concentrations found in groundwater at the Pittman Lateral. Costs for the continuous ion exchange process are being determined by AST.

As with on-site groundwater, electrodialysis of off-site water was removed from consideration on the basis of cost when compared with reverse osmosis.

---

[3] Company press release, Calgon Carbon, Dec. 7, 1998.

EVALUATION OF DESTRUCTION TECHNOLOGIES

Incineration

High levels of sodium in concentrated solids have a negative impact on refractory bricks used in incinerator construction. No commercial operators have been identified who are willing to take the solids.

Biochemical Destruction

As reported previously for on-site groundwater, biochemical destruction of perchlorate and chlorate is effective. Samples of groundwater from the Pittman Lateral have been tested at Applied Research Associates (ARA) and performed similarly to on-site water. The limiting factor may be the TDS concentration in the water.

ARA recommends that TDS concentrations be controlled at less than 2 percent (20,000 mg/L) in their pilot biological systems. Their bacteria survived TDS concentrations up to 3.4 percent in water samples from other sites, but that level is thought to be near the maximum tolerated by the organisms and is not recommended. Additional tests will be performed to determine the TDS limit in Pittman Lateral water.

Laboratory tests by Aerojet have also confirmed destruction of perchlorate from starting concentrations of about 150 mg/L to below 20 μg/L. The effect of TDS on their process has yet to be evaluated completely.

TDS concentrations become increasingly problematic when biochemical treatment is paired with groundwater storage. Average TDS concentrations at the Pittman Lateral are about 15,000 mg/L. Ponding of water to provide short-term storage would result in significant evaporation, and thus, higher TDS levels. To maintain TDS concentrations below the 20,000 mg/L level recommended by ARA, pond evaporation of off-site water would be limited to less than 30 volume percent.

Further concentration either by ponding or mechanical evaporation would raise the TDS limits to a point where dilution with fresh water would be required to operate the biological treatment process. This would raise costs and increase the size of the treatment plant.

In-situ Biological Remediation

Use of in-situ biological remediation (also known as bio-augmentation) at the Pittman Lateral is a potential approach, which might be possible if a biological process unit is successful on the Kerr-McGee site. ARA has proposed a study of reinjecting water from an on-site biological remediation system, plus additional nutrients, along the Pittman Lateral. The remediated stream from the on-site treatment facility would be used to inoculate in-situ Pittman Lateral groundwater without the need to bring it to the surface. Recent tests indicate the ARA bacteria are active at ambient groundwater temperatures and could

destroy perchlorate over a period of months or years. Another firm has also suggested an in-situ remediation test program involving injection of reducing agents. Details of the concept are not yet available.

Bruce Logan, of Penn State University, is reported to have successfully tested perchlorate destruction using bacteria in tubes filled with soil.[4] He reports that chlorate and perchlorate-destroying micro-organisms are already present in soils from "the Nevada Wash areas."

The in-situ concept would require extensive evaluation/test work and may also require successful completion of a commercial scale on-site bioremediation plant. Kerr-McGee will continue to evaluate the option.

Electrochemical Destruction

Electrochemical perchlorate destruction is at the same stage of development for off-site use as for on-site applications. Initial expectations that a flow-through cell design would allow treatment of up to 6 gpm of groundwater have not yet been realized. Flow rates on the order of milliliters per minute have been demonstrated. Final perchlorate concentrations from the cell system are in the low part per million range. Efforts are now concentrated on increasing the electrode surface area to improve cell throughput.

Pittman Lateral groundwater tested at laboratory bench scale has shown slightly faster perchlorate reduction than groundwater from the Kerr-McGee facility. These results are currently being verified. TDS concentrations may play a part in the faster perchlorate reduction.

Higher surface area cathodes have been constructed and will shortly be tested in Pittman Lateral groundwater.

Other Perchlorate Destruction Approaches

AST (the Calgon Carbon subsidiary) reportedly has a new perchlorate destruction technology being pilot tested in a program with the Jet Propulsion Laboratory in California. Very little information is available on the new process. Kerr-McGee is seeking additional details and will evaluate the process as information becomes available.

[4] Water Engineering and Management December 1998, p 7.

Appendix I

Groundwater Analyses

- Onsite
- Offsite

Table I
Henderson Groundwater Treatment Plant
Analysis of Feed and Discharge Water
Results: mg/l

Parameters	Samples			
	Feed		Discharge	
	Total	Soluble	Total	Soluble
pH	7.42	---	7.54	---
HCO_3	480	410	390	350
Cl	2100[1.]	2000[3.]	2100[1.]	2100[3.]
SO_4	1700[2.]	1700[3.]	1700[2.]	1700[3.]
ClO_3	3500[1.]	3400[3.]	3400[1.]	3200[3.]
ClO_4	1590[4.]	1520[4.]	1560[4.]	1520[4.]
ICAP Scan:				
Al	0.16	0.14	0.14	0.13
B	13.4	14.4	13.9	13.2
Ba	0.03	0.03	0.02	0.02
Ca	800	770	797	736
Co	0.01	0.01	0.01	0.01
Cr	8.88	8.88	0.06	0.009
Cu	0.009	0.006	0.007	0.006
Fe	6.19	0.007	0.40	0.008
K	33.6	37.3	39.4	36.5
Mg	426	434	445	419
Mo	0.03	0.07	0.09	0.07
Na	1800	1760	1950	1830
Ni	0.02	0.02	0.02	0.02
Sr	0.70	0.79	0.75	0.57
Sn	0.15	0.03	0.02	<0.01
Ti	0.01	0.001	0.006	<0.001
V	0.38	0.006	<0.005	<0.005
Zn	0.12	0.02	0.05	0.06
TDS	12,240	12,020	12,690	12,120
TSS	28.2	---	12.2	---
Specific Conductance (mS/cm)	16.72	16.70	18.79	14.50

1. Titration
2. Gravimetric
3. Ion Chromatography
4. Ion Selective Electrode

Primary and Secondary Drinking Water Regulations

	PARAMETER REGULATED	MCL/ [SMCL] mg/L	MCLG mg/L	DATE OF PROMULGATION/ PROPOSAL	EPA METHOD[5,7]	ACCEPTANCE LIMIT
METALS	Aluminum[1]	(0.05-0.2)	—	1-30-91	202.1,.2, 200.7,.8,.9	± 30%
	Antimony[2]	0.006	0.006	7-17-92	204.2, 200.8,.9, Gaseous Hydride	± 15%
	Arsenic	0.05	—	2-19-88	206.2,.3,.4, 200.7A	
	Barium[3]	2	2	7-1-91	200.7, 208.1,.2	± 15%
	Beryllium[2]	0.004	0.004	7-17-92	210.2, 200.7,.8,.9	± 15%
	Cadmium[3]	0.005	0.005	1-30-91	213.2, 200.7	± 20%
	Calcium	—	—	6-7-91	215.1,.2, 200.7	
	Chromium[3]	0.1	0.1	1-30-91	218.2, 200.7	± 15%
	Copper[4,1]	1.3/90%ile [1.0]	1.3	6-7-91, 1-30-91	220.1,.2, 200.7,.8,.9	± 10%
	Iron[1]	[0.3]	—	1-30-91	236.1,.2, 200.7	
	Lead[4]	0.015/90%ile	zero	6-7-91	239.2, 200.8,.9	± 30%
	Manganese[1]	[0.05]	—	1-30-91	243.1,.2, 200.7	
	Mercury[3]	0.002	0.002	1-30-91	245.1, 245.2	± 30%
	Nickel[2]	0.1	0.1	7-17-92	249.1,.2, 200.7,.8,.9	± 15%
	Selenium[3]	0.05	0.05	1-30-91	270.2, Gaseous Hydride	± 20%
	Silver[1]	[0.1]		1-30-91	272.1,.2, 200.7,.8,.9	
	Sodium	20[10]	—	8-27-80, 6-7-91	273.1, 200.7	
	Thallium[2]	0.002	0.0005	7-17-92	279.2, 200.8,.9	± 30%
	Zinc[1]	[5.0]		1-30-91	289.1, 200.7	
INORGANICS	Alkalinity[4]	—	—	6-7-91	310.1, Titration	
	Asbestos[3]	7MFL >10 μm	7MFL>10 μm	1-30-91	TEM	± StdDev
	Chloride[1]	[250] 1400	—	1-30-91	See rule	
	Residual Disinfectant[3]	detectable	—	6-29-89	See rule	
	Color[1]	[15cu]	—	1-30-91	110.2	
	Conductivity[4]	—	—	6-7-91	120.1	
	Corrosivity[1]	[non-corrosive]	—	1-30-91	Langlier Index, Aggressive Index	
	Cyanide[2]	0.2	0.2	7-17-92	Manual distillation followed by 335.1,.2,.3, Electrode	± 25%
	Fluoride[1]	4.0 [2.0]	—	4-2-86 1-30-91	340.2, distillation followed by 340.1,.3	± 10%
	Foaming Agents[1]	(0.5)	—	1-30-91	425.1	
	Nitrate (as N)[3]	10	10	1-30-91	353.1,.2,.3, 300.0A	± 10%
	Nitrite (as N)[3]	1	1	1-30-91	353.2,.3, 354.1, 300.0A	± 15%
	Nitrate/Nitrite (as N)[3]	10	10	1-30-91	353.1,.2,.3, 300.0A	
	Odor[1]	[3ton]	—	1-30-91	140.1	
	pH[1,4]	6.5-8.5 [6.5-8.5]		6-7-91 1-30-91	150.1,.2	
	o-Phosphate[4]	—	—	6-7-91	365.2,.3, 300.0A	
	Silica[4]	—	—	6-7-91	370.1, 200.7	
	Solids (TDS)[1]	[500] 1000	—	1-30-91	160.1	
	Sulfate[1,2]	deferred [250] 500	deferred	7-17-92 1-30-91	375.4	
	Temperature[4]	—	—	6-7-91		
MICRO-BIOLOGICALS	Turbidity[4]	Treatment 1.0	—	6-29-89	See rule	
	Coliform[8]	≤5% positive samples/mo	zero	6-29-89	MF, MTF, P-A, MMO-MUG	
	E. Coli[8]	no positive repeat sample	zero	6-29-89	EC MUG, Nutrient Agar with MUG, MMO-MUG with subculture	
	Fecal Coliform[9]	no positive repeat sample	zero	6-29-89	EC test	
	Giardia Lamblia[6]	Treatment	zero	6-29-89		
	Heterotropic Bacteria or Residual Disinfectant[6]	Treatment	—	6-29-89	Pour plate, see rule	
	Legionella[6]	Treatment	zero	6-29-89		
	Viruses[6]	Treatment	zero	6-29-89		

1 — Secondary Maximum Contaminant Level — non-enforceable federal guidelines for aesthetic quality

2 — Phase V Regulations — promulgated 7-17-92

3 — Phase II Regulations — promulgated 1-30-91 and 7-1-91

4 — Lead and Copper Rule — promulgated 6-7-91; approved methods must be used for lead, copper, and water quality parameters; lead and copper levels are Action Levels

5 — Secondary contaminants must be analyzed using approved methods in laboratories approved by the states; primary contaminants must be analyzed using approved methods in laboratories certified by the states

6 — Radionuclides Proposed Rule — 7-18-91

7 — Only EPA methods have been listed here; additional methods are listed in the rules

8 — Coliform and Surface Water Treatment Rules — promulgated 6-29-89

9 — Methods 505 and 506 are used for screening and method 506A is used to quantify

10 — Recommended level

* — The acceptance limits for VOCs are ±20% 0.01 mg/L and ±40% at 1 μg/L

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To Walter Ross	From Bill Lynn
Co.	Co. CCHD
Dept.	Phone #

	PARAMETER REGULATED	MCL (SMCL) mg/L	MCLG mg/L	DATE OF PROMULGATION/ PROPOSAL	EPA METHOD[4,7]	ACCEPTA LIMIT
VOLATILES	Trihalomethanes (Total)	0.10		11-29-79	501.1,2	± 20%
	Benzene	0.005	zero	7-8-87	502.2, 503.1, 524.1,2	•
	Carbon tetrachloride	0.005	zero	7-8-87	502.1,2, 524.1,2	•
	Chlorobenzene[3]	0.1	0.1	1-30-91	502.1,2, 503.1, 524.1,2	•
	p-Dichlorobenzene	0.075 (0.005)	0.075	7-8-87 5-89	502.1,2, 503.1, 524.1,2	•
	o-Dichlorobenzene[3]	0.6	0.6	1-30-91	502.1,2, 503.1, 524.1,2	•
	1,2-Dichloroethane	0.005	zero	7-8-87	502.1,2, 524.1,2	•
	1,1-Dichloroethylene	0.007	0.007	7-8-87	502.1,2, 524.1,2	•
	c-1,2-Dichloroethylene[3]	0.07	0.07	1-30-91	502.1,2, 524.1,2	•
	t-1,2-Dichloroethylene[3]	0.1	0.1	1-30-91	502.1,2, 524.1,2	•
	Dichloromethane[2]	0.005	zero	7-17-92	502.1,2, 524.1,2	•
	1,2-Dichloropropane[3]	0.005	zero	1-30-91	502.1,2, 524.1,2	± 40%
	Ethyl benzene[3]	0.7	0.7	1-30-91	502.2, 503.1, 524.1,2	•
	Styrene[3]	0.1	0.1	1-30-91	502.2, 503.1, 524.1,2	•
	Tetrachloroethylene[3]	0.005	zero	1-30-91	502.1,2, 503.1, 524.1,2	•
	Toluene[3]	1	1	1-30-91	502.2, 503.1, 524.1,2	•
	1,2,4-Trichlorobenzene[3]	0.07	0.07	7-17-92	502.2, 503.1, 524.2	± 40%
	1,1,1-Trichloroethane	0.2	0.2	7-8-87	502.1,2, 524.1,2	•
	1,1,2-Trichloroethane[2]	0.005	0.003	7-17-92	502.1,2, 524.1,2	± 40%
	Trichloroethylene	0.005	zero	7-8-87	502.1,2, 503.1, 524.1,2	•
	Vinyl chloride	0.002	zero	7-8-87	502.1, 2, 524.1,2	•
	Xylenes (Total)[3]	10	10	1-30-91	502.2, 503.1, 524.1,2	•
HERBICIDES & PESTICIDES	Alachlor[3]	0.002	zero	1-30-91	505, 507, 525.1	± 45%
	Aldicarb[3]	Postponed	Postponed	5-27-92	531.1	2 StdDev
	Aldicarb Sulfoxide[3]	Postponed	Postponed	5-27-92	531.1	2 StdDev
	Aldicarb Sulfone[3]	Postponed	Postponed	5-27-92	531.1	2 StdDev
	Atrazine[3]	0.003	0.003	1-30-91	505, 507, 525.1	± 45%
	Carbofuran[3]	0.04	0.04	1-30-91	531.1	± 45%
	Chlordane[3]	0.002	zero	1-30-91	505, 508, 525.1	± 45%
	2,4-D[3]	0.07	0.07	1-30-91	515.1	± 50%
	Dalapon[3]	0.2	0.2	7-17-92	515.1	2 StdDev
	Dibromochloropropane(DBCP)[3]	0.0002	zero	1-30-91	504	± 40%
	Dinoseb[2]	0.007	0.007	7-17-92	515.1	2 StdDev
	Diquat[2]	0.02	0.02	7-17-92	549	2 StdDev
	Endothall[2]	0.1	0.1	7-17-92	548	2 StdDev
	Endrin[3]	0.002	0.002	7-17-92	505, 508, 525.1	± 30%
	Ethylenedibromide(EDB)[3]	0.00005	zero	1-30-91	504	± 40%
	Glyphosate[2]	0.7	0.7	7-17-92	547	2 StdDev
	Heptachlor[3]	0.0004	zero	1-30-91	505, 508, 525.1	± 45%
	Heptachlor epoxide[3]	0.0002	zero	1-30-91	505, 508, 525.1	± 45%
	Lindane[3]	0.0002	0.0002	1-30-91	505, 508, 525.1	± 45%
	Methoxychlor[3]	0.04	0.04	1-30-91	505, 508, 525.1	± 45%
	Oxamyl[3] (vydate)	0.2	0.2	7-17-92	531.1	2 StdDev
	Pentachlorophenol[3]	0.001	zero	7-1-91	515.1, 525.1	± 50%
	Picloram[3]	0.5	0.5	7-17-92	515.1	2 StdDev
	Simazine[3]	0.004	0.004	7-17-92	505, 507, 525.1	2 StdDev
	Toxaphene[3]	0.003	zero	1-30-91	505, 508, 525.1	± 45%
	2,4,5-TP (Silvex)[3]	0.05	0.05	1-30-91	515.1	± 50%
OTHER SOCs	Hexachlorobenzene[3]	0.001	zero	7-17-92	505, 508, 525.1	2 StdDev
	Hexachlorocyclopentadiene[3]	0.05	0.05	7-17-92	505, 525.1	2 StdDev
	Benzo(a)pyrene[2]	0.0002	zero	7-17-92	550, 550.1, 525.1	2 StdDev
	PCBs[3] (as decachlorobiphenyl)	0.0005	zero	1-30-91	505, 508 508A[9]	0-200 mg/L
	2,3,7,8-TCDD(Dioxin)[2]	3x10-8	zero	7-17-92	1613	2 StdDev
	Acrylamide[3]	Treatment	zero	1-30-91		
	Epichlorohydrin[3]	Treatment	zero	1-30-91		
	Di(2-ethylhexyl)adipate[2]	0.4	0.4	7-17-92	506, 525.1	2 StdDev
	Di(2-ethylhexyl)phthalate[2]	0.006	zero	7-17-92	506, 525.1	2 StdDev
RADIONUCLIDES	Adjusted Gross Alpha[4]	15 pCi/L	zero	7-18-91	900.0	± 50%
	Beta Particle Emitters[4]	4 mrem cde per year	zero	7-18-91	900.0	± 30%
	radioactive Cesium	— 50 pCi/L	—		901.0	± 30%
	radioactive Iodine	—	—		902.0	± 30%
	radioactive Strontium	—	—		905.0	± 30%
	tritium	—	—		906.0	± 20%
	gamma&photon emitters	—	—		901.1	
	Radium-226[4]	20 pCi/L	zero	7-18-91	903.0, 1	± 30%
	Radium-228[4]	20 pCi/L	zero	7-18-91	904.0	± 50%
	Radon-222[4]	300 pCi/L	zero	7-18-91	903.1, 913.0	± 30%
	Uranium[4]	0.02	zero	7-18-91	908.0, 1	± 30%

Primary and Secondary Drinking Water Regulations

	PARAMETER REGULATED	MCL/ [SMCL] mg/L	MCLG mg/L	DATE OF PROMULGATION/ PROPOSAL	EPA METHOD[5,7]	ACCEPTANCE LIMIT
METALS	Aluminum[1]	[0.05-0.2]	—	7-1-30-91	202.1,.2, 200.7,.8,.9	± 30%
	Antimony[2]	0.006	0.006	7-1-7-92	204.2, 200.8,.9, Gaseous Hydride	± 15%
	Arsenic	0.05	—	2-1-9-88	206.2,.3,.4, 200.7A	
	Barium[3]	2	2	7-1-91	200.7, 208.1,.2	± 15%
	Beryllium[2]	0.004	0.004	7-1-7-92	210.2, 200.7,.8,.9	± 15%
	Cadmium[3]	0.005	0.005	1-30-91	213.2, 200.7	± 20%
	Calcium	—	—	6-7-91	215.1,.2, 200.7	
	Chromium[3]	0.1	0.1	1-30-91	218.2, 200.7	± 15%
	Copper[4,1]	1.3/90%-ile [1.0]	1.3	6-7-91, 1-30-91	220.1,.2, 200.7,.8,.9	± 10%
	Iron[1]	[0.3]	—	1-30-91	236.1,.2, 200.7	
	Lead[4]	0.015/90%-ile	zero	6-7-91	239.2, 200.8,.9	± 30%
	Manganese[1]	[0.05]	—	1-30-91	243.1,.2, 200.7	
	Mercury[3]	0.002	0.002	1-30-91	245.1, 245.2	± 30%
	Nickel[2]	0.1	0.1	7-1-7-92	249.1,.2, 200.7,.8,.9	± 15%
	Selenium[3]	0.05	0.05	1-30-91	270.2, Gaseous Hydride	± 20%
	Silver[1]	[0.1]		1-30-91	272.1,.2, 200.7,.8,.9	
	Sodium	20[10]	—	8-27-80, 6-7-91	273.1, 200.7	
	Thallium[2]	0.002	0.0005	7-1-7-92	279.2, 200.8,.9	± 30%
	Zinc[1]	[5.0]		1-30-91	289.1, 200.7	
INORGANICS	Alkalinity[1]	—	—	6-7-91	310.1, Titration	
	Asbestos[3]	7MF/L >10 µm	7MF/L>10 µm	1-30-91	TEM	2 StdDev
	Chloride[1]	[250] / 400	—	1-30-91	See rule	
	Residual Disinfectant[8]	detectable	—	6-29-89	See rule	
	Color[1]	[15cu]	—	1-30-91	110.2	
	Conductivity[4]	—	—	6-7-91	120.1	
	Corrosivity[1]	[non-corrosive]	—	1-30-91	Langlier Index, Aggressive Index	
	Cyanide[2]	0.2	0.2	7-1-7-92	Manual distillation followed by 335.1,.2,.3, Electrode	± 25%
	Fluoride[1]	4.0 [2.0]	—	4-2-86 1-30-91	340.2, distillation followed by 340.1,.3	± 10%
	Foaming Agents[1]	[0.5]	—	1-30-91	425.1	
	Nitrate (as N)[3]	10	10	1-30-91	353.1,.2,.3, 300.0A	± 10%
	Nitrite (as N)[3]	1	1	1-30-91	353.2,.3, 354.1, 300.0A	± 15%
	Nitrate/Nitrite (as N)[3]	10	10	1-30-91	353.1,.2,.3, 300.0A	
	Odor[1]	[3ton]	—	1-30-91	140.1	
	pH[1,4]	6.5-8.5 [6.5-8.5]		6-7-91 1-30-91	150.1,.2	
	o-Phosphate[4]	—	—	6-7-91	365.2,.3, 300.0A	
	Silica[4]	—	—	6-7-91	370.1, 200.7	
	Solids (TDS)[1]	[500] / 1000	—	1-30-91	160.1	
	Sulfate[1,2]	deferred [250] / 500	deferred	7-1-92 1-30-91	375.4	
	Temperature[4]	—	—	6-7-91		
MICRO-BIOLOGICALS	Turbidity[8]	Treatment 1.0	—	6-29-89	See rule	
	Coliform[8]	≥5% positive samples/mo	zero	6-29-89	MF, MTF, P-A, MMO-MUG	
	E. Coli[8]	no positive repeat sample	zero	6-29-89	EC MUG, Nutrient Agar with MUG, MMO-MUG with tube/azure	
	Fecal Coliform[8]	no positive repeat sample	zero	6-29-89	EC test	
	Giardia Lamblia[8]	Treatment	zero	6-29-89		
	Heterotropic Bacteria or Residual Disinfectant[8]	Treatment	—	6-29-89	Four plate, see rule	
	Legionella[8]	Treatment	zero	6-29-89		
	Viruses[8]	Treatment	zero	6-29-89		

1 — Secondary Maximum Contaminant Level — non-enforceable federal guidelines for aesthetic quality

2 — Phase V Regulations — promulgated 7-17-92

3 — Phase II Regulations — promulgated 1-30-91 and 7-1-91

4 — Lead and Copper Rule — promulgated 6-7-91; approved methods must be used for lead, copper, and water quality parameters; lead and copper levels are Action Levels

5 — Secondary contaminants must be analyzed using approved methods in laboratories approved by the states; primary contaminants must be analyzed using approved methods in laboratories certified by the states

6 — Radionuclides Proposed Rule — 7-18-91

7 — Only EPA methods have been listed here; additional methods are listed in the rules

8 — Coliform and Surface Water Treatment Rules — promulgated 6-29-89

9 — Methods 505 and 506 are used for screening and method 508A is used to quantify

10 — Recommended level

* — The acceptance limits for VOCs are ±20% 0.010mg/L and ±40% at 0.005mg/L

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To Walter Rosa	From Bill Lyon
Co.	Co. CCHD
Dept.	Phone # 243-1214

	PARAMETER REGULATED	MCL/ (SMCL) mg/L	MCLG mg/L	DATE OF PROMULGATION/ PROPOSAL	EPA METHOD[4,7]	ACCEPTA LIMIT
VOLATILES	Trihalomethanes (Total)	0.10		11-29-79	501.1,2	± 20%
	Benzene	0.005	zero	7-8-87	502.2, 503.1, 524.1,2	•
	Carbon tetrachloride	0.005	zero	7-8-87	502.1,2, 524.1,2	•
	Chlorobenzene[3]	0.1	0.1	1-30-91	502.1,2, 503.1, 524.1,2	•
	p-Dichlorobenzene	0.075 (0.005)	0.075	7-8-87 5-89	502.1,2, 503.1, 524.1,2	•
	o-Dichlorobenzene[3]	0.6	0.6	1-30-91	502.1,2, 503.1, 524.1,2	•
	1,2-Dichloroethane	0.005	zero	7-8-87	502.1,2, 524.1,2	•
	1,1-Dichloroethylene	0.007	0.007	7-8-87	502.1,2, 524.1,2	•
	c-1,2-Dichloroethylene[3]	0.07	0.07	1-30-91	502.1,2, 524.1,2	•
	t-1,2-Dichloroethylene[3]	0.1	0.1	1-30-91	502.1,2, 524.1,2	•
	Dichloromethane[2]	0.005	zero	7-17-92	502.1,2, 524.1,2	•
	1,2-Dichloropropane[3]	0.005	zero	1-30-91	502.1,2, 524.1,2	•
	Ethyl benzene[3]	0.7	0.7	1-30-91	502.2, 503.1, 524.1,2	± 40%
	Styrene[3]	0.1	0.1	1-30-91	502.2, 503.1, 524.1,2	•
	Tetrachloroethylene[3]	0.005	zero	1-30-91	502.1,2, 503.1, 524.1,2	•
	Toluene[3]	1	1	1-30-91	502.2, 503.1, 524.1,2	•
	1,2,4-Trichlorobenzene[3]	0.07	0.07	7-17-92	502.2, 503.1, 524.2	± 40%
	1,1,1-Trichloroethane	0.2	0.2	7-8-87	502.1,2, 524.1,2	•
	1,1,2-Trichloroethane[2]	0.005	0.003	7-17-92	502.1,2, 524.1,2	± 40%
	Trichloroethylene	0.005	zero	7-8-87	502.1,2, 503.1, 524.1,2	•
	Vinyl chloride	0.002	zero	7-8-87	502.1,2, 524.1,2	•
	Xylenes (Total)[3]	10	10	1-30-91	502.2, 503.1, 524.1,2	•
HERBICIDES & PESTICIDES	Alachlor[3]	0.002	zero	1-30-91	505, 507, 525.1	± 45%
	Aldicarb[3]	Postponed	Postponed	5-27-92	531.1	2 StdDev
	Aldicarb Sulfoxide[3]	Postponed	Postponed	5-27-92	531.1	2 StdDev
	Aldicarb Sulfone[3]	Postponed	Postponed	5-27-92	531.1	2 StdDev
	Atrazine[3]	0.003	0.003	1-30-91	505, 507, 525.1	± 45%
	Carbofuran[3]	0.04	0.04	1-30-91	531.1	± 45%
	Chlordane[3]	0.002	zero	1-30-91	505, 508, 525.1	± 45%
	2,4-D[3]	0.07	0.07	1-30-91	515.1	± 50%
	Dalapon[3]	0.2	0.2	7-17-92	515.1	2 StdDev
	Dibromochloropropane(DBCP)[3]	0.0002	zero	1-30-91	504	± 40%
	Dinoseb[3]	0.007	0.007	7-17-92	515.1	2 StdDev
	Diquat[3]	0.02	0.02	7-17-92	549	2 StdDev
	Endothall[3]	0.1	0.1	7-17-92	548	2 StdDev
	Endrin[3]	0.002	0.002	7-17-92	505, 508, 525.1	± 30%
	Ethylenedibromide(EDB)[3]	0.00005	zero	1-30-91	504	± 40%
	Glyphosate[3]	0.7	0.7	7-17-92	547	2 StdDev
	Heptachlor[3]	0.0004	zero	1-30-91	505, 508, 525.1	± 45%
	Heptachlor epoxide[3]	0.0002	zero	1-30-91	505, 508, 525.1	± 45%
	Lindane[3]	0.0002	0.0002	1-30-91	505, 508, 525.1	± 45%
	Methoxychlor[3]	0.04	0.04	1-30-91	505, 508, 525.1	± 45%
	Oxamyl[3] (vydate)	0.2	0.2	7-17-92	531.1	2 StdDev
	Pentachlorophenol[3]	0.001	zero	7-1-91	515.1, 525.1	± 50%
	Picloram[3]	0.5	0.5	7-17-92	515.1	2 StdDev
	Simazine[3]	0.004	0.004	7-17-92	505, 507, 525.1	2 StdDev
	Toxaphene[3]	0.003	zero	1-30-91	505, 508, 525.1	± 45%
	2,4,5-TP (Silvex)[3]	0.05	0.05	1-30-91	515.1	± 50%
OTHER SOCs	Hexachlorobenzene[3]	0.001	zero	7-17-92	505, 508, 525.1	2 StdDev
	Hexachlorocyclopentadiene[3]	0.05	0.05	7-17-92	505, 525.1	2 StdDev
	Benzo(a)pyrene[3]	0.0002	zero	7-17-92	550, 550.1, 525.1	2 StdDev
	PCBs[3] (as decachlorobiphenyl)	0.0005	zero	1-30-91	505, 508 508A[9]	0-200 mg/L
	2,3,7,8-TCDD(Dioxin)[2]	3x10-8	zero	7-17-92	1613	2 StdDev
	Acrylamide[3]	Treatment	zero	1-30-91		
	Epichlorohydrin[3]	Treatment	zero	1-30-91		
	Di(2-ethylhexyl)adipate[2]	0.4	0.4	7-17-92	506, 525.1	± 50%
	Di(2-ethylhexyl)phthalate[2]	0.006	zero	7-17-92	506, 525.1	2 StdDev
RADIONUCLIDES	Adjusted Gross Alpha[6]	15 pCi/L	zero	7-18-91	900.0	± 50%
	Beta Particle Emitters[6]	4 mrem cde per year	zero	7-18-91	900.0	± 30%
	radioactive Cesium	— 50 pCi/L	—		901.0	± 30%
	radioactive Iodine	—	—		902.0	± 30%
	radioactive Strontium	—	—		905.0	± 30%
	tritium	—	—		906.0	± 20%
	gamma&photon emitters	—	—		901.1	
	Radium-226[6]	20 pCi/L	zero	7-18-91	903.0, 1	± 30%
	Radium-228[6]	20 pCi/L	zero	7-18-91	904.0	± 50%
	Radon-222[6]	300 pCi/L	zero	7-18-91	903.1, 913.0	± 30%
	Uranium[6]	0.02	zero	7-18-91	908.0, 1	± 30%

KERR-McGEE CHEMICAL CORPORATION
POST OFFICE BOX 55 • HENDERSON, NEVADA 89009

December 17, 1997

Mr. Robert Kelso
Supervisor Remediation Branch
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89706-0866

Dear Mr. Kelso:

Subject: Exclusion Request for Southern KMCC Property

Kerr-McGee Chemical Corporation (KMCC) requests a no further action determination and a written assurance regarding future liability for the southern portion of KMCC's property (the Property) within the BMI Industrial Complex, Clark County, Nevada, also within the limits of the City of Henderson. The Property is more fully described in the legal description, which is attached as Exhibit A and incorporated by this reference. KMCC also requests release of the Property from the terms, requirements and obligations of the Consent Agreement entered into by the NDEP respecting the KMCC Henderson facility, dated August 12, 1996.

KMCC's request is based on an assessment of the Property, the Environmental Conditions Assessment, Kerr-McGee Chemical Corporation, Henderson, NV (Kleinfelder, Inc., April 15, 1993). KMCC believes this report adequately characterizes the environmental conditions at the KMCC facility including the parcel which this exclusion request covers and fulfills the environmental assessment requirements of the NDEP's letter to Basic Management, Inc. dated March 8, 1994. The letter states, "if the environmental assessment for a particular parcel indicates no public health or environmental problems are present, the Division will issue a letter indicating development may proceed on the property." KMCC desires to allow development of the property and requests a letter stating that no further actions are necessary with respect to the Property, certifying that development may proceed without environmental restriction, and assuring third parties that the NDEP will not seek to hold them liable for any environmental conditions on the Property.

If you have any questions please call me at (702) 651-2234. Thank you for your consideration and assistance.

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

By certified mail
cc: PSCorbett
RHJones
TWReed
PBDizikes
RANapier
Gregory W. Schlink, BMI

SMC\Southern exclusion request.doc

PETER G. MORROS, Director
ALLEN BIAGGI, *Administrator*
(702) 687-4670
TDD 687-4678
Administration
Water Pollution Control
Facsimile 687-5856
Mining Regulation and Reclamation
Facsimile 684-5259

STATE OF NEVADA
BOB MILLER
Governor

Waste Management
Corrective Actions
Federal Facilities
Air Quality
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 89706-0851

December 17, 1998

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

RE: Phase II Response and Supplemental Work Plan

We have received and reviewed the "Response to Phase II Report Comments" and the "Supplemental Work Plan" submitted by Kerr-McGee on November 9, 1998. We approve your responses including the response to Item 4.9 (AP-1, AP-2 and AP-3 Ponds) that the impacts to groundwater should be addressed in the perchlorate remediation effort. The Work Plan is approved subject to including the development of a conceptual site model for the plant site and the comparing the soil sample results that are obtained to Nevada cleanup standards and actual background values.

A conceptual site model is a three-dimensional representation that conveys what is know or suspected about contamination sources, release mechanisms, and the transport and fate of those contaminants. ("Conceptual site model" is not synonymous with "computer model.") The conceptual site model should initially be based on existing geological, geochemical, hydrological, climatological and analytical data and the sampling described in the Supplemental Work Plan. Additional sampling and analysis may be necessary to refine and complete the models. Guidance on the development of a site conceptual model is contained in ASTM Standard E1689 and US EPA's Draft Policy (OSWER Directive 9200.4-17, November 18, 1997).

This review is for administrative purposes only and does not relieve Kerr-McGee Chemical Corporation of its responsibility to utilize the appropriate means and methods to investigate the site as required under Nevada Statutes and Administrative Codes, the Consent Agreement, ASTM Guide D5730 and good management practices. The conceptual site models developed under this Supplemental Work Plan must be complete enough to provide the basis for Remedial Alternative Studies.

Sincerely,

Thomas A. Whalen, P.E.
Remediation Branch

TAW:kmf

EXHIBIT A
BOUNDARY DESCRIPTION

A PARCEL OF LAND SITUATE THE SOUTHWEST QUARTER (SW 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 13, TOWNSHIP 22 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SAID SECTION 13; THENCE ALONG THE EAST LINE THEREOF, SOUTH 00°19'30" WEST, A DISTANCE OF 1956.16 FEET TO THE POINT OF INTERSECTION WITH THE NORTHERLY RIGHT-OF-WAY LINE OF LAKE MEAD DRIVE (NEVADA STATE HIGHWAY NO. 146): THENCE ALONG SAID RIGHT-OF-WAY LINE, SOUTH 81°09'41" WEST, A DISTANCE OF 1028.66 FEET; THENCE DEPARTING SAID RIGHT-OF-WAY LINE AND CONTINUING ON THE SAME COURSE, SOUTH 81°09'41" WEST, A DISTANCE OF 454.00 FEET TO A POINT ON AFORESAID RIGHT-OF-WAY LINE FOR **THE POINT OF BEGINNING**; THENCE ALONG SAID RIGHT-OF-WAY LINE, SOUTH 81°09'41" WEST, A DISTANCE OF 1292.59 FEET TO A POINT OF INTERSECTION WITH THE EASTERLY SIDE LINE OF SIXTH STREET; THENCE DEPARTING SAID RIGHT-OF-WAY LINE AND ALONG SAID SIDE LINE, NORTH 08°51'37" WEST, A DISTANCE OF 430.10 FEET; THENCE NORTH 81°22'26" EAST, A DISTANCE OF 1292.60 FEET TO A POINT OF INTERSECTION WITH THE WESTERLY BOUNDARY OF THAT CERTAIN PROPERTY OWNED BY THE UNITED STATES OF AMERICA AND SHOWN UPON THE CLARK COUNTY ASSESSOR'S MAP AS APN 178-013-601-003; THENCE ALONG SAID BOUNDARY, SOUTH 08°51'37" EAST, A DISTANCE OF 425.31 FEET TO TO THE POINT OF BEGINNING.

SAID PARCEL CONTAINS APPROXIMATELY 552,852 SQ. FT. (12.692 ACRES).

BASIS OF BEARING
SOUTH 00°19'30" WEST BEING THE EAST LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 13, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., CLARK COUNTY, NEVADA, AS DESCRIBED IN THAT CERTAIN DOCUMENT RECORDED IN BOOK 844, INSTRUMENT NO. 678196 OF OFFICIAL RECORDS.

NOTE: THE ABOVE BOUNDARY DESCRIPTION WAS WRITTEN FROM RECORDED INFORMATION AND NO FIELD SURVEY WAS DONE TO VERIFY IT'S LOCATION UPON THE GROUND. ALSO, THE ABOVE BOUNDARY DESCRIPTION DOES NOT REPRESENT A LEGAL PARCEL OF LAND PER NEVADA REVISED STATUTES, CHAPTER 278, UNTIL SUCH A TIME A SUBDIVISION MAP IS RECORDED.

PROFESSIONAL LAND SURVEYOR - STATE OF NEVADA
BERNARD F. KOCHEVAR, SR.
12/4/97
No. 8381

C:\LEGAL\51330\33012ACR.LGL
December 04, 1997, bfk sr.

Dec. 1, 1998

PCLR8 Pat Corbett + Susan Crowley

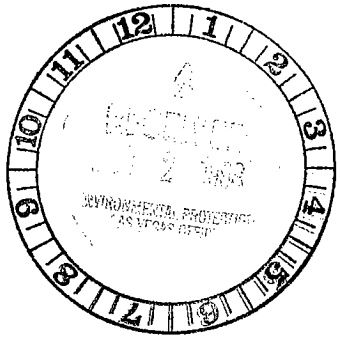
Pond is full: testing being done now. Equipment is ready to empty pond. Still need modification of NPDES permit and UIC permit. Discharge permit is in place + discharge should occur later this week.

ICET cell not performing as hoped. Need to substantially reduce flow rates to get it to perform. Are looking at a way to substantially increase surface area. Everett spoke w/ vendor about packed-bed cell. Some of the problems are discussed in document mailed to us yesterday.

Still looking at biochemical reduction as a possible technology.

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

November 30, 1998



Ms. Brenda Pohlmann
Remediation Branch Supervisor
Nevada Division of Environmental Protection
555 East Washington, Suite 4300
Las Vegas, NV 89101

Dear Ms. Pohlmann:

Subject: Henderson On-Site Groundwater Perchlorate Treatment Technology Review

Please find enclosed two copies of the Henderson On-Site Groundwater Perchlorate Treatment Technology Review.

Kerr-McGee Chemical (KMC) will forward copies to Doug Zimmerman (Nevada Division Environmental Protection), Southern Nevada Water Authority, US EPA Region IX, Metropolitan Water District, and the City of Henderson.

Please feel free to call me at (702) 651-2234 or Keith Bailey at (405) 270-3651 if you have any questions regarding this information. KMC believes a meeting to review this information would be helpful. Please contact me at your earliest convenience to set a time. Thank you.

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

Enclosures

cc: Jeanne-Marie Bruno
Barry Conaty
Patrick S. Corbett
Alan Dooley
Kevin Mayer
Pat Mulroy
Tom Reed
Doug Zimmerman

C:\DATA\DOCS\SMC\LTR\GROUNDWATER PERCHLORATE TREATMENT TECHNOLOGY REVIEW COVER LETTER.DOC

Henderson
On-Site Groundwater Perchlorate Treatment
Technology Review

L. K. Bailey
and
E. M. Spore

Kerr-McGee Chemical LLC
8000 W. Lake Mead Drive
Henderson, NV, 89015
November 30, 1998

TABLE OF CONTENTS

Henderson On-Site Groundwater
Perchlorate Treatment Technology Review

OVERVIEW

In late July 1997, the presence of perchlorate was identified in the Las Vegas Wash and in Lake Mead. Resulting efforts by Kerr-McGee Chemical LLC (Kerr-McGee) to determine the extent of perchlorate migration in groundwater both on- and off-site have been reported separately.[1,2] In addition to defining the extent of perchlorate in area groundwater, in early August 1997, work was undertaken by Kerr-McGee to evaluate potential technologies which could:

1. Provide temporary storage of contaminated groundwater.
2. Separate perchlorate from groundwater.
3. Destroy perchlorate from groundwater.

This report summarizes the technologies evaluated by Kerr-McGee to deal with perchlorate containing groundwater recovered from the Kerr-McGee plant site. A subsequent report, due by the end of December 1998, will address treatability results on groundwater samples collected from the area of the Pittman Lateral. A recommendation for remedial actions will be made to Nevada Division of Environmental Protection (NDEP) in early 1999.

TECHNOLOGY SUMMARY

Approaches to provide temporary groundwater storage of were reviewed to stop migration of perchlorate off-site while providing time for development and construction of treatment technologies. Construction of an 11-acre pond was initiated in mid-1998 and should be complete by the middle of December.

In August 1997, Kerr-McGee's review of available technologies to remove or destroy perchlorate yielded no commercially demonstrated technologies. Several separation technologies showed promise in removing perchlorate, but expected capital and operating costs were high. Evaporation and reverse osmosis appeared most developed. In addition, for perchlorate destruction, only one technology showed significant promise: biochemical reduction of perchlorate.

Since August 1997, Kerr-McGee has spent in excess of $500,000 evaluating and testing perchlorate destruction technologies at both laboratory and pilot scales. The work is not yet complete, but indications are promising, particularly in the biochemical area. Pilot testing of one biotechnology option has progressed to a stage where a commercial scale plant can be designed. A second technology, catalyzed electrochemical destruction of perchlorate, has been brought from a concept to a laboratory success. Pilot testing is being initiated but will likely require several months to yield sufficient information for commercialization.

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[1] KMCC Perchlorate Characterization Project: Historical Review Report/Sampling Plan, Kerr-McGee, January 16, 1998.

[2] Phase II Groundwater Perchlorate Investigation Report, Kerr-McGee Chemical LLC, July 15, 1998.

The following sections present results of Kerr-McGee test work. In several cases, proprietary technologies are involved and under terms of confidentiality agreements specifics of the processes may not be revealed by Kerr-McGee. Accordingly, capital and operating costs for each technology are reported in this document on a relative scale: high, moderate, or low.

There have been and will continue to be many claims in the technological arena as to processes which reduce perchlorate in groundwater. Each technology has limits, and those limits must be discerned and understood. There is much work on technology to reduce low levels (300-500 ppb) of perchlorate in water to much lower levels (<18 ppb). This technology must not be confused with technology developed to treat higher levels (200-2000 ppm) in brackish groundwater. It is easy to confuse what has become common in this short period of technology development and that is the use of gallons per minute of flow as a rating of technology capacity. The use of this unit to characterize technology is inappropriate. Flow rate is a resultant measure of the rate of reduction of perchlorate; thus, the rate of reduction of perchlorate in a concentration range in a water matrix is what should be used to rate a technology.

In evaluating each potential technology, the extent of perchlorate removal/destruction has been assessed. For most technologies, this is reported as the perchlorate concentration in the final water discharge product. For other technologies, the fraction of perchlorate destroyed or concentration ratios are noted.

Based on work performed to date, biochemical destruction of perchlorate appears to be the most effective (lowest effluent perchlorate concentration) and among the lowest cost alternatives studied. While the process continues to be optimized, flow sheets for commercial applications are being developed. Capital and operating costs for the process are projected as moderate and low respectively. Final effluent concentrations of less than 18 ppb (non-detect) have been demonstrated at the laboratory scale.

Electrocatalyst development work begun in October 1997, and last November yielded a catalyst which would reduce nitrate, chlorate, and perchlorate. Development and optimization of the electrocatalyst has continued with the most recent scale up to a small pilot cell located in Henderson. While it was anticipated that the pilot cell would have a capacity near six gallons per minute of water containing on the order of 300 ppm perchlorate, initial tests have shown lower effective flow rates. To address the flow rate issue, the electrocatalyst work is now focused on maximizing the surface area of the electrocatalyst in contact with the water to be treated.

Electrochemical destruction is potentially viable, but has not yet been sufficiently tested to allow commercial design or operation. Current test results indicate that the process will reduce perchlorate concentrations only to low ppm levels rather than the ppb levels possible with biotechnology.

It should be noted that in all of the technology evaluations performed, the final effluent concentration is a key factor. Equipment sizing, process effectiveness, and capital/operating costs all depend on the final effluent target. Since toxicology work has not yet resulted in a standard for perchlorate, selection of a process option is premature.

EVALUATION OF STORAGE TECHNOLOGIES

Two alternatives were examined to store impacted groundwater:

1) Above ground ponding.
2) Below ground containment with slurry walls.

Both approaches are only temporary measures with limited storage potential. In evaluating the two approaches, Kerr-McGee rated the above ground ponding alternative as preferred based on the ability to see and control the liner materials used to contain the water. Slurry walls were considered, but problems ensuring complete watertight coverage and alteration of existing hydrogeology weighed against the option.

Kerr-McGee received approval and initiated construction of an 11-acre pond with a capacity of about 70 million gallons earlier this year. Capital costs for the pond are moderate. The pond is undergoing integrity testing and should be available for service by mid-December 1998.

EVALUATION OF SEPARATION/CONCENTRATION TECHNOLOGIES

Separation or concentration of perchlorate from groundwater to reduce the volume of impacted material is only an interim measure. Ultimately a destruction technology must be employed or the perchlorate must be disposed of. Contacts with landfill operators indicate that perchlorate concentrations in excess of 1 percent generally make any waste material unsuitable for permanent land disposal. The separation/concentration alternatives, therefore, will likely be paired with perchlorate destruction alternatives to provide a viable perchlorate remediation alternative.

Evaporation

Evaporation removes water from perchlorate containing solids which substantially reduces the volume of material to be handled. It may, however, result in a material that is classified as an oxidizer under Department of Transportation (DOT) and EPA regulations. Samples are being collected and test work will be performed to determine whether evaporation residues meet the characteristics of an "oxidizer" when subjected to DOT tests.

Solar evaporation is the simplest form of evaporation considered. In the Henderson area, Kerr-McGee experience shows evaporation rates of about 2.8 gallons per minute per acre of water surface area. The 11-acre pond now being hydrotested on the Kerr-McGee site is thus capable of evaporating about 31 gallons per minute of water. Solar evaporation can be enhanced by aeration spray nozzles in the pond, bringing the evaporation rate up by 5-10 percent (pond evaporation enhanced to 32-34 gpm). Possible carry-over of mists or fine aerosols may be a problem with enhanced evaporation.

Mechanical evaporators are utilized in the Kerr-McGee process. Laboratory testing by Resources Conservation Company (RCC) indicates that groundwater containing up to 1.5 g/l

perchlorate and 3 g/l chlorate can be successfully evaporated without extensive fouling of tubes. Further pilot testing would be required to prove the concept at larger scale. Capital and operating costs for typical falling film evaporators are moderate. See Appendix I Evaporation Testing.

If evaporation is used without recovery of recondensed water, the process of separating out perchlorate is essentially complete. Recondensing water, however, is likely to involve at least modest contamination of the water with perchlorate at ppb levels (RCC test results indicated a level of 700 ppb).

Reverse Osmosis/Electrodialysis

Membrane separators are used in desalinating water and many other applications. The technologies are generally expensive (both capital and operating costs are high). Reverse Osmosis (RO) on site water was successfully tested by Osmonics at a laboratory scale. Membrane fouling and short life expectancy are major issues with the technology, particularly in the relatively high total dissolved solids water generated at the site (see Appendix II Groundwater Analysis)

Concentration ratios for RO systems treating Kerr-McGee water are likely on the order of 4:1. Multiple stage systems would be required to achieve low ppm perchlorate levels. It is questionable whether levels near the California provisional standard of 18 ppb are achievable. See Appendix III Reverse Osmosis.

Potential use of electrodialysis membrane systems was reviewed by a consultant. He indicated that at the perchlorate concentrations in Kerr-McGee site groundwater, RO is likely a less expensive alternative than electrodialysis. Accordingly, no further work has been performed on electrodialysis.

Ion Exchange

Aerojet has successfully tested use of ion exchange resins to remove relatively low levels of perchlorate from groundwater. They found, however, that biochemical destruction was more cost effective than ion exchange.

At higher perchlorate concentrations and when coupled with high chlorate concentrations (1.5 and 3.0 g/L at the Kerr-McGee site respectively), the potential for production of an unstable mixture increases. Organic resins loaded with chlorate and perchlorate may present an unacceptable hazard. The resins are also reportedly difficult to strip. Based on these factors, the technology was not considered further.

EVALUATION OF DESTRUCTION TECHNOLOGIES

Incineration

A commercial hazardous waste/explosives incinerator was contacted regarding the potential to process perchlorate containing solids and liquids from concentration technologies. A waste profile was submitted and was rejected due to the high sodium level in concentrated perchlorate streams. Sodium is detrimental to refractory bricks used in incinerator construction. While perchlorate destruction with this approach is complete, costs were also very high.

Biochemical Destruction

Literature reviews on biochemical destruction of perchlorate yielded several potential vendors. Subsequent evaluations, however, reduced the number claiming developed technology and the ability to perform pilot tests to three:

1) Applied Research Associates (ARA) has performed pilot scale test work for the U.S. Air Force and Thiokol Corp in Utah.
2) Aerojet has constructed and is now starting up a large commercial plant on relatively low perchlorate concentration ground water in California.
3) U.S Filter and Envirogen have announced a joint venture to market perchlorate treatment systems building on established denitrification technology.

The US Air Force initiated work in 1989 to develop bacteria that would remove ammonium perchlorate from water. To date, more than $13 million has been spent by the Air Force in developing the technology. Testing of Kerr-McGee water by Applied Research Associates (USAF contractor for work at Tyndall AFB) has been successful in the laboratory and at a small pilot scale. Optimization of this technology continues today.

The pilot scale ARA plant is located at Thiokol's solid rocket motor plant in Utah. The plant is capable of treating ~1.5 gpm of nominal 5,000 ppm perchlorate (maximum rate 3.75 lb/hr perchlorate reduced). Developments from work funded by Kerr-McGee have been implemented on this pilot plant and are shown to be successful on groundwater from the aquifer. This work has been proven on a laboratory scale to remove perchlorate to <18 ppb levels in this groundwater (non-detect levels using the Dionix IC method). The process operates on brackish water reportedly containing up to 34,000 ppm TDS. The Thiokol plant is controlled to maintain TDS levels below 20,000 ppm. See Appendices IV and V, Biochemical Flow Sheets and Biochemical Technical Publications.

Welinella succinogenes is a microaerophyllic bacterium used in the ARA process to remediate perchlorate in groundwater. This bacterium performs best in the 1-3% oxygen range (anoxic conditions). Nutrient in the beginning of this work was cheese whey and washed brewer's yeast. Residence time for reduction of perchlorate was approximately 24 to 26 hours at 36 to 40°C. Optimization of the process has yielded lower temperature operating conditions and lower costs through use of locally available wastes in place of the initial cheese whey and brewer's yeast. This optimization has reduced the residence time for reduction to 8-16 hours at

a temperature of 30°C. The residence time and nutrient/micro-nutrient (metals required for metabolic process of bacteria) concentration have the largest effect on the rate of reduction of perchlorate in groundwater using this technology.

The use of optimum nutrient/micro-nutrient ratios has also dramatically reduced the amount of biomass produced by the process. This aspect lessens wastage and increases process efficiency. Pilot plant implementation of the micro-nutrient/nutrient ratios has shown excellent performance improvement indicating that scale up performance from laboratory results should be reasonable. This process reduces nitrate, chlorate, and perchlorate in that order. Chromium VI is also reduced to Chromium III in the process.

Biomass (waste solids not containing appreciable perchlorate) generated in the biochemical process can be handled in several ways. If biological oxygen demand (BOD) levels are sufficiently low, effluents can be sent to a POTW where they would be reacted and filtered prior to sending the remaining biomass to a landfill. Alternatively aerobic reactors could be coupled with the anoxic perchlorate reactors to reduce the biological oxygen demand (BOD). This would significantly increase the cost of the process.

In addition to the ARA technology, Kerr-McGee has contracted with Aerojet for bench scale "bucket" tests to demonstrate the ability of the Aerojet process to tolerate the higher perchlorate and salt concentrations in Kerr-McGee groundwater. Aerojet has constructed a large (several thousand gpm) commercial plant in California to treat low concentration perchlorate groundwater. Their system, however, had not been operated at concentrations similar to Kerr-McGee site water. Initial Aerojet results on Kerr-McGee water are encouraging, though destruction of perchlorate was not complete, and the tests did not achieve the low levels demonstrated by the ARA technology. Additional tests will be required to fully adapt the technology to the Kerr-McGee water.

A significant difference between the ARA and Aerojet approaches is the method for suspending the bacteria. The ARA approach is a suspended growth process (bacteria are suspended in the water without a substrate), while Aerojet utilizes a fixed film fluidized bed process (bacteria grows on the surface of activated carbon particles suspended by the fluidized bed action). Aerojet's system runs at ambient groundwater temperature (65-70°F) while ARA work to date is at elevated temperatures (86-95°F). The U.S. Filter/Envirogen system is also reportedly operated at ambient temperature.

Electrochemical Destruction

Based on Kerr-McGee's experience in producing perchlorate in electrochemical cells, the concept of reversing the process was evaluated. Work was initiated with an electrochemical research company in September 1997 to develop a method of perchlorate reduction in groundwater. Last November, the discovery of an electrocatalyst was made which reduces perchlorate to chloride in an electrochemical cell. Further R & D work began at the bench level to develop the technology. To date, these results continue to show success in reducing not only perchlorate, but also chlorate and nitrate. Scale up, development, and R & D have all been ongoing since the discovery last year.

The electrolytic cell has reached pilot phase and is currently being operated at the Henderson facility. This operation begins the cycle of completing a full material balance and improvement (optimization) of the cell for economics and efficiency. The tests are expected to take several months. The optimization of the process is underway at this time with engineering expected to ultimately result in development of full-scale electrolytic systems.

The electrocatalyst facilitates the production of hydrogen in sufficient quantity and in proximity to the nitrate, chlorate, and perchlorate ions that oxygen is removed by the hydrogen ion, and water, chloride, and nitrogen are left. This cell consists of a precious metal coated titanium anode, a separator or membrane and a cathode, which has, in close proximity, an electrocatalyst applied. Current is applied to this cell arrangement which produces oxygen at the anode and some hydrogen at the cathode, which is a measure of the inefficiency of the process. The process requires a pH of 1 to 2 and temperature of approximately 70°C. It must be pointed out that this process is in the midst of much revelation and exploration of operating parameters. Current efficiencies have ranged from 80% to 2% depending on the concentration of ions in the groundwater. The electrochemical reduction technology performs best at higher concentrations of perchlorate, chlorate, and nitrate in conventional cell arrangements. See Appendices VI and VII, Electrochemical Flowsheet and Electrochemical Data.

The use of high surface area cathode cells will have an impact on these parameters. Use of extremely high surface area cathode cells is now underway. Re-exploration of these parameters will occur during the development cycle of this type of electrochemical cell. Emphasis is placed on the fact that performance data shown here are for a specific cell type and may not represent what happens in a high surface area cathode cell.

Recently use of Chlor-Alkali membrane cell technology was evaluated. The cell technology may not be adaptable to the optimum cell design, which is a very high surface area cathode to achieve the highest rate of reduction. The classic electrochemical cell of anode-separator-electrocatalyst-cathode does not facilitate maximum contact between catalyst and ions to be reduced. Since current densities are low, on the order of 0.04 kA/m^2, the use of very high surface areas appears desirable. Current Chlor-Alkali cell technology does not lend enough cathode space to facilitate this feature of the electrolytic cell. Nickel electrowinning cells and some water treatment cells are more easily adaptable to this design. Exploration of this system is underway.

Appendix I

Evaporation Testing

TM-970349

KERR-McGEE CHEMICAL CORPORATION
ANALYTICAL CHEMISTRY SECTION

REPORT OF ANALYSIS

Received From:	B.M. Spore	***Date of Report:***	November 17, 1997
On Date:	October 27, 1997	***Project Number:***	PE 362
Identification:	Henderson Distillate from RRC Job: AC008499	***Page:***	1 of 1

The water samples submitted on the above date have been analyzed for the requested parameters, Table I.

Table I
Distillate from RRC
JOB: AC008499

Sample	ClO_4, mg/l
Final Distillate (CF20-5)	0.7
Final Distillate	0.7
Final - Sum (CF25)	27,000

M. T. Miller

Validated - Project Leader

D. A. Ward DAWard/pc 11/18/97
VALIDATED *-Project Leader*

B. R. Clark B.R. Clark 11-18-97
APPROVED-Manager

Distribution:

File: Chron
P/C PE 362
CHEM 4
AC-97050
JOB: AC008499

PETER G. MORROS, Director

L.H. DODGION, *Administrator*

(702) 687-4670
TDD 687-4678

Administration
Mining Regulation and Reclamation
Water Pollution Control
Facsimile 687-5856

STATE OF NEVADA
BOB MILLER
Governor

Waste Management
Corrective Actions
Federal Facilities

Air Quality
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 89706-0851

November 24, 1998

TO: Henderson Industrial Site Steering Committee - Joel Mack
Basic Management, Incorporated - Greg Schlink & David Tundermann
Stauffer Management Company - Lee Erickson
Pioneer Chlor Alkali Company, Inc. - Sam Chamberlain & Verrill Norwood
Montrose Chemical Corporation of California - Frank Bachman
Titanium Metals Corporation - Tony Garcia & Susan Stewart
Kerr-McGee Chemical LLC - Susan Crowley

RE: Accelerated Work to Abate, Mitigate and Eliminate Environmental Contaminants

I have received the letter of November 13, 1998, signed by David W. Tundermann, addressing the "Accelerated Work." I wish to affirm the mandates contained in my November 6, 1998 letter on this work including the contaminants of concern such as benzene and total dissolved solids, the need to protect the water of the State and the Colorado River System by controlling the plume and the workplans to be submitted on January 6, 1999 which must include timely implementation dates of the appropriate remedial measures.

The timeline for U.S. Bureau of Reclamation financial assistance envisions a conceptual design for the Pittman pump and treat system to be submitted with an application early in the first quarter of 1999 and initiation of construction coincident with a funding agreement during the third quarter of 1999. Staff members from our Bureau of Corrective Actions will work with you to expedite and facilitate this accelerated work to abate, mitigate and eliminate environmental contaminants from the groundwater emanating from the BMI Complex. Please feel free to call me or Doug Zimmerman regarding this work at 702-687-4670.

Sincerely,

Allen Biaggi
Administrator

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

November 11, 1998

Mr. LaVerne Rosse
Deputy Administrator
State of Nevada
Division of Environmental Protection
333 W. Nye Lane
Carson City, NV 89710

Subject: Closed Hazardous Waste Landfill
1998 Post Closure Monitoring Results

Dear Mr. Rosse:

Kerr-McGee Chemical Corporation's (KMCC) Henderson facility conducted RCRA groundwater monitoring as required by 40 CFR 265.92 (d)(1) in May 1998. The wells sampled are associated with the post closure requirements of the on-site closed hazardous waste landfill. Analytical results were compared with 1982/83 baseline values as required under 40 CFR 265.93 (c). All significant changes in water quality represented a movement towards improved quality.

Notice of a statistically significant change of an upgradient well groundwater quality parameter is made herein pursuant to 40 CFR 265.93 (c)(1). Because the downgradient conditions continue to indicate a better groundwater quality than is apparent upgradient of the landfill, there is no indication the landfill has impacted water quality parameters in the vicinity of the landfill.

In 1982, a monitoring program was established with one upgradient and three downgradient wells to follow the groundwater quality in the closed hazardous waste landfill area. M-5 was the upgradient well. M-6, M-7 and H-28 were the downgradient wells. During the May 1998 post closure sampling, a statistically significant change from baseline of the historical **upgradient** well M-5 was detected for parameters of pH, specific conductance (SpCd), and total organic halides (TOX or TOH). Please see Table 1. The change from baseline was trending towards a **quality improvement** for parameters of pH and TOX. The trend for SpCd was toward high level. This change is consistent with past sampling efforts. This same trend has been apparent since 1991 monitoring.

All statistically significant changes from baseline detected in the **downgradient** monitoring wells described below reflect a groundwater **quality improvement** when compared to the 1982/83 baseline values of upgradient well M-5. Please see Table 1. All parameters, pH, SpCd, TOC and TOX moved in the direction of quality improvement in all three downgradient wells, M-6, M-7 and H-28. Additional groundwater samples were collected, as required under 40 CFR 265.93 (c)(2), and analyzed for pH, SpCd, TOC and TOX at each well showing a significant difference from the historical upgradient well concentrations.

Statistically, analysis of the resampled parameters did show support for:

1. An increase in pH in M-5A, M-6A, M-7A and H-28, towards better water quality.

2. A decrease in SpCd in M-6A, M-7A and H-28, towards better water quality.

3. An increase in SpCd in 5A, the upgradient well.

4. A decrease in TOC in M-5A, M-6A, M-7A and H-28, towards better water quality.

4. A decrease in TOX in M-5A, M-6A, M-7A and H-28, towards better water quality.

The downgradient change from baseline was trending towards a **quality improvement** for parameters of pH, SpCd, TOC and TOX. This change is consistent with past sampling efforts. This same trend has been apparent since 1991 monitoring.

Water levels, statistical comparisons and analytical results are attached as Table 1. Resample results are attached as Table 2.

Based on information herein and the information presented since the June 1984 Closure/Post Closure Plan (revised October 1984) was submitted, the closed landfill has been demonstrated to have no impact on groundwater quality.

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

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

smc\Landfill Monitoring to NDEP 06-98.doc
cc: PSCorbett
MJPorterfield

TABLE 1. KERR-McGEE CHEMICAL CORPORATION - HENDERSON, NV
Hazardous Waste Landfill Post Closure Monitoring
1998

Well #	Date	Water Level (feet)	Total Chromium (ppm)	Iron (ppm)	Manganese (ppm)	Sodium (ppm)	Chloride (ppm)	Sulfate (ppm)	Phenols (ppb)	TOC (ppm)	TOX (ppm)	pH	Specific Conductance (umhos/cm)
M-5A	04/30/98	1708.44	ND	1.6	1.5	1500	4600	1200	<0.25	40.0	18.0	7.14	14800
										40.0	18.0	7.13	14700
										40.0	19.0	7.06	14600
										40.0	20.0	7.03	14600
							M-5A Average			40.0	18.8	7.09	14675
							M-5A Standard Deviation			0.0	0.8	0.05	83
							Background (M-5) *			62.3	47.7	6.34	10469
							M-5A t-Test			**0.90**	**3.47**	**4.48**	**39.84**
M-6A	04/30/98	1688.88	ND	6.9	1.8	1200	2000	1200	<0.25	2.9	2.1	7.43	8080
										3.1	1.8	7.55	8040
										3.4	2.0	7.50	7990
										3.2	1.7	7.50	7970
							M-6A Average			3.2	1.9	7.50	8020
							M-6A Standard Deviation			0.2	0.2	0.04	43
							Background (M-5) *			62.3	47.7	6.34	10469
							M-6A t-Test			**2.40**	**5.49**	**7.50**	**23.57**
M-7A	05/01/98	1684.6	ND	0.21	0.039	1200	2000	1400	<0.25	3.6	10.0	7.35	8250
										3.6	12.0	7.42	8450
										3.5	13.0	7.35	8330
										4.0	14.0	7.24	8320
							M-7A Average			3.7	12.3	7.34	8338
							M-7A Standard Deviation			0.2	1.5	0.06	72
							Background (M-5) *			62.3	47.7	6.34	10469
							M-7A t-Test			**2.38**	**4.24**	**6.48**	**20.30**
H-28	05/01/98	1690.01	ND	32	1.2	1100	2600	420	<0.25	5.7	75.0	7.55	8240
										6.1	2.5	7.55	8370
										5.9	2.5	7.58	8430
										5.9	3.0	7.60	8370
							H-28 Average			5.9	20.8	7.57	8353
							H-28 Standard Deviation			0.1	31.3	0.02	69
							Background (M-5) *			62.3	47.7	6.34	10469
							H-28 t-Test			**2.29**	**2.16**	**8.01**	**20.18**
Field Blank	04/30/98		ND	ND	ND	ND	ND	ND	<10	<1.0	<0.1	6.80	4

* Values are the result of 16 replicates (4 per quarter from 6/82 to 3/83)

TABLE 2.
Hazardous Waste Landfill - Confirmatory Resampling

Well #	Date	TOC (mg/l)	TOX (mg/l)	pH	Specific Conductance (umhos/cm)
M-5A	09/09/98	38.00	17.00	7.12	12800
		39.00	19.00	7.23	13100
		40.00	19.00	7.06	12600
		36.00	22.00	7.13	12500
	M-5A Average	38.25	19.25	7.14	12750
	M-5A Standard Deviation	1.48	1.79	0.06	229
	Background (M-5) *	62.3	47.7	6.34	10469
	M-5 t-Test	**0.98**	**3.40**	**5.15**	**19.07**
M-6A	09/09/98	2.50	2.20	7.43	7990
		2.30	2.10	7.40	7800
		2.30	2.20	7.30	7860
		2.30	2.00	7.30	7850
	M-6A Average	2.35	2.13	7.36	7875
	M-6A Standard Deviation	0.09	0.08	0.06	70
	Background (M-5) *	62.3	47.7	6.34	10469
	M-6A t-Test	**2.43**	**5.46**	**6.60**	**24.72**
M-7A	09/09/98	3.50	12.00	7.40	8090
		3.20	11.00	7.40	8010
		3.10	12.50	7.50	7900
		3.20	10.50	7.40	8050
	M-7A Average	3.25	11.50	7.43	8013
	M-7A Standard Deviation	0.15	0.79	0.04	71
	Background (M-5) *	62.3	47.7	6.34	10469
	M-7A t-Test	**2.39**	**4.12**	**7.00**	**22.12**
H-28	09/09/98	4.50	2.60	7.55	8200
		4.80	3.10	7.60	8050
		5.10	3.20	7.45	7990
		4.90	3.10	7.50	8000
	H-28 Average	4.83	3.00	7.53	8060
	H-28 Standard Deviation	0.22	0.23	0.06	84
	Background (M-5) *	62.3	47.7	6.34	10469
	H-28 t-Test	**2.33**	**5.36**	**7.69**	**22.81**
Field Blank	10/23/96	<1.0	<0.1	6.8	3

* Values are the result of 16 replicates (4 per quarter from 6/82 to 3/83)

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

November 9, 1998

Mr. Tom Whalen
Bureau of Corrective Actions
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 98710

Dear Mr. Whalen:

Subject: KMCLLC Response to Phase II Report Comments

Kerr-McGee Chemical LLC (KMCLLC) submitted a report "Phase II Conditions Assessment at Kerr-McGee Chemical Corporation, Henderson, Nevada", to NDEP in August 1997. Your office subsequently provided approval of that report subject to conditions noted in your correspondence of June 10, 1998. With follow-up correspondence from your office, the conditions required a KMCLLC response by November 10, 1998.

KMCLLC's response is attached, with your original comments provided in italics. KMCLLC's response includes a Supplemental Work Plan to further characterize the areas noted as requiring additional study in the Phase II Report.

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

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

cc: PSCorbett
WOGreen
RHJones
TWReed
RSimon
Robert Kelso, NDEP
Doug Zimmerman, NDEP

Smc/Response to Tom Whalen Comments - KM Submittal.doc

2.3.2 Hydrogeology

Comment:
A reference is given for the Nevada Department of Water Resources. Please provide the citation for this information.

Response:
The reference should have specified "personal communication with representatives of the Nevada Department of Water Resources, April 1997."

3.1 Trade Effluent Settling Ponds

Comment:
Is LOU Item Number 2 the area described as "S-8" in the July 1980 US EPA photo analysis?

Response:
LOU Item Number 2 was described by NDEP as the area due south of the Trade Effluent Disposal Ponds. Area "S-8" in the 1943 photo analysis, included in the Region IX – EMSL-LV Project AMD 7980, is most descriptive of the area investigated. Although other subsequent photo analyses included in the same EPA document expand and contract this area, the 1943 photo analysis most closely describes the undisturbed "S-8" area on KMC Work Plan. Soil samples SB1-1 and SB1-2 are descriptive of this area's conditions.

3.1.1 Background

Comment:
Please provide an analysis of the data from the post-closure monitoring program for the closed landfill.

Response:
Annual post closure monitoring of the closed hazardous waste landfill has been ongoing since 1984. Results show that hexavalent chromium, the constituent which would be indicative of landfill impact, has not risen in downgradient wells. Downgradient chromium concentrations have been consistently lower that upgradient concentrations. Other constituents (i.e. organics) which are not indicative of landfill components, are trending downward. This is most likely due to the impact of Pioneer's water extraction/treatment facility, which began operation in 1980.

Comment:
Please explain the conditions of the NDEP permit and provide an analysis of any monitoring program.

Response:
The KMC Henderson NPDES Permit NV #0000078 includes provisions for regulation of active double-lined process water and waste water ponds, including the named ponds WC-East and WC-West, constructed in the area of the old Trade Effluent Pond area. The permit includes requirements to maintain the WC-East and WC-West ponds in good working order. This condition is verified by a leak detection monitoring system between the top and bottom liners. Information related to the monitoring is reported in each quarterly DMR submission.

3.5.1 Background

Comment:
Please provide the location of the leach field and any groundwater evaluations conducted in the vicinity. Also, please be more specific about "appropriate disposal facility" for hazardous solutions.

Response:
Please refer to Plate 1 of the "Phase II Environmental Conditions Assessment at Kerr-McGee Chemical Corporation, Henderson, Nevada", August 1997, for the location of the leach field associated with the changehouse/lab leach field, and for samples taken related to that area. Sample SB6-1 was taken from the leach field itself. Sample SB6-2 was taken as close to the discharge line to the leach field as possible.

Several wastes have been generated in the laboratory which have been disposed of at an "appropriate disposal facility." Disposal facilities used have been: Aptus in Aragonite, Utah, for those requiring incineration and USPCI in Aragonite, Utah or US Ecology in Beatty, Nevada, for those requiring treatment and/or landfilling.

3.8 Unit 1 Tenant Stains

Comment:
Please provide results of the resampling of the area.

Response:
Resampling results are provided in Section 4.8 of the "Phase II Environmental Conditions Assessment Located at Kerr-McGee Chemical Corporation, Henderson, Nevada" 1997.

4.1 Trade Effluent Settling Ponds

Comment:
We agree that project objectives for this area have been met.

In this and some of the following sections in the report, reference is made to the American Society of Testing Materials publication "Cleanup Criteria for Contaminated Soil and Groundwater." [Please correct the citation for this publication in the list of references.] The publication contains average concentration and natural range of metals in the United States. The ranges in the publication are very broad and represent a large variety of geologic and soil conditions.

The report makes the implied assumption that because RCRA metals values fall "within the range of the average concentration of these constituents in soils," there is not an impact from KMCLLC or predecessor operations at the site. The ASTM ranges are very broad (for example, chromium ranges from 2 to 3,000 milligrams per kilogram, or three orders of magnitude). To determine impacts to the environment from facility operations, the Nevada cleanup standards or actual background soil metals concentrations should be used.

NDEP's soil and Ground Water Remediation Policy of 1992 was superseded on October 3, 1996, by NAC 445A.226-445A.22755. NDEP no longer requires Subpart S calculations. However, Subpart S may be appropriate in some cases. Also, background values must be determined prior to establishing cleanup levels!

Response:
We acknowledge that the objectives for this investigation have been achieved.

ASTM average background metal concentrations were used in the Phase II Report to provide a generalized comparison of detected metal concentrations. It is also acknowledged that the Nevada Cleanup Standards have been specified, as of October 3, 1996, by NAC 445A.226 through NAC 445A.22755, and that the findings of the August 1997 Phase II investigation remain unchanged.

4.2 Old P-2, Old P-3 Ponds

Comment:

We agree that further work is required. More areal and subsurface definition is required. Please provide a workplan for the proposed work.

Response:
Old P-2 and P-3 ponds will be further investigated as stipulated in the attached Supplemental Phase II Work Plan.

4.3 Truck Unloading Area

Comment:
Based on the data presented in the report, no further investigative work needs to be conducted at the site at this time.

Response:
We acknowledge that additional work is not required.

4.4 Diesel Fuel Storage Tank

Comment:
We agree that further work is required to determine the affected volume of soil. Please submit a workplan for this work.

Response:
The Diesel Fuel Storage Tank area will be further investigated as stipulated in the attached Supplemental Phase II Work Plan.

Comment:
We agree that groundwater from M-21 does not appear to be impacted by diesel; consequently no further monitoring well installation is required. However, TPH should be routinely sampled from M-21 in the future.

Response:
Monitor well M-21 sampling will be conducted as described in the attached Supplemental Phase II Work Plan. In addition, annual sampling of monitor well M-21 for TPH will continue for 4 years. This will provide 5 data points with which KMCLLC can determine any impact from the old diesel fuel storage tanks.

4.6 J. B. Kelly, Inc. Trucking Site

Comment:
Although concentration of total chromium is below action levels, where did it come from and what is the migration through soil?

Response: Sample S7-1-1 was collected from a boring below the concrete slab in the bottom of the vaults. The chromium concentration(19.3 mg/kg) is similar to concentrations found in areas unimpacted by previous operations (See Table 3-4, Environmental Characterization Report, BMI Exclusion Areas 3 ,4A, 4B, 5/6, Henderson, NV April 1997) prepared by ENSR. Therefore it appears to be in the range of naturally occurring mineralization. Sample S7-1-S consisted of sand collected from the bottom of several vaults. This sample is only two times the subsurface concentration (42.9 mg/kg). Why it is higher is unknown, but as noted, it is below action levels and does not appear to be impacting subsurface concentrations.

4.7 A.P. Satellite Accumulation Point – AP Maintenance Shop

Comment:
We agree that the removal action was effective in removing soil affected by diesel fuel compounds. However, please explain why motor oil concentrations. Based on the data presented in the report, no further investigative work needs to be conducted at the site at this time.

Response:
The area under investigation was the storage location for collection drums of used oil. Motor oil was one of the oil types collected.

4.8 Unit 1 Tenant Site

Comment:
We agree with the report regarding the effectiveness of the removal action. Based on the data presented, no further investigative work needs to be conducted at the site at this time.

Response:
We acknowledge that additional work is not required.

4.9 AP-1, AP-2, and AP-3 Ponds

Comment:

We agree that additional investigative work is required to determine the source of elevated levels of elemental nitrogen in the existing monitor wells M-17, M-89, and M-25. Please submit a workplan for this additional investigative work.

Considering that monitoring well M-25 is located about 280 feet to the northwest (ostensibly downgradient) of monitoring well M-89, the volume of affected groundwater could be extensive. Additional work should address the potential lateral extent of affected groundwater. Analysis of groundwater samples for ammonium perchlorate should be included in any sampling scheme.

Response:
Since the Phase II Work Plan activities were completed in April 1997, perchlorate impact to the groundwater beneath the Henderson facility has been under review. Source capture and control of impacted groundwater (utilizing the groundwater interception system for chromium remediation) is expected in the last quarter of 1998. KMC requests that because the perchlorate remedial alternatives currently under investigation will address nitrogen based compounds as well as perchlorate, the additional work needed to control impacted groundwater be addressed in the perchlorate remediation effort.

4.10 Hardesty Chemical Site

Comment:
We agree that the removed underground storage tanks did not affect groundwater.

Response:
We acknowledge that additional work is not required.

5.0 Data Validation and Review

Comment:
Please explain the impact of numerous sample qualifications on future remedial decisions.

Response:
The Data Validation and Review section of the Phase II Environmental Conditions Assessment contains references to "qualified" data. The qualified data consists of:

1. Three laboratory packages with pH samples analyzed outside of their holding time.
2. One laboratory package in which all samples were delivered to the laboratory at a temperature exceeding 4 degrees Celsius.

3. Three instances where the relative percent difference of certain constituents in the sample compared to the duplicate was greater than 20 percent.
4. A detectable concentration of acetone in one method blank.

Although these occurrences were noted, these specific qualifiers are not expected to have a significant adverse affect to the analysis results. The qualified data should not be invalidated and can be used to evaluate future remedial action at the site.

KERR-McGEE CHEMICAL LLC
HENDERSON, NEVADA FACILITY

SUPPLEMENTAL PHASE II WORK PLAN

November 9, 1998

Prepared for:
Nevada Division of Environmental Protection

Prepared by:
Kerr-McGee Chemical LLC

SUPPLEMENTAL PHASE II WORK PLAN
TABLE OF CONTENTS

1.0 INTRODUCTION

This Supplemental Work Plan describes proposed activities which will provide information to supplement information gathered during the April 1997 Phase II Environmental Conditions Investigation of the Henderson, Nevada facility.

This Work Plan is based on the requirements set forth by the Nevada Department of Environmental Protection (NDEP) in a letter to KMCLLC dated June 10, 1998. This Supplemental Work Plan will be appended to and comply with the NDEP-approved Phase II Work Plan issued by KMCLLC on May 10, 1996.

1.1 Site History

Details of the site history are set forth in the Phase II Work Plan and Health and Safety Plan, Henderson, Nevada Facility, KMCLLC document dated May 10, 1996.

1.2 Environmental Conditions Assessment

Results of the environmental conditions assessment are set forth in the Phase II Work Plan and Health and Safety Plan, Henderson, Nevada Facility, KMCLLC document dated May 10, 1996.

1.3 Objectives

Based on the results from samples collected during the Phase II Environmental Assessment and in response to NDEP comments (letter dated June 10, 1998) on the Phase II Environmental Conditions Assessment (ENSR document No. 4020-004-250, dated August 1997), KMCLLC has agreed to conduct additional work to address remaining concerns in the following areas at the KMCLLC Henderson Facility:

- Old P-2, Old P-3 Ponds
- Diesel Fuel Storage Tank

Please note that further investigation in the AP-1, AP-2, and AP-3 Pond area will be completed as part of the perchlorate assessment.

2.0 Scope of Work

2.1 Introduction and Approach

This work plan scope of work (SOW) addresses methods to meet the objectives stated in Section 1.3. The objectives for the two areas requiring additional work are as follows:

- Define the areal and subsurface extent of chromium in the Old P-2 and Old P-3 Ponds.
- Determine the extent and volume of petroleum affected soils in the Diesel Fuel Storage Tank area, and conduct additional TPH monitoring at monitoring well M-21.

2.2 Old P-2 and Old P-3 Ponds

The ponds were surface impoundments used to collect and concentrate dilute sodium chlorate solutions. For explicit background and former sampling information, refer to the Phase II Environmental Conditions Assessment (ENSR Document No. 4020-004-250, dated August 7, 1997).

2.2.1 Previous Analytical Results

Eight soil borings were advanced in Old P-3 Pond and five borings were advanced in Old P-2 Pond. Sample locations were selected using a random generation grid and were collected at a depth of 12 inches and 36 inches below ground surface (bgs). The samples were analyzed for total chromium and pH, and the results indicated elevated levels of chromium (above 100 mg/kg) were evident in the samples.

2.2.2 Proposed SOW for Supplemental Investigation of Old P-2 and Old P-3 Ponds

To define the areal extent of residual chromium resulting from the former use of the impoundments, eight borings will be advanced along the outer perimeter of the ponds (See Figure 2-1). The perimeter borings are proposed in locations that will enable the lateral and vertical limits of chromium in soil to be assessed. The perimeter borings are located just outside the berms encircling the chromium-containing soils within the Old P-2 and Old P-3 Ponds, Figure 2-1. The perimeter

boring locations will serve to confirm that chromium is limited to within the pond boundaries.

The bore holes will be advanced with a hollow-stem auger drill rig and will be logged by a geologist. Soil descriptions will be in accordance with the United Soil Classification System (USCS) based on inspection of the split-spoon samples collected and by visual inspection of drill cuttings. Sampling will commence at the ground surface and will continue to the capillary fringe, which is anticipated to be at a depth of approximately 40 feet bgs. Soil samples will be collected at two-foot intervals and will be analyzed for total chrome and pH until two successive samples are determined to be less than 100 milligrams per kilograms (mg/kg) of total chromium.

Four additional borings will be advanced in a similar manner within the interior boundaries of the former ponds (see Figure 2-1). The interior borings are located near areas of earlier chromium detection and are intended to confirm the extent of vertical chromium migration in soil, and to assess whether chromium-containing soils extend to the depth of groundwater. Sampling will be conducted at two-foot intervals to the capillary fringe anticipated to be approximately 40 feet bgs. Samples will be analyzed for pH and total chromium until two successive samples are determined to be less than 100 mg/kg of total chromium.

Sample collection, analysis, and sample custody will be conducted in accordance with the NDEP-approved Kerr-McGee Phase II Work Plan issued on May 10, 1996.

2.3 Diesel Fuel Storage Tank

The former diesel fuel storage aboveground storage tank (AST) located south of Old P-2 Pond was removed by KMCLLC in 1994. For explicit background and former sampling information, refer to the Phase II Environmental Conditions Assessment (ENSR Document No. 4020-004-250, dated August 1998).

2.3.1 Previous Investigation Results

Three soil borings, SB5-1, SB5-2, and SB5-3, were advanced to 10 feet bgs within the bermed diesel fuel storage area. Soil samples collected at 5 and 10 feet bgs in soil borings SB5-2 and SB5-3 contained total petroleum hydrocarbon

(TPH) above the NDEP cleanup level of 100 mg/kg. Additional work is proposed to assess the extent and volume of soil affected.

2.3.2 Proposed SOW for Additional Investigation of the Diesel Fuel Storage Tank

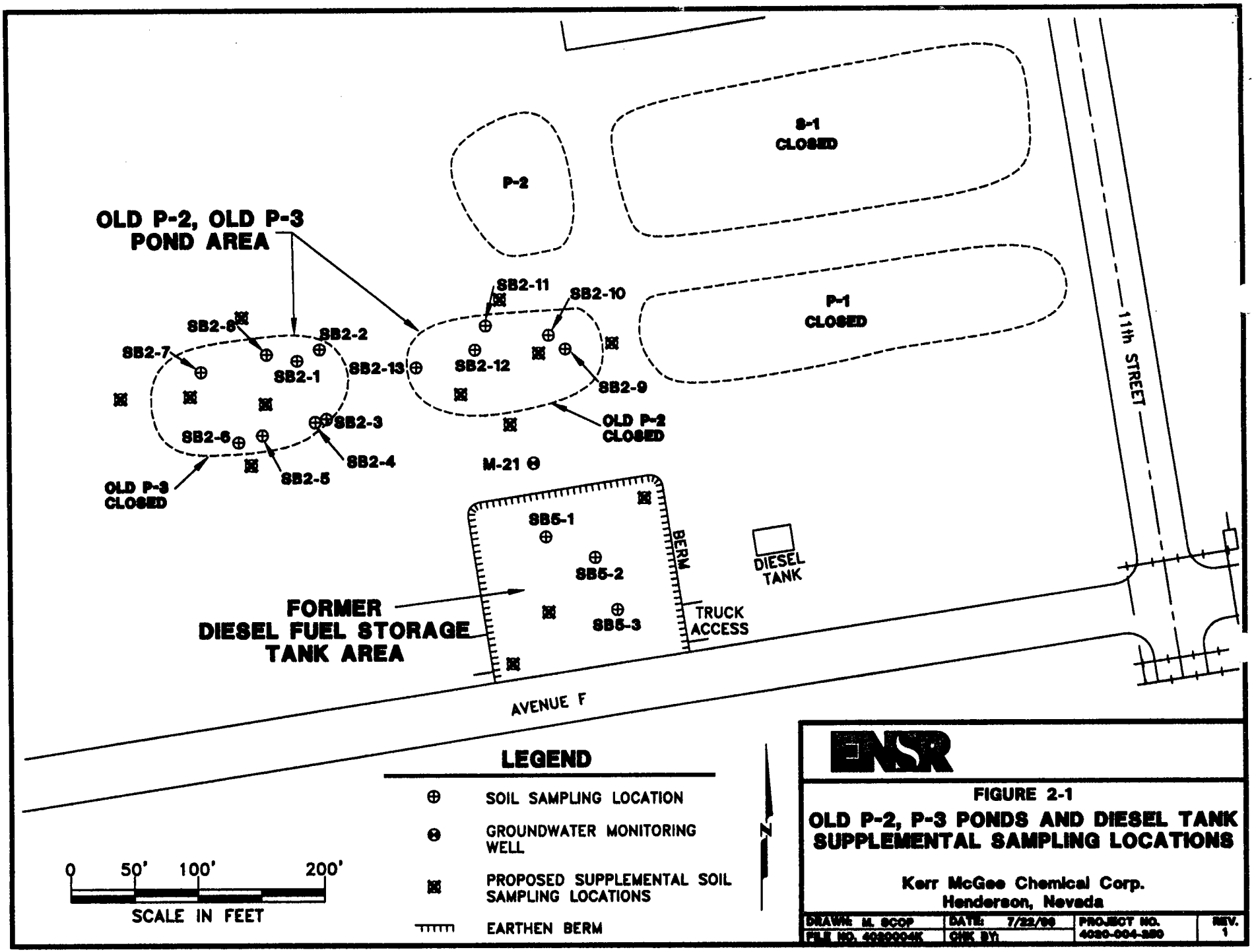
Four additional borings will be advanced in the Diesel Fuel Storage Tank bermed area (see Figure 2-1). The four borings are located to surround previous borings which detected TPH-d, and to confirm the limits of diesel in soil. The borings will be advanced using a hollow-stem auger drill rig to the capillary fringe or an approximate depth of 40 feet bgs. Samples will be collected via a split-spoon sampler on five-foot intervals to the terminal depth at the capillary fringe.

The soil samples will be analyzed for petroleum hydrocarbon compounds including benzene, toluene, xylenes and ethylbenzene (BTEX) and polynuclear aromatic compounds (PAHs). In addition to the soil sampling, one groundwater sample will collected using Hydropunch equipment for analysis of THP-d, BTEX and PAHs. To support future evaluation, one soil sample will also be collected for geotechnical parameters that include porosity, bulk density, moisture content and organic carbon content.

2.3.3 Additional TPH Sampling for Monitoring Well M-21

At the request of NDEP to confirm no impacts to groundwater, a groundwater sample will be collected from M-21 (see Figure 2-1) during the upcoming field activities described above at the Old P-2 and Old P-3 Ponds and Diesel Fuel Storage Tank.

The water sample collection, sample analysis, and sample handling will be performed in accordance with the previous NDEP-approved Kerr-McGee Phase II Work Plan, dated May 10, 1996.



ENSR

FIGURE 2-1

OLD P-2, P-3 PONDS AND DIESEL TANK SUPPLEMENTAL SAMPLING LOCATIONS

Kerr McGee Chemical Corp.
Henderson, Nevada

DRAWN: M. SCOP	DATE: 7/22/99	PROJECT NO. 4020-004-250	REV. 1
FILE NO. 4020004K	CHK BY:		

3.0 Data Collection and Quality Assurance Plan

Soil samples from the Old P-2 and Old P-3 Ponds will be collected and analyzed for total chromium and soil pH as specified in the Kerr-McGee Phase II Work Plan, dated May 10, 1996.

Soil samples from the former Diesel Fuel Storage Tank Area and water samples from the adjacent monitoring well, M-21, will be collected and analyzed for diesel components as specified in the Kerr-McGee, Phase II Work Plan, dated May 10, 1996.

4.0 Project Management Plan

The project management will be staffed and managed as specified in the Kerr-McGee Phase II Work Plan, dated May 10, 1996.

5.0 Health and Safety Plan

The original Health and Safety Plan issued on May 10, 1996, for the Phase II investigative work will be reviewed and updated or revised as necessary for use during the Supplemental Phase II investigative work.

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

November 9, 1998

Ms. Brenda Pohlmann
Remediation Branch Supervisor
Nevada Division of Environmental Protection
555 E. Washington, Suite 4300
Las Vegas, NV 89101

Dear Ms. Pohlmann:

Subject: Perchlorate Monthly Activity Status

Following is the current status of Kerr-McGee Chemical LLC's (KMC) activities regarding the perchlorate issue:

- **Off-Site Characterization** - KMC prepared a Historical Information Report related to off-site subsurface geological characterization and submitted this for NDEP review and approval January 16, 1998. This review included a Sampling Plan describing additional field activities necessary to more fully characterize the area between the KMC facility and the Las Vegas wash. NDEP comments were received March 1998. NDEP commented on this Plan and activities associated with the Sampling Plan were completed. A report, including the results of the additional drilling, was submitted to NDEP on July 15, 1998. An additional pump test was completed on Well PC-70, in the Pittman Lateral area. This pump test yielded information which has allowed for better quantification of the hydrogeologic characteristics of the Pittman Lateral area. A report summarizing the PC-70 pump test information has been submitted under separate cover to NDEP.

- **On-Site Groundwater Holding Pond** - KMCLLC is constructing an 11-acre retention basin to retain perchlorate impacted groundwater until a suitable perchlorate treatment technology has been determined. KMCLLC intends to use the basin for source control. Groundwater from the KMCLLC facility, already intercepted to remediate for chromium, will be placed into the basin until a treatment technology for perchlorate is developed. NDEP has issued an approval of the basin construction drawings. As the basin is completed, PE certification of the basin's construction per the drawings will be provided to NDEP. Modification of the Henderson facility UIC Permit and NPDES Permit has been requested. Assuming the modified permits are approved in the next several weeks, the basin's expected availability is the fourth quarter of 1998. Remaining activities associated with the pond construction include:

	Expected Completion Date
• Fill the pond with Lake Mead water to test its integrity.	November 27, 1998
• Electrical testing of the liner.	December 2, 1998
• Empty the pond (authorized by Temporary Discharge Permit).	December 9, 1998
• Repair liner breaches and final inspection	December 14, 1998
• Basin is available for use.	December 15, 1998

Please note that filling of the basin has taken considerably longer than expected due to the water supply availability. The flow rate into the basin is as high as allowable considering the requirement to maintain pressure for the fire suppression system within the Henderson plant.

- As indicated above, a modification of the Henderson **Underground Injection Control (UIC) Permit** is underway. The modification includes use of an 11-acre retention basin to retain perchlorate impacted groundwater until a suitable treatment technology has been determined. KMCLLC intends to use the basin for source control. Groundwater from the KMCLLC facility, already intercepted to remediate for chromium, will be placed into the pond until a treatment technology for perchlorate is developed. At that time the groundwater is intended for reinjection. The permit modification requests that, as the intercepted groundwater is placed into the 11-acre retention basin for holding, an equal amount of Lake Water be injected into the recharge trenches to replace the water which is diverted to the basin. The modification has not yet been approved by NDEP, Bureau of Water Pollution Control. This approval is also needed prior to use of the 11-acre retention basin.

- A request to modify the Henderson NPDES Permit has also been submitted to NDEP. Inclusion of the 11-acre basin is needed. The modification has not yet been approved by NDEP, Bureau of Water Pollution Control. This approval is needed prior to use of the basin.

- Counsel for KMCLLC and NDEP continue to discuss an appropriate legal structure for on going perchlorate related activities.

- KMC has initiated an investigation into remedial alternatives for reduction of perchlorate concentrations in water. A status summary of that investigation is attached.

KMC is committed to act responsibly and cooperate fully with local, state, and federal officials in determining appropriate remedial actions. Please feel free to contact me at (702) 651-2200 if you have any questions related to this information. Thank you.

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

By certified mail
cc: PSCorbett
EMSpore
TWReed
WOGreen
RHJones
LKBailey
ALDooley
Robert Kelso (NDEP)
Doug Zimmerman (NDEP)
MWD
Barry Conaty, COH
Pat Mulroy, SNWA
Kevin Meyer, EPA Region IX
smc\Status to Pohlmann082098.doc

Technology Review

Bioremediation

Micronutrients have enhanced activity of the bacteria and shortened residence time for reduction of perchlorate to low ppb levels. Utilization of locally available micronutrients and nutrients in testing is also continuing. The use of marshmallow plant waste has been successful as a nutrient in combination with micronutrients in reducing perchlorate in the groundwater. Additional research is underway to characterize other sugar sources which are locally available as waste. Testing of the bioprocess at alternate temperatures is also underway. Water collected from the Pittman Lateral has been successfully treated in laboratory studies with this technology.

Electrochemical Catalysis

Electrochemical pilot operations will begin in Henderson in early November. Work is on going to rapidly scale up the technology and discern its ultimate potential as a method to reduce perchlorate in the groundwater. Meetings with electrolytic commercial cell equipment suppliers will occur in November. This work will ascertain the feasibility to use existing proven cell technology adapted to use the electrocatalyst and cathode unique to this technology's success. Time tables will be developed for implementation of a larger cell(s) for processing larger streams of water containing perchlorate.

Aquifer Retention Basin

The basin has been completed from the construction aspect. Testing of the integrity of the liner is underway. The first phase of testing is complete and the necessary liner repairs have been made. Testing of the berm liner is now underway, which takes considerable time. It is necessary to hydrotest the basin, which means filling to capacity with Lake Mead water. This work will go on through out November, with completion expected in early December. Operation of the basin is expected by mid December.

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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL PROTECTION

333 W. Nye Lane, Room 138
Carson City, Nevada 89706-0851

November 6, 1998

TO: Henderson Industrial Site Steering Committee - Joel Mack
Basic Management, Incorporated - Greg Schlink
Stauffer Management Company - Lee Erickson
Pioneer Chlor Alkali Company, Inc. - Sam Chamberlain & Verrill Norwood
Montrose Chemical Corporation of California - Frank Bachman
Titanium Metals Corporation - Tony Garcia & Susan Stewart
Kerr-McGee Chemical LLC - Susan Crowley

RE: Accelerated Work to Abate, Mitigate and Eliminate Environmental Contaminants

Reports of recent groundwater studies confirm the presence of a plume containing contaminants of concern emanating from the North end of the BMI Complex in Henderson. This plume discharges into the Las Vegas Wash and ultimately enters the Colorado River system. The contaminants of concern include benzene in excess of the maximum contaminant level for drinking water and total dissolved solids (salinity) in excess of the secondary maximum contaminant level as well as perchlorate and various organo-phosphates and organo-acids in excess of background levels. Nevada Statutes and Administrative Codes prohibit the alteration of the chemical, physical, biological and radiological integrity of surface and underground water. All groundwater in the State of Nevada is considered to be a potential source of drinking water. NDEP will not waiver from these protective requirements in this matter. The load of the total dissolved solids and other contaminants entering the Las Vegas Wash from this plume will not meet the requirements to protect this sensitive ecosystem, will damage the natural resources in the Las Vegas Wash and will enter Lake Mead, the principal drinking water supply of the Las Vegas Valley.

Data available to the Nevada Division of Environmental Protection (NDEP) suggest that this plume is the result of past, and possibly present, liquid and solid waste management practices by the various major industrial operations in the vicinity of BMI. We have concluded that data is available to describe the groundwater contamination, identify sources, explore remedial alternatives, and implement technically feasible remedial measures in an accelerated timeframe to abate, mitigate and eliminate environmental contaminants.

After consideration of the factors in Section IV.C.2. of NDEP's Consent Agreements with the Companies, individually and collectively, we have determined that the migration of this contaminated groundwater plume must be controlled near the property boundary of each company and in the vicinity of the Pittman Lateral. Therefore, NDEP is providing this notice to "Accelerate Work to Abate, Mitigate and Eliminate Environmental Contaminants" under Section IV.D. of the Consent Agreements. Based upon additional chemical, physical and radiological characterization of the groundwater, NDEP may invoke its authorities provided under Sections IV.C. and XIX of the Consent Agreements.

The companies may choose to implement the Pittman Lateral remedial measure(s) individually and collectively. NDEP expects that the implementation of the appropriate remedial measures to abate, mitigate and eliminate further adverse impacts to groundwater and the Las Vegas Wash will be accelerated. Please submit the requisite Workplans prior to January 6, 1999. The Workplans should be performance oriented, that is, the implementation date of the appropriate remedial measures will be the stated objective and all "deliverables" and reviews will be accelerated to achieve this goal. Each of the affected companies is expected to submit a letter report, by fax, to NDEP's Bureau of Corrective Actions about the 1st and 15th of each month beginning November 15, 1998.

Because staff from the Bureau of Corrective Actions will be in the Henderson area for the Public Meeting on December 1st, a meeting of the interested parties will be held between 8:15 AM and Noon on Wednesday, December 2nd, at a place to be determined in Las Vegas. This meeting will be an opportunity to discuss the maintenance of progress on resolving this significant environmental protection issue. Please feel free to call me or Doug Zimmerman regarding this notification, at 702-687-4670.

Sincerely,

Allen Biaggi
Administrator

AJB:TAW/kmf

cc: Bureau of Reclamation - Dave Truman
City of Henderson - Barry Conaty
American Pacific Company - Pete Gibson
Southern Nevada Water Authority - Kay Brothers
Region IX, U.S. EPA - Keith Takata & Julie Anderson

11/4/98 KMCC Meeting

- Best course for KMCC & NDEP - finish pond Commissioning ICET cell. Will take it to Pittman Lateral to PC-70. If it works will acquire cell to be able to pump 40-50 gpm.
Will need to acquire discharge permits
ICET cell can probably meet 10 ppm cleanup. Already looking at the full-scale commercially available cell.
Biological cell has some potential problems - creation of BOD, COD, biomass, need 16-18 hr residence time which would require large construction at this time.

- Concern about liability
Once you return flow to pond, KMCC maintains ownership of other problems & will establish a policy & precedent showing that they're willing to clean up others' mess.

- Susan feels that ICET unit will pump as much water as we had in mind.

- Time to scale-up: 3-4 wks to test pilot scale cell. ICI will have most components "off-the-shelf" but cathode will have to be manufactured. Expect that to be a 3-4 wk process. Will be meeting w/ manufacturer on the 16th or 17th of Nov.

- Nitrate, chlorate & perchlorate will all be treated by cell. Chromium will also be reduced somewhat.

- Will need temporary discharge permit to discharge water into same place as French Drain. Seen as an interim measure for ClO_4^-. Won't affect TDS.

- If NDEP insists on pumping + recovery & we issue Order to entire Steering Committee & AmPac + Hatcher maybe. May have a lot of difficulty & end up in court & probably doesn't remove liability from KMCC since material will end up on their property.

- If we agree to their suggested plan, we need to memorialize the agreement in writing. "Critical Path"

- Is Pittman Lateral as close to the west as we can get? Results of field work + pump tests need to be put into a report which explains why PL is as close to the west as possible. Report is already being worked on.

- Don prefers called this IEM under the Consent Agreement rather than additional work. Susan needs to talk to Bill Green about best way to proceed under Consent Agreement.

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

October 30, 1998

Ms. Brenda Pohlmann
Remediation Branch Supervisor
Nevada Division of Environmental Protection
555 E. Washington, Suite 4300
Las Vegas, NV 89101

Dear Ms. Pohlmann:

Subject: PC-70 Pump Test Results

Attached are two copies of the PC-70 pump test results. This information will assist KMCLLC in evaluating remedial measures for perchlorate impact.

KMC is committed to act responsibly and cooperate fully with local, state, and federal officials in determining appropriate remedial actions. Please feel free to contact me at (702) 651-2200 if you have any questions related to this information. Thank you.

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

By certified mail
cc: PSCorbett w/o attachment
EMSpore w/o attachment
TWReed w/o attachment
WOGreen w/o attachment
RHJones w/o attachment
LKBailey w/o attachment
ALDooley w/o attachment
Robert Kelso (NDEP) w/o attachment
Doug Zimmerman (NDEP) w/o attachment
MWD
Barry Conaty, COH
Pat Mulroy, SNWA
Kevin Meyer, EPA Region IX
smc\PC70 Report to Pohlmann.doc

10/28/98 KMCC Telecon

- KMCC ready to send back modified Consent Agreement. Bill Green will talk to Bill Frey.

- Joel Mack will send us Draft letter proposing additional work on TDS plume. Steering Committee wants to look at issue & understand other contaminants are in the plume. Short time frame for full characterization. Committee understands that it cannot be delayed.

- Everett emptied pond - had 8 to 10 ft. water. 135 ppm TSS may be hard to meet - doesn't want to have to postpone discharge. One option - Cathe ready to make changes to permit (ave. flow & one measurement of TSS). 2nd option - permit worded to simply state BMP must be used to meet Wash discharge permit requirements.

Repairs were supposed to take 6 days. Will put another 8-10 ft. of water, seal vent pipe and then fill pond. Susan will get schedule from Everett & send to us.

- Doug would like to see more aggressive remediation approach close to the wash. e.g. 40 gpm pumped out of 6 inch well at Pittman Lateral. If necessary, NDEP may issue Order or link it to the Consent Agreement for removal of any implication that work is being done voluntarily

PETER G. MORROS, Director
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Waste Management
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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL PROTECTION
333 W. Nye Lane, Room 138
Carson City, Nevada 89706-0851

October 15, 1998

TO: Henderson Industrial Site Steering Committee
Stauffer Management Company
Pioneer Chlor Alkali Company, Inc.
Montrose Chemical Corporation of California
Titanium Metals Corporation
Kerr-McGee Chemical Corporation
City of Henderson

RE: Proposed Approach and Draft Letter - TDS Plume

The Division is proposing to address the TDS plume, which was discussed at our meeting on October 1, 1998, through Section IV.C.2. of the existing Consent Agreements. The attached draft letter will be issued the week of October 19th unless a viable alternative to this approach is presented to the Division at the Steering Committee meeting on October 20, 1998.

Sincerely,

Douglas Zimmerman, Chief
Bureau of Corrective Actions

DZ:TAW/kmf

Attachment

DRAFT

TO: See Addresses

RE: Interim Remedial Measures

Reports of recent groundwater studies confirm the presence of a plume containing contaminants of concern emanating from the North end of the BMI Complex in Henderson, traveling under Pittman and discharging into the Las Vegas Wash. The contaminants of concern include benzene in excess of the maximum contaminant level (MCL) for drinking water and total dissolved solids (TDS) in excess of the secondary maximum contaminant level (SMCL) as well as perchlorate, radionuclides and various organo-phosphates and organo-acids. Nevada Statutes and Administrative Codes prohibit the man-induced alteration of the chemical, physical, biological and radiological integrity of surface and underground water. The load of the total dissolved solids and other contaminants entering the Las Vegas Wash from this plume may not meet the requirements to maintain the higher quality in this sensitive ecosystem and may damage the natural resources in the Las Vegas Wash..

Data available to the Nevada Division of Environmental Protection (NDEP) suggest that this plume is the result of past, and possibly present, liquid and solid waste management practices by the various major industrial operations in the vicinity of BMI. We have concluded that sufficient data is available to describe the lateral and vertical extent of the plume, explore remedial alternatives, and implement interim remedial measures in a timely fashion.

After consideration of the factors in Section IV.C.2. of NDEP's Consent Agreements with the Companies, individually and collectively, we have determined that the migration of this contaminated groundwater plume must be controlled near the property boundaries of the individual companies and in the vicinity of the Pittman Lateral. NDEP expects that the appropriate Interim Remedial Measures (IRM) to mitigate further impacts to groundwater and the Las Vegas Wash will be developed and implemented within the next six months. Please submit the requisite IRM Workplans within the next sixty days.

Please feel free to call me regarding this notification, issued under Section IV.C.1. of the Consent Agreements, at 702-687-4670 extension 3127.

Sincerely,

Douglas Zimmerman, Chief
Bureau of Corrective Action

DRAFT

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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL PROTECTION

333 W. Nye Lane, Room 138
Carson City, Nevada 89706-0851

October 15, 1998

Patrick S. Corbett
Plant Manager
Kerr-McGee Chemical Corporation
P.O. Box 55
Henderson, NV 89009

RE: **Permit Modification for Permit #UNEV94218, Kerr-McGee Chemical Corporation**

Dear Mr. Corbett:

The Division of Environmental Protection has received and reviewed the correspondence dated September 23, 1998, requesting to modify the existing UIC permit. The modification includes the injection of Lake Mead water into the two existing injection trenches. The injection is proposed to occur at the same rate as the upgradient groundwater is being extracted. The extracted groundwater is to be treated for chromium and stored in a lined pond until perchlorate treatment can be effectively administered. The Lake Mead water is to be used as a substitute injectate.

To provide a complete review of this modification request, NDEP requests the following information be provided by Kerr-McGee:

- Clarify the last sentence in the first paragraph. Why is injection required for operational maintenance of the groundwater intercept system?
- Provide schematics detailing the proposed Lake Mead water injection activities to be conducted.
- Specify the manner in which the injectate will be introduced (pressure or gravity flow).
- Provide analytical water quality data for the make-up Lake Mead water to verify that it is "clean".

- Provide a concentration contour map for both hexavalent chromium and ammonium perchlorate using the most recent data available, also, specify the analytical methods utilized for sample analyses.

- Provide screened interval depths and elevations of all existing extraction wells and monitoring wells associated with the Kerr-McGee remediation project.

Please be advised that NDEP will request additional extraction wells to be constructed between the existing injection trench system and the Las Vegas Wash to supplement contaminant capture. The construction of these extraction wells will be placed on a schedule of compliance by NDEP.

Thank you for your attention to this matter. If you have any questions or would like to discuss this further, please call me at (702)687-4670 extension 3146.

Sincerely,

Valerie G. King

Valerie G. King
Environmental Scientist
Bureau of Water Pollution Control

cc: Cathe Pool
Doug Zimmerman
Bob Kelso
Brenda Pohlmann
Susan Crowley

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

October 15,1998

Robert Kelso
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89710

Dear Mr. Kelso:

Subject: KMC Environmental Conditions Investigation Quarterly Report

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

Activities Conducted 07/01/98 to 09/30/98

Final fact sheet prepared in coordination with other HISSC members and submitted to NDEP.

Draft response prepared to NDEP comments on the August 1997 Phase II Environmental Conditions Assessment Report.

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

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

cc: ALDooley
PSCorbett
WOGreen
RHJones
TWReed
Doug Zimmerman (NDEP)
Tom Whalen (NDEP)
RSimon (ENSR)
JTSmith (Covington & Burling)

SMC\QUARTERLY (10-98) PROGRESS REPORT TO KELSO.DOC

KMCC Meeting 10/13/98

- Remediation of entire plume
KMCC needs consent agreement to get financial commitment from other companies. Without Order or Consent Agreement other companies take the attitude that KMCC is doing work to be a "good neighbor". Also gives KMCC chance to see what new reference doses will be.

- Pat wants to get ICET unit here & prove it out w/ Pittman Lateral water. Looking at trucking water from PL area. Some concern that ICET unit will only get down to low ppm level.

- Timing. Cell will be here any day. Currently being used on a bench scale. Cell is 6 gpm. Will take a couple of weeks to get into operation. Don't know how catalyst will react. Don't want to leave it at PL for security reasons. Doug suggests some type of temp. discharge permit & leave it on site. For initial startup they want it up on site. As of right now they've purchased a single cell.

- Last pump test results
Underflow values 300-350 gpm - other suggestion 500-600 gpm. Could we pump well which can be pumped at 45 gpm & run it back to pond on-site.

- Local NERL lab has been authorized to begin research on TDS interference problem.

- Allen wants commitment to something done at existing well at PL. EPA wants to see more effort at PL rather than at plant site. Pat will look into right-of-way issues involved w/ piping water back to Ware pond.

- Swan will get us PC-70 pump test results.

- By end of month KMCC will look into what it will take to pump water at PL - what's going into pond, costs, running electricity, right-of-way issues. "Feasibility of Pumping Well & Returning back to plant site". Doug want something fairly well defined. KMCC may not want to become owners of solids which originated from other sites. temp. pipeline vs permanent

- Bill Green (attorney for KMCC) is working on Consent Agreement.

- Check out Mon. Sun article - Mary Manning
  Sat. R-J " Keith Rogers

PETER G. MORROS, Director

L.H. DODGION, *Administrator*

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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL PROTECTION

333 W. Nye Lane, Room 138

Carson City, Nevada 89706-0851

October 5, 1998

Susan Crowley
Staff Environmental Specialist
Kerr-McKee Chemical Corporation
P.O. Box 55
Henderson, NV 89009

RE: Review of Phase II Environmental Conditions Assessment

Dear Ms. Crowley:

This is to confirm our previous discussions regarding a delay in the "due date" for submittals to NDEP. Where specified in our Phase II review, dated June 10, 1998, information requested and workplans for additional environmental conditions investigations activities or remedial alternatives studies shall be submitted to NDEP prior to November 10, 1998.

Sincerely,

Thomas A. Whalen, P.E.
Remediation Branch
Bureau of Corrective Actions

TAW:kmf

Oct. 2, '98 Thatcher Chemical

Las Vegas treatment plant found ClO_4^-. Stated to haul in water. Spent $43,000 hauling water. Are now on Henderson water w/ temp. water line. To get permanent line $150,000.

Manganese & sulfur ore on property when Thatcher moved in.

Kyle Peterson
Larry Thatcher
Brenda Poldrack

KERR-MCGEE COMMENTS ON THE AMERICAN PACIFIC CORPORATION'S PERCHLORATE INVESTIGATION NEAR HENDERSON, NEVADA

SEPTEMBER 1998

RE: Hydrogeologic Investigation of Perchlorate in Ground Water at the Former PEPCON Plant, Henderson, Nevada, prepared by Broadbent and Associates, May 1998

INCORRECT INTERPRETATION OF GROUNDWATER LEVELS AND PERCHLORATE PLUME

The lithology is complex in the vicinity of the old PEPCON site. The shallow alluvium and the underlying Muddy Creek formation are not easily separated because both are composed of similar sands and gravels.

At the PEPCON site, any surface contaminant would tend to move downward through the shallow sands and gravels into the Muddy Creek sands and gravels. Subsequently this groundwater moves easterly, eventually discharging down gradient in the basin. The exact pathways have not been mapped but the published literature shows this general flow pattern to be the normal case. (USGS Water Supply Paper 1780, plate 3)

A few hundred feet north of the PEPCON site, the Muddy Creek clay is present in the shallow subsurface. The saturated alluvium above the clay is considered to be the "near surface" aquifer. In this area any surface contaminant would move downward to encounter the clay and then move northeasterly in the alluvium toward the Las Vegas Wash.

Am Pac chose to combine these two very different hydrogeologic regimes into a single north-south perchlorate plume across their area of investigation. (Am Pac Report, Drawings 1 and 2) They have ignored what their water level data reveals about flow directions. While the northern half of their plume shows a pattern fairly consistent with the flow direction in the alluvial "near surface" aquifer, the southern half of their plume is almost 90 degrees to the easterly groundwater flow direction in the Muddy Creek.

If the water level data for the wells in the Muddy Creek in this area are valid as stated in the Am Pac report then the Thatcher well, east of the PEPCON site, is clearly down gradient of that site and should be part of the Muddy

Creek plume. Am Pac's monitor well, MW-M, between the PEPCON site and the Thatcher well stopped at the first clay (105 feet deep with 0.069 ppm perchlorate) and did not go deep enough to encounter the Muddy Creek contamination noted in the Thatcher well (400 feet deep with 210 ppm perchlorate).

Furthermore, the Savage well, located between the PEPCON site and the Thatcher well at a depth of 250 feet has a recent perchlorate concentration of 380 ppm (preliminary KM analysis). The combined evidence strongly indicates that there is a significant perchlorate plume from the PEPCON site moving to the east, impacting the Savage and Thatcher wells and possibly reaching the Kerr-McGee site.

It is important that plume interpretation be consistent with and supported by the water level data from wells or it cannot be a credible interpretation. Also, wells completed in different horizons should never be combined on a water level map or plume map.

INADEQUATE MAPPING OF PLUMES AND CHANNELS

In Am Pac wells where significant perchlorate (in excess of 100 ppm) was detected (i.e., wells MW-C, MW-D, MW-F1, MW-F2, MW-G) there was no follow up drilling to determine the local extent of the perchlorate or the channel orientation or maximum depth. Kerr-McGee's experience has been that drilling at 100 foot centers or less is necessary in this environment to find and confirm channel depth and plume boundaries. Am Pac's scatter of 42 exploratory wells over 8 square miles and lack of follow up investigation at any location makes their approach little more than random sampling. Due to the limited areal extent of the channels and the tendency of the perchlorate to follow the channels, there is a very small chance that Am Pac would hit either a major channel or find the highest perchlorate concentration in any single well.

Case in point – Am Pac's well F-2 has a perchlorate concentration of 347 ppm, yet no reasonably close down gradient wells were installed to characterize this plume or the channel associated with the flow. It is unrealistic to believe that the plume with this concentration gradient has failed to migrate beyond this point in 40 years.

ERRORS IN MASS BALANCE AND UNDERFLOW CALCULATIONS

In an effort to show that the eastern plume (attributable to KM) contains sufficient perchlorate and groundwater flow to provide the perchlorate concentration found in the Las Vegas Wash, Am Pac applied a very high permeability value derived from a test on the Pioneer site 3 miles away. The most recent pump test by KM in the Pittman Lateral area shows a permeability of the channel material to be about a third of that assumed by Am Pac. Clearly flow conditions and mass balance calculations are not credible without site-specific data. The analysis of the perchlorate occurrence in the area cannot be reduced to a few simple assumptions and calculations.

LACK OF PEPCON SITE INFORMATION

No site information for the PEPCON operation is provided. The 1984 USGS topographic map for the area shows a pond of 1 to 2 acres in size to be present at this site. Some explanation of this pond, along with a plant layout should be provided. This would be especially helpful in determining likely flow patterns for both surface and groundwater flows during years of operation. A single well near the former pond is an insufficient characterization of the area. Also, more borings are needed to define the southern extent of the Muddy Creek clay in this general area.

PROBLEMS WITH APPROACH TO DRILLING AND WELL COMPLETIONS

Am Pac's approach to drilling basically precluded their ability to find any thin or low yielding zones of water – the very condition that is expected in the alluvium in their area. Typically, after setting a shallow temporary casing for a boring, they converted to air rotary and "attempt(ed) to drill approximately 10 feet deeper than the depth at which groundwater was encountered in each boring for the purpose of obtaining sufficient groundwater production to adequately develop the monitoring wells prior to sampling." (pages 2-3, GES Drilling Report, Jan. 1998) Unfortunately, this approach meant that they often went through the thin water table zone where the contaminated water could have been. They did not stop until a "large" quantity of groundwater was encountered. Furthermore, it is reported that the first 6 wells found the groundwater to rise anywhere from 13 to 34 feet after the wells were completed. This strongly suggests that

they were finding "confined" water, typical of the Muddy Creek aquifer, rather than the "unconfined" water on top of the Muddy Creek clay, the intended focus of the investigation.

Kerr McGee Meeting 9/22/98

1. Pond Status
   - finished liner, doing quality checks, working out wrinkles - should be done by Friday
   - need to put vent in around berms - couple days
   - contacted 3 firms to do hydrostatic testing for leaks. Will completely fill pond w/ water; 70 million gal. Plan on starting 10/2 - expect 2 wks to complete process.

We can follow-up w/: 1) Nadia - pond completion approval
2) modification of permit - Cattle Pool
3) Joe needs to respond to water test w/ approval for discharge.

2. PC-70 Pump test
   underflow calculated 130 gpm is charted (maybe up to 200 gpm). Sampled at end of test - slight odor indicative of urea. Never been able to duplicate milky white color & effervescence. Had effect on well 100 feet away and took a long time to recover.

3. Technology
   Pilot cell w/ electrochemical - titanium deposit on membrane. Cell will be 10/6 to begin operation ICET. Can't get number down to lower than 1-5 ppm. Need to try it w/ Pitzer Lateral water. Have run it on influent & effluent from chromium system.

Running biochemical reduction w/ f3 shallow waste. 16-hr residence time in reactor. Looking like better process based on capital + O&M costs. Gotten down to 20-50 ppb. ARA doing tests.

Consent Agreement

Will probably see copy from KMCC within the next few days.

PETER G. MORROS, Director

L.H. DODGION, *Administrator*

(702) 687-4670
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DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL PROTECTION

333 W. Nye Lane, Room 138
Carson City, Nevada 89706-0851

September 21, 1998

TO: Henderson Industrial Site Steering Committee
Basic Management, Incorporated
Stauffer Management Company
Pioneer Chlor Alkali Company, Inc.
Montrose Chemical Corporation of California
Kerr-McGee Chemical Corporation
Titanium Metals Corporation

RE: Fact Sheet for the BMI Complex

Representatives of NDEP have reviewed the Fact Sheet for the BMI Complex August, 1998 that was submitted to us on September 16, 1998. Please proceed to distribute this to interested parties in accordance with the appropriate Public Involvement Plan(s). Also, please initiate action to announce the Public Meeting scheduled for December 1, 1998 in the Henderson Convention Center. We will discuss the Public Meeting at the HISSC meeting scheduled in Henderson on October 20, 1998.

Sincerely,

Thomas A. Whalen, P.E.
Remediation Branch
Bureau of Corrective Actions

TAW:kmf

PETER G. MORROS, Director
L.H. DODGION, *Administrator*
(702) 687-4670
TDD 687-4678
Administration
Mining Regulation and Reclamation
Water Pollution Control
Facsimile 687-5856

STATE OF NEVADA
BOB MILLER
Governor

Waste Management
Corrective Actions
Federal Facilities
Air Quality
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 89706-0851

September 15, 1998

TO: See Addressees

RE: Henderson High-Conductivity Plume

Recent groundwater studies conducted by Kerr-McGee Chemical Corporation revealed the presence of a high-conductivity plume emanating from the North end of the BMI Complex in Henderson, traveling under Pittman and discharging into the Las Vegas Wash. This study confirms past data presented in Bureau of Reclamation Reports and studies by others. Data available to the Nevada Division of Environmental Protection (NDEP) suggest that this plume is the result of past, and possibly present, liquid and solid waste management practices by the various major industrial operations in the vicinity of BMI. We have concluded that sufficient data is available to describe the lateral and vertical extent of the plume and explore remedial alternatives in a timely fashion.

Therefore, I am cordially inviting a representative from each of the organizations listed above to attend a meeting where I will present the NDEP perspective on the identification and remediation of the high-conductivity plume. The meeting will be held, with limited seating, on Thursday, October 1, 1998, between 1:00 and 3:00 PM in Room 4400 of the Sawyer State Building located at 555 East Washington Avenue in Las Vegas. Another objective of the meeting is to solicit your comments regarding the evaluation of this plume and future corrective actions.

Thanks for your interest in this matter and feel free to call me at 702-687-4670 ext. 3127.

Sincerely,

Douglas Zimmerman, Chief
Bureau of Corrective Actions

TAW:kmf

Addressees: See page 2

Addressees:

Henderson Industrial Site Steering Committee
Stauffer Management Company
Pioneer Chlor Alkali Company, Inc.
Montrose Chemical Corporation of California
Kerr-McGee Chemical Corporation
Titanium Metals Corporation
American Pacific Corporation
City of Henderson
Clark County Health District
Southern Nevada Water Authority
Region IX, U.S. EPA

Ken McGee 9/3/98

- Intended to do K5 + PC17 pump test & collect water from PC55.
  K5 + PC17 ← .4' drawdown } didn't work well for
  .2' drawdown } pump test.

K5 - thought due to RTCs, PC17 may not have allowed for good drawdown Don thinks due to good permeability of alluvium. Similar to record test on PC-55 so probably due to formation. Information is conflicting PC-17 close to what was expected, PC-55 was not. Need a new well about the size of PC-55. Test hole going in on Tuesday - will be doing sieve analyses. Will be in vicinity of PC-55. DTW ≈ 18'

- Pond Construction
  Liner was damaged by wind so that portion of pond relined. Completion date put back 1½-2 weeks. Mid-October completion date, rain has slowed activity a little bit.

- Analytical
  Went back + looked at QC. Looked good to them - discussed work Dave Terni is doing.

- 2 points missed on perchlorate map

- 9/15/98 Meeting w/ EPA: Keith Takata + Julie Anderson
  Need to impress upon EPA how much progress has been made.

- Consent Agreement
  p. 15 selection of remedial action section may get modified to reflect economic viability. Will try to turn document around ASAP.

- UIC/EQI permitting issues

Pond permit can be done now with minor modification to existing permit. ICC permit will also be no problem.

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

August 25, 1998

Ms. Brenda Pohlmann
Remediation Branch Supervisor
Nevada Division of Environmental Protection
555 E. Washington, Suite 4300
Las Vegas, NV 89101

Dear Ms. Pohlmann:

Subject: Perchlorate Monthly Activity Status

Following is the current status of Kerr-McGee Chemical LLC's (KMC) activities regarding the perchlorate issue:

1. KMC prepared a Historical Information Report related to off-site subsurface geological characterization and submitted this for NDEP review and approval January 16, 1998. This review included a Sampling Plan describing additional field activities necessary to more fully characterize the area between the KMC facility and the Las Vegas wash. NDEP comments were received March 1998. NDEP commented on this Plan and activities associated with the Sampling Plan were completed.

   a) Site access was obtained from the City of Henderson and Nevada Dept of Transportation for subsurface investigation in rights-of-way. Drilling was commenced.

   b) During the field activities, the investigation's scope was discussed with NDEP and EPA in a May 7th meeting. Additional work to define the area between the COH rapid infiltration basins and the Las Vegas wash was proposed by Doug Zimmerman. Subsequently KMC submitted a proposal for addition drilling north of the COH rapid infiltration basins.

2. Work was completed and a report, including the results of the additional drilling, was submitted to NDEP on July 15, 1998. Continuing the characterization, additional work has been proposed by KMC to gain an understanding of the groundwater characteristics, as they relate to capture and treatability, in the area to north of Sunset Road. A Work Plan describing these field activities was submitted to NDEP. NDEP has commented on this Plan and KMC work will proceed the week of August 24th.

3. KMC has sought NDEP and Clark County Building Department approval for the design and construction of an 11-acre containment retention basin to be located on our site. Verbal construction approval has been granted through NDEP, Corrective Actions, however approval of the retention basin construction drawings has not yet been received from NDEP, Water Resources. Assuming the approvals are received in the next several weeks, the expected construction completion is the third or fourth quarter of 1998. Currently, pond construction is on schedule.

4. A modification of the Henderson Underground Injection Control (UIC) Permit is underway. The modification includes use of an 11-acre retention basin to retain perchlorate impacted groundwater until a suitable treatment technology has been determined. In that request KMC proposed that an equal amount of Lake Water be injected into the recharge trenches to replace the water which is diverted to

the 11-acre retention basin. The modification or other suitable amendment to the UIC Permit has not yet been approved by NDEP. This approval is also needed prior to use of the 11-acre pond.

5. A draft Perchlorate Consent Agreement has been submitted to NDEP for review. KMC has proposed modification for all but two sections of the template document. Portions of Sections V (cost reimbursement) and XVII (public participation) will require additional modifications by NDEP. NDEP has agreed to keep costs associated with the perchlorate investigation separate from those associated with the on-going HISSC Environmental Conditions Assessment, currently underway in the Henderson Industrial complex. Section V of the Perchlorate Consent Agreement should address reimbursement of those costs. Comments on the draft Consent Agreement were received from NDEP mid-August.

6. KMC has initiated an investigation into remedial alternatives for reduction of perchlorate concentrations in water. A status summary of that investigation is attached.

KMC is committed to act responsibly and cooperate fully with local, state, and federal officials in determining appropriate remedial actions. Please feel free to contact me at (702) 651-2200 if you have any questions related to this information. Thank you.

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

By certified mail
cc: SMCrowley
EMSpore
TWReed
RANapier
RHJones
PBDizikes
LKBailey
ALDooley
Robert Kelso (NDEP)
Doug Zimmerman (NDEP)
MWD
Barry Conaty, COH
Pat Mulroy, SNWA
Kevin Meyer, EPA Region IX
smc\Status to Pohlmann082098.doc

Technology Review

Bioremediation

Bioremediation of perchlorate in the groundwater has been successful. Preliminary engineering of several capacity levels has been completed. Detailed engineering continues to be done on the system. Impacts on the engineering due to the discovery of the ability of micronutrients to enhance the reduction of perchlorate are being accessed and integrated into the process flow diagram. Additional R&D work continues for further enhancement of the biochemical reduction of perchlorate by understanding the role of micronutrients. Micronutrients have enhanced activity of the bacteria and shortened residence time for reduction of perchlorate to low ppb levels. Utilization of locally available micronutrients and nutrients in testing is also continuing. The use of marshmallow and ice cream waste has been successful as a nutrient and in combination with micronutrients, including recovery after system upsets. Characterization of the treatability of water collected nearer the Las Vegas Wash is underway.

Electrochemical Catalysis

Electrochemical catalysis research work is continuing with a focus on several very successful catalysts which are applied to the cathode. The catalyst has been modified to reduce nitrates, chlorates and perchlorates in the groundwater. A pilot electrochemical cell has been constructed and is being operated successfully in the laboratory on our groundwater . This laboratory operation will detect any design flaws in the electrochemical cell prior to operation in Henderson. The support equipment for the pilot plant is being delivered to Henderson. The pilot cell will be operated in Henderson on the groundwater at the completion of the construction of the support equipment.

Aquifer Retention Basin

Work on the 11-acre retention basin continues. Engineering for the basin is complete and a grading permit was applied for in early April. The grading permit has been issued by Clark County for the basin. The earth work for the basin is complete, with only dress up work remaining on the external grades. Double lining of the basin is underway, with completion expected by the end of September, pending weather delays.

From: Mayer.Kevin @ epamail.epa.gov
To: Brenda Pohlmann
Subject: Perchlorate and TDS Plumes

===NOTE==========7/28/98==5:54pm==========

Brenda -

I am heading out for a vacation while school is out, from 7/29 until 8/10. Mitch wanted to go over the K-M report before my return. I passed along the salient points of our discussion to Mitch and his chief, Larry Bowerman.

Thank you for checking the ionic balance. What are the major cations? (Ca, Na...) Is there any concern about this high TDS plume reaching the Wash? I wonder whether it is already - perhaps a quick check of major cation/anion concentrations in the Wash would be interesting.

Kevin

From: Mayer.Kevin @ epamail.epa.gov
To: Brenda Pohlmann
Subject: fwd: Perchlorate - K-M Report first impression

===NOTE==========7/16/98=12:36pm==========
CC: Bowerman.Larry @ epamail.epa.gov, Kaplan.Mitch @ epamail.epa.gov

Brenda - Thank you for sending the overheads to Dr. Medville. I told her she could send them back to you. I have a presentation scheduled for August 13, so I think there should be plenty of time for all the transit.

In fact, we should start planning to get together on the next steps once we have had a chance to digest the KM report which we received yesterday. The figures are quite attractive (although I was hoping to see the perchlorate/conductivity cross-section that was hand-drawn on the plane). I noticed all the colors are soothing and unalarming.

Any news on the unknown organic? EPA is going to reiterate our previous comment that the full range of organic and inorganic chemical analyses should be run on at least a subset of the wells in the area. Perhaps NDEP already has a handle on some of the "usual suspects" priority pollutants. What are the chemical constituents of the high conductivity plume that K-M maps?

In my quick reading (Mitch has it now) I think I saw an estimated groundwater underflow of 18,900 gal/day in the channel at the Pittman lateral. That seems low if we try to account for the mass that appears to be entering the LV Wash. I will expose my ignorance:

Pittman Lateral Concentration - Say 600mg/l (=0.6 grams/liter)
0.6g/l x 18,900 gal/day x 3.8 l/gal = 43,000 grams/day (= 43 kg of perchlorate/day)

Las Vegas Wash Concentration - say 600 micrograms/liter, Flow , say, 120 million gallons/day
0.0006 g/l x 120 E6 gal/day x 3.8 l/gal = 273,600 grams/day (= 274 kg of perchlorate/day) or about 6 times more mass

The underflow of 600 mg/l of perchlorate would have to be about 120,000 gal/day (If the concentration were 1,000 mg/l, the flow would only need to be 72,000 gal/day) to account for the mass of perchlorate in the Wash.

The flow past the Davis Dam (Lake Mohave) is about 17,000 cfs this month (1 cfs is 646,272 gal/day) (according to the Bureau of Reclamation website, www. lc.usbr.gov/~pao/rivops.html). This represents about 11 E9 gallons/day (eleven billion gallons/day). We just got results showing that perchlorate concentration in the water a few miles downstream from Davis Dam is about 9 micrograms/l (9.5 ppb, sampled June 17, 1998 for EPA Region 9, analyzed by Cal DHS lab). There do not appear to be any major diversions from the River between there and the Hoover Dam (about the same flow rate over both dams this month, since the storage in the entire Lower Colorado system is at 95% of capacity).

The perchlorate flux at Davis Dam calculates to:
9 E-6 g/l x 11 E9 gal/day x 3.8 l/gal = 376,000 grams/day (= 376 kg/day)

This value is remarkably close to the number calculated for the Las Vegas Wash (if the LVWash concentration were 820 ppb, the values for mass flux would be identical!)

About the idea of pumping water from the groundwater and putting it in evaporation ponds -

At my Acid Mine Drainage site near Carson City (but at 7000' elevation), they have been measuring evaporation from a 2.2 acre pond at roughly 7,000 gal/day per acre of surface area during June. Enhanced evaporation (using a sprinkler system to spray water - actually a sulfuric acid solution - within the pond's bermed area) achieved about twice the "natural" rate, or 14,350 gallon/day per acre of pond. I am sure that there are much better

data for pan evaporation rates in Hende[illegible]n, but I thou[illegible] I would pa[illegible]
along a ballpark number while I was spec[illegible]ting quanti[illegible]vely.

Fwd by: Brenda Pohlma 7/17/1998 10:01 ==
Fwd to: Brenda Pohlmann, DZIMMERM @ NDEP-CC

....
FYI

DIEPENBROCK, WULFF, PLANT & HANNEGAN

LAW OFFICES

300 CAPITOL MALL, SUITE 1700

POST OFFICE BOX 3034

SACRAMENTO, CALIFORNIA 95812-3034

(916) 444-3910

TELECOPIER

(916) 446-1696

August 17, 1990

RE: Aerojet-General v. PEPCON
Our File No.: 23963

Mr. Rick Griffith
HELLER, EHRMAN, WHITE & McAULIFFE
333 Bush Street, Suite 3100
San Francisco, CA 94104-2878

Dear Mr. Griffith:

Enclosed please find a list of users or handlers of ammonium perchlorate prepared from non-privileged, non-confidential materials in the PEPCON litigation:

Atlantic Research
Avibras Industria Aerospacial
Clear Creek Engineering
Cobro International
Com-Tek Communications
D.P.S. Associates Co., Ltd. Defense Systems
Defense Supply
Girindus
Goex Inc.
Government of Israel
Hercules Magna
Internal Ballistics
Island Pyrochemical
Milfield Mfg. Co.
(Morton Thiokol-Wasatch)
Multi Scientech Co.
Naval Ordnance
Naval Weapons Center
Ontek

Ravenna Rocket Research
Reaction Labs, Inc.
Rocket Research
S.E.R.A.
Safety Consulting Engineers
Sesa Electronik Systems
Talley Defense Systems
USM Weapons
(United Technologies Corp.)
Veritay Technologies
Vulcan Systems
Watergreen Corp.

The parentheses indicate a party in the PEPCON litigation. Should you have any questions, please do not hesitate to contact me.

Very truly yours,

JACK V. LOVELL

JVL:hg
cc: Jo P. Vaughan
007\23963.014

Ammonium Perchlorate

PRIMARY DOMESTIC AP USERS FOR PROPULSION APPLICATIONS

Produced at the request of AFMC LO/JAV – January, 1998

FACILITY NAME AND LOCATION	TYPE	AP-RELATED PRODUCTS
Air Force Research Laboratory (formerly Phillips Lab) OLAC PL/RK 5 Pollux Drive Edwards AFB CA 93524-7048	Government research laboratory for propulsion	Propellants and rocket motors
Alliant Techsystems Allegany Ballistics Laboratory 210 State Route 956 Rocket Center WV 26726 (304) 726-5000	Propulsion manufacturer/ subcontractor	Solid propellant tactical rocket motors and propellant production and research.
Alliant Techsystems Bacchus Works PO Box 98 Magna UT 84044 (formerly Hercules Aerospace) (801) 250-5911	Propulsion manufacturer/ subcontractor	Solid propellant strategic and space motors production and research. Recent AP reclamation pilot plant
Army Aviation & Missile Command Redstone Arsenal AL 35898 (205) 876-2151 (205) 876-1500	Government propulsion research lab	Solid propellant tactical motors and propellant research
Atlantic Research Corporation 5945 Wellington Road Gainesville VA 20155 (703) 754-5316	Propulsion manufacturer/ subcontractor	Production and research of solid propellant tactical motors, propellants, and plastic-bonded explosives containing AP
Atlantic Research Corporation PO Box 1036 Camden AR 70701 (501) 574-0610	Propulsion manufacturer/ subcontractor	Production of tactical solid propellant rocket motors
Industrial Solid Propulsion Inc. 1955 S. Palm St. Suite 15 Las Vegas NV 89104 (702) 641-2302	Manufacturer	Production of small solid propellant motors and gas generators
Gencorp Aerojet PO Box 13222 Sacramento CA 95813 (916) 351-8668	Propulsion manufacturer/ subcontractor	Production and research of solid propellant rocket motors, liquid propellant engines. Propellant washout facility.
NASA Marshall Space Flight Center AL 35812 (205) 544-2121	Government propulsion research lab	Solid propellant test motors
Naval Air Warfare Center Weapons Div 1 Administration Circle China Lake CA 93555 (760) 939-9011	Government propulsion research lab	Propellant and rocket motor research
Naval Surface Warfare Center Indian Head Div 101 Strauss Ave Indian Head MD 20640 (301) 743-4000	Government propulsion research lab	Propellant and rocket motor research, plastic-bonded explosives

Pratt & Whitney Space Propulsion Operations Chemical Systems PO Box 49028 San Jose CA 95161 (408) 776-9121	Propulsion manufacturer/ subcontractor	Production of solid propellant space and tactical motors
Talley Industries Inc. PO Box 849 Mesa AZ 85205	Propulsion manufacturer/ subcontractor	Production of small ejection rocket motors
Thiokol Corporation Utah DLV Operations and Space Operations PO Box 707 Brigham City UT 84302 (801) 863-3511 (facilities located near Promontory UT)	Propulsion manufacturer/ subcontractor	Production and research of solid propellant launch, strategic, and tactical rocket motors. Propellant washout/AP reclamation facilities
Thiokol Corporation Elkton DLV Operations PO Box 241 (410) 392-1429 Elkton MD 21922	Propulsion manufacturer/ subcontractor	Production and research of solid propellant space motors and propellants.
Universal Propulsion Company (unit of Talley Ind.) 25401 N. Central Ave Phoenix AZ 85027-9801 (602) 869-8067	Propulsion manufacturer/ subcontractor	Production of small boost and seat ejection solid propellant motors.
FORMER FACILITIES		
Alliant Techsystems McGregor TX 76657 (formerly Hercules, also Rocketdyne Solid Rocket Division of Rockwell prior to acquisition by Hercules)	Propulsion manufacturer/ subcontractor	Solid propellants and rocket motors (facility closed 1996).
California Institute of Technology Jet Propulsion Laboratory North Edwards CA	Propellant research lab	Solid propellant research and development (facility closed 1995).
Gencorp Aerojet Iuka MS	Propulsion manufacturer/ subcontractor to NASA	Space Shuttle Advanced Solid Rocket Motor (cancelled, facility closed 1993, subscale propellant manufacture only prior to shutdown)
Lockheed Propulsion Company Redlands CA (former Grand Central Rocket Co.)	Propulsion manufacturer/ subcontractor	Solid propellants and rocket motors 1961-1975
Thiokol Corporation Huntsville Division (at Redstone Arsenal AL)	Propulsion manufacturer/ subcontractor	Solid propellants and tactical and space rocket motors (facility closed 1996).

MAJOR AP SUPPLIERS FOR PROPULSION APPLICATIONS:

Western Electrochemical Company (WECCO), a subsidiary of American Pacific Corp.
PO Box 629
Cedar City UT 84720
Note: ***Cedar City plant*** in Iron County, UT was opened in 1989 following 1988 explosion at ***former plant in Henderson, NV***; company known at that time as Pacific Engineering and Production Company (PEPCON). In 1992, WECCO quoted planned production quantities of 20 million lb per year.

Kerr-McGee Chemical Corp
Henderson NV
(headquarters Oklahoma City OK)
Note: Quoted production capacity of 40 million lb per year. However, in October 1997, Kerr-McGee announced the sale of its AP manufacturing business to American Pacific. Kerr-McGee retains the Henderson plants and will continue to produce other chemical products there.

Other companies that produced AP in large quantities in the 1960s include:

Hooker Chemical - plant location unknown (Hooker was taken over by Occidental Chemical Corp - may be able to get further information from Occidental at www.oxychem.com)

Pennwalt - plant location unknown (merged with Elf Atochem North America in 1989 - may be able to get more information from Elf through www.elf-atochem.com

American Potash (acquired by Kerr-McGee in 1967)

RECOMMENDED REFERENCES:

Schilt, Alfred A., Northern Illinois University, *Perchloric Acid and Perchlorates*, published by the G. Frederick Smith Chemical Company, 867 McKinley Ave., Columbus OH 43223, 1979.

ADDITIONAL SUGGESTED CONTACT:

Bay Area Water Authority
San Jose CA
(Monitors water supply in proximity of United Technologies/Pratt & Whitney plant)

Potential Applications for AP Biodegradation - Contact Information - 4/30/97

Company/Organization	Contacts/Position	Phone/FAX/e-mail	Problem/Interest
GenCorp - Aerojet PO Box 13222 Sacramento CA 95813-6000 Fed Ex: Hwy 50 & Aerojet Rd Attn: Gerald Newman Dept 1372, Bldg 2019, Rm 106 Rancho Cordova CA 95670	**Gregory Meagher** Manufacturing **Gerald Newman** Manager of Contracts	Phone: (916) 355-2457 FAX: (916) 355-2897 e-mail: meagher_gregory@aphub.aerojetpd.com Phone: (916) 355-2881	Minuteman stage 2 manufacturer Very interested! In process of designing IWTP to handle all propellant wastes and eliminate OB/OD - wants alternate to explosives manufacturing - mostly 1.3, some 1.1 with HMX, RDX and nitroguanidine
Alliant Techsystems State Rt. 956-MS-26P Rocket Site, WV 26726 Magna, UT	**John Waugaman** **Alan Staggs** Environmental **John R. (Jack) Hamilton** Environmental Remediation	Phone: (304) 726-5218 Phone: (304) 726-5244 FAX: (304) 726-5562 Phone: (801) 251-6935 FAX: (801) 251-6254	New machining facility driving need to dispose of AP in an energetic matrix Initially concerned about remediation applications
United Technologies Company - Chemical Systems Div. 600 Metcalf Road San Jose, CA 95138	**Ron Borcherding** Environmental	Phone: (408) 776-4139 FAX: (408) 776-4820 e-mail: ronb@post.csd.com	New hydrolysis facility just completed. Interested in treating propellant hydrolysate
Thiokol Corporation Highway 83, Bldg M-345 Mail Stop 301-A Thiokol, Utah 84302 Elkton, MD	**Glenn Mower** Manager, Chemical Processes Bill Lucas - Env. Mgr	Phone: (801) 863-3087 FAX: (801) 863-6767 e-mail: mowergl@tc.thiokol.com Phone: (410) 392-1626	Building prototype to treat AP contaminated wastewater
Atlantic Research Corp. 5945 Wellington Road Gainesville, VA 22065	**Tim Holden** Environmental	Phone: (703) 754-5106	Produces the MLRS using HTPB AP based propellant - 3 facilities - still planning to open burn

Company/Organization	Contacts/Position	Phone/FAX/e-mail	Problem/Interest
Western Electrochemical Co. (WECCO) PO Box 629 Cedar City, UT 84721 Fed Ex: 10622 West 6400 North Cedar City, UT 84720	**Ray Smith** Consultant/Marketing **Greg Howearth** Environmental/Safety	Phone: (801) 865-5022 Phone: (801) 865-5026 FAX: (801) 865-5092 e-mail howearth@apfc.com	AP Manufacturer Must treat AP in evaporation ponds. Considering Thiokol's K+ precipitation process - Need AP bio of resultant brine.
Commander Naval Surface Weapons Center (NSWC) Attn: Code 4073 (name) 300 Highway 361 Crane, IN 47522	**Dan Burch** Ordnance Engineering	Phone: (812) 854-3505 FAX: (812) 854-6836 DSN: 482-xxxx e-mail: db3739@smtp.nwscc.sea06.navy.mil	Generates wastewater from conventional weapons demil. JOCG & ESTCP sponsorship. Interested in biodegradation of wastewater from a process that recovers RDX from munitions
NSWC Attn: Code PM4A 101 Strauss Ave. Indian Head, MD	**Charles Painter** Environmental Program Manager	Phone: (301) 743-6627 FAX: (301) 743-4187	
JOCG US Army Defense Ammunition Center 3700 Army Depot Road Savanna IL 61074-9639	**Jim Wheeler** Program Director	Phone: (815) 273-8084 FAX: (815) 273-8718 DSN: 585-xxxx	Supports AP biodegradation program, large rocket motor demil programs, and conventional demil programs

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9
75 Hawthorne Street
San Francisco, CA 94105-3901

AUG 14 98

Mr. Douglas Zimmerman Chief,
Bureau of Corrective Action
Nevada Division of Environmental Protection
Capitol Complex
333 W. Nye Lane
Carson City, Nevada 89710

August 11 , 1998

Dear Mr. Zimmerman:

The Phase II Ground Water Perchlorate Investigation Report which was prepared by Kerr McGee and dated July 15, 1998 has been reviewed by EPA. The following comments and recommendations are provided to assist the NDEP in finalizing the remediation strategy that Kerr McGee will implement shortly. Most of these comments were discussed during our recently held conference call on July 31, 1998.

1) Perchlorate-contaminated groundwater from the **Chromium Treatment Wells** (on Kerr-McGee property, approximately 14,000 feet from Las Vegas Wash), should not be reinjected after the proposed evaporation pond is operational. The mass of perchlorate removed at this point should be monitored and recorded (flow rate times concentration) to provide information on the effectiveness of the interception effort. We expect this diversion of perchlorate to begin on September 15, 1998.

2) The calculated capacity (in gallons per day) of the 11-acre **evaporation pond** should be reported, both for standard conditions in the Las Vegas area and for possible enhanced evaporation by aeration. If necessary, additional evaporative capacity should be developed to handle contaminated groundwater from other interception locations closer to Las Vegas Wash. The evaporation rates (in inches of water per year) used in the capacity calculations should be reported for both standard and aerated conditions. Our preliminary calculations indicate that the long term pond capacity is about 100,000 gallons per day (using an evaporation rate of 120 inches/year) which is enough to begin extraction at the 3 locations discussed in this letter.

3) The design of the interception system at the **Pittman Lateral** (approximately 5,700 feet from the Wash) should be completed by September 1, 1998 and operational by September 15, 1998. We understand that the reported transmissivity and underflow are being confirmed as there are suggestions the initial values may be underestimates. However, this confirmation process must not delay the start-up of perchlorate extraction at the Pittman Lateral. We also understand that

trucks to transport the extracted ground water to the evaporation ponds.

The mass of perchlorate removed at this point should also be monitored and recorded to provide information on the effectiveness of the interception effort and to compare with the mass movement observed in the Las Vegas Wash and Colorado River. Observations in June indicate approximately 800-850 pounds of perchlorate are flowing out of Lake Mead each day, and a similar amount appears to be entering the lake through Las Vegas Wash. It is important to account for the mass of perchlorate moving with the groundwater into the Wash to provide assurances that the Colorado River System is being protected. Accordingly, the Pittman Lateral extraction well line should be designed and operated to remove 800 or more pounds per day of perchlorate. You may want to consider the use of an arbitrary perchlorate cut-off concentration (perhaps 100 ppm) to determine which wells along the Pittman Lateral to include in the extraction system. This would be done in order to maximize the mass of perchlorate removed while minimizing the volume of ground water handled. We recognize that initial pumping rates at the Pittman Lateral may be limited by the capacity of the evaporation ponds.

4) Better hydrogeologic information is needed in the **vicinity of MW K-5** (approximately 3,700 feet from the Wash, slightly upgradient from the Rapid Infiltration Basins) to establish the feasibility of an interception system (several extraction wells) at this location. The information is also needed to provide an estimate of the rate of movement of groundwater between the Pittman Lateral and Las Vegas Wash. The information sufficient for a decision on the feasibility of interception here should be available by September 1, 1998 and implementation should follow by November 1, 1998, if feasible. All information on quality and quantity of groundwater required at other possible interception areas would be expected here as well.

However, even given the uncertainty described above, the 370 mg/kg perchlorate concentration reported in MW-K5 and its location much closer to Las Vegas Wash than the Pittman Lateral justify some immediate ground water extraction at this location at an approximate pumping rate of 10 gpm. This well should be operational by September 15, 1998.

5) Better hydrogeological information and perchlorate distribution observations are necessary at the **A-A' line of wells** approximately 1,000 feet south of the Wash. The comments and expectations for the MW K-5 area described in the first paragraph of item 4 above apply to this location. Due to the complexity of the groundwater flow downgradient of the Henderson rapid infiltration basins, this information should be available by November 15, 1998. Obviously an interception system this close to the Wash would provide the most immediate protection of the Lake Mead/Colorado River system. All reasonable efforts should be used to ensure that such an extraction system becomes a reality.

6) The **full range of contaminants** in the groundwater must be monitored, and the unknown organic contaminant observed during the pump test must be identified. Both organic and inorganic constituents of the groundwater should be sampled at all potential extraction locations, including areas covering the western portion of the BMI Complex that coincide with the mapped zone of high conductivity ground water. This may be an indicator of the presence of other hazardous waste constituents which are migrating toward the main perchlorate plume and/or the Wash itself. EPA and NDEP should arrange to compile and share water quality data from the BMI complex and the Henderson area to help us both better understand the nature of the problem

in this area.

7) Systematic **sampling of the Colorado River** must be designed and implemented to observe seasonal fluctuations in perchlorate concentration and mass flow. At a minimum, the sampling program should include monthly sampling at the major dam locations from Hoover Dam to the border with Mexico. This program should provide downstream populations an early indication of any increase in concentration and document the effect of remedial actions as they are implemented.

8) Phase III of this investigation should be conducted as outlined in the report (page 18), but the primary effort at this point should focus on the immediate start-up of ground water extraction from the chrome treatment line, Pittman Lateral and from well MW-K5. Use of the evaporation ponds should serve as the primary means of treatment of perchlorate-contaminated ground water at the present time. Final disposition of accumulating perchlorate sludges in the evaporation ponds will also need to be addressed. Finally, expansion of the evaporation ponds capacity by use of aeration should be undertaken quickly as a relatively inexpensive way to enhance the efectiveness of the perchlorate remedy.

As always we remain available to assist you in any way that you think would be useful. Please feel free to call Kevin at (415) 744-2248 or Mitch at (415) 744-2063.

Sincerely,

Kevin Mayer
Superfund Division, SFD-7

Mitch Kaplan
Waste Management Division
WST-5

cc: Julie Anderson, EPA Region 9
Larry Bowerman, EPA Region 9
Keith Takata, EPA Region 9
John Kemmerer, EPA Region 9

PETER G. MORROS, Director
L.H. DODGION, *Administrator*
(702) 687-4670
TDD 687-4678
Administration
Mining Regulation and Reclamation
Water Pollution Control
Facsimile 687-5856

STATE OF NEVADA
BOB MILLER
Governor

Waste Management
Corrective Actions
Federal Facilities
Air Quality
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 89706-0851

August 10, 1998

Certified Mail No. P 444 498 479
RETURN RECEIPT REQUESTED

ATTN: Patrick S. Corbett, Plant Manager
Kerr-McGee Chemical Corporation
P.O. Box 55
Henderson, NV 89009

RE: Violations of Discharge Permit No. NV0000078

Dear Mr. Corbett:

The enclosed Finding of Violation and Order issued by the Administrator of the Division of Environmental Protection, pursuant to Nevada Revised Statutes (NRS) 445A.675 and 445A.690, requires compliance by Kerr-McGee Chemical Corporation with the terms of the Order by the dates specified.

The Finding and Order were developed as a result of the failure to provide a description of the process waste stream received by each pond in 1997; failure to properly report the results obtained from the pond leakage detection system (Pond AP-6); failure to report flow for Outfalls 001 and 002 during the First Quarter of 1998, when the cover letter conveying the Discharge Monitoring Reports (DMR's) showed discharges; and for failing to maintain Pond AP-6 in good working order.

Any violation of the terms of this Order could subject Kerr-McGee Chemical Corporation to an action for appropriate relief pursuant to NRS 445A.695, NRS 445A.700 or NRS 445A.705.

Pursuant to NRS 445A.690 this Order is final and not subject to review unless, within thirty (30) days after the date such order is served, a request by written petition on Form #3 for an appeal hearing is received by the State Environmental Commission, David R. Cowperthwaite, Executive Secretary, 333 West Nye Lane, Room 138, Carson City, Nevada, 89706-0851, or by telefax 702-687-5856. A Commission appeal Form #3 is enclosed. Please provide me with a copy of any correspondence your company may have with the Commission. If you require assistance and guidance as to this enforcement action you may contact the Division's Ombudsman, Ms. Marcia Manley prior to submitting an appeal to the Environmental Commission. She can be reached at 702-687-4670 extension 3162.

If you have any questions concerning this matter, please contact the undersigned at (702) 687-4670 ext 3148.

Sincerely,

Robert L. Speck
Enforcement Branch
Bureau of Water Pollution Control

Enclosures

cc: Allen Biaggi, Administrator
James B. Williams, NDEP
Shannon Bell, NDEP
Dick Serdoz, NDEP, Las Vegas Office
Nadir Sous, NDEP, Las Vegas Office
Environmental Commission
Phil Speight, Henderson City Manager, 240 Water Street, Henderson, NV 89009
Dale Askew, Clark County Manager, P.O. Box 551111, Las Vegas, NV 89155-1111
EPA, Region IX, Dan Meer (WTR-7)

IN THE MATTER OF)
KERR-MCGEE CHEMICAL CORPORATION)

FINDING OF VIOLATION

I. This Finding is made on the basis of the following facts, to wit:

A. The State of Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, under the authority of Nevada Revised Statutes (NRS) 445A.445 subsection 1 has the power and duty to administer and enforce the provisions of NRS 445A.300 to 445A.730 inclusive and all rules, regulations and standards promulgated by the Commission and all Orders and permits promulgated by the Department.

B. NRS 445A.465 "Unlawful discharge of a pollutant without a permit."

Except as authorized by a permit issued by the Department under the provisions of NRS 445A.300 to 445A.730 inclusive and regulations promulgated under such sections by the Commission, it is unlawful for any person to discharge from any point source any pollutant into any waters of the state or any treatment works.

C. Permit No. NV0000078 issued by the Department on February 14, 1995 contains general and specific conditions including:

1. Part I.A.5. The permittee shall provide the Director by January 28 of each year a description of the process waste stream received by each pond, a chemical analysis of each process waste stream and the annual average flow of each waste stream.

2. Part I.A.9. The permittee shall submit to the Director and Regional Administrator a report of the results obtained from the pond leakage detection system in accordance with Part I.B.2 of the permit. The report shall include: (a) name of pond, (b) volume and rate of leakage and (c) analysis of leakage for chemical constituents contained in the pond.

3. Part I.B.2. Reporting

Monitoring results obtained during the previous three (3) months shall be summarized for each month and reported on a Discharge Monitoring Report (DMR) Form received in this office no later than the 28th day of the month following the completed reporting period.

4. Part II.A.2. Facilities Operation

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities, collection systems or pump stations installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

D. The permittee has failed to comply with the aforementioned conditions, in that:

1. There is no *description* of the process waste stream received by *each* pond. The cover letter with the Fourth Quarter 1997 DMR's states that: "Information relating to the characterization of the water streams going to each of the ponds is included with this correspondence as Attachment 3." Attachment 3 does not include any such characterization for Ponds AP-2, C-1, AP-3, AP-5, AP-6, or P-2.

2a. It was noted in the cover letter conveying the First Quarter 1996 DMR's that there was damage to the top liner of pond AP-6 and that the damage would be repaired in April of that year. No volume or rate of the leak was reported. No analysis of the leakage for chemical constituents was submitted.

2b. Cover letters with the DMR's for the second, third and fourth quarters of 1996 stated that pond liquor was being transferred from pond AP-6 to other AP ponds *until repair of the top liner can be accomplished.* Obviously the pond wasn't repaired in April. No volume or rate of the leak was reported. No analysis of the leakage for chemical constituents was submitted.

2c. Cover letters with the DMR's for all four quarters of 1997 and the first quarter of 1998 state that: "Pond liquor between the top and bottom liner of AP-6 was returned to the pond. Repair of the top liner will be accomplished as the liquid level in the pond is lowered." No volume or rate of the leak was reported. No analysis of the leakage for chemical constituents was submitted.

2d. The cover letter with the DMR's for the second quarter of 1998 notes that, "Pond liquor is apparent between the top and bottom liner of AP-6. Previous testing has indicated that the liquor is pond contents." And, "Repair of the top liner will be accomplished as the liquid level in the

ponds is lowered." No volume or rate of the leak was reported. No analysis of the leakage for chemical constituents was submitted, but reference was made to "previous testing" indicating the liquor was "pond contents".

2e. During a compliance inspection conducted on June 29, 1998 by Bureau of Water Pollution Control staff, they were told that Pond AP-6 has so much fluid in the leak detection sump (LDS) that even if they pumped continuously, they could not dry up the sump. This was used as justification as to why they don't know the volume or rate of the leak.

3. The cover letter with the First Quarter 1998 DMR's notes that there was 500,000 gallons (30 day avg. of .017 MGD) of flow from outfall 001 in the month of January. The flow block in the DMR was left blank. The same chart on the cover letter shows some flow for Outfall 001 in February and March and for all three months at Outfall 002 (all at 30 day avg. < .01 MGD) but the blocks on the DMR were left blank. The "NO DISCHARGE" box at the top of the DMR's was checked for Outfalls 001 and 002 for all three months.

4. The top liner of Pond AP-6 has been leaking since the First Quarter of 1996. Each quarter since then the a statement such as "Repair of the top liner will be accomplished as the liquid level in the pond is lowered" has accompanied the DMR's. The liner has not been repaired.

II. On the basis of the facts listed above, the Administrator of the Division of Environmental Protection finds that Kerr-McGee Chemical Corporation is in violation of permit No. NV0000078, Part I.A.5 for failure to provide a description of the process waste stream received by each pond; Part I.A.9 for failing to properly report the results obtained from the pond leakage detection system; Part I.B.2 for failing to report flow for Outfalls 001 and 002 during the First Quarter of 1998; and Part II.A.2 for failing to maintain in good working order and operate as efficiently as possible all treatment or control facilities and collection systems.

08/10/98
Dated

Robert Speck
Enforcement Branch
Bureau of Water Pollution Control

IN THE MATTER OF)
KERR-MCGEE CHEMICAL CORPORATION)

Order No. NV081098W1

ORDER

This Order is issued under the authority vested in the Director of the Department of Conservation and Natural Resources by Nevada Revised Statutes (NRS) Chapter 445A.445 and 445A.450, which has been delegated to the Division of Environmental Protection; and is issued in accordance with the provisions of NRS 445A.660, NRS 445A.675 and NRS 445A.690.

On the basis of the attached Finding of Violation, which is a part of this Order, the Administrator of the Division of Environmental Protection has determined that Kerr-McGee Chemical Corporation is in violation of Permit No. NV0000078 as outlined in the Finding of Violation.

IT IS HEREBY ORDERED:

That Kerr-McGee Chemical Corporation complete the following acts by the dates specified:

1. Immediately cease and desist from discharging to Pond AP-6 until such time as authorization to resume discharging is obtained from this office.

2. By September 11, 1998 submit a plan and schedule for the repair of Pond AP-6.

3. Within 10 days of completion of the repairs, submit documentation and a narrative detailing how the repairs were accomplished.

4. By September 11, 1998 submit a description of the process waste stream received by each pond in 1997, as required by Part I.A.5 of the permit.

5. By September 11, 1998 submit corrected DMR's for the First Quarter of 1998.

6. Submissions shall be mailed to:

   Attn: Robert Speck
   Nevada Division of Environmental Protection
   333 West Nye Lane
   Carson City, Nevada 89706-0851

7. By September 11, 1998 appear at the Division of Environmental Protection office at 555 E. Washington Blvd., Suite 4300, in Las Vegas to show cause why the Division should not seek civil penalties for the violations cited, as provided for under NRS 445A.700. A meeting for this purpose may be arranged by contacting Dick Serdoz at (702) 486-2858 or Nadir Sous at (702) 486-2853.

8/10/98
Dated

James B. Williams, Chief
Bureau of Water Pollution Control

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

July 28, 1998

CERTIFIED MAIL

Mr. Doug Zimmerman
State of Nevada
Division of Environmental Protection
333 West Nye Lane
Carson City, Nevada 89710

RE: Phase II Perchlorate Study Pumping Test

Dear Mr. Zimmerman:

Kerr-McGee Chemical LLC, KMC submitted a Phase II Groundwater Perchlorate Investigation Report to NDEP in July, 1998. This report describes work done to date which characterizes the perchlorate impact on groundwater between the KMCLLC facility and Las Vegas Wash. This characterization was conducted in accordance with the KMCLLC Phase II Work Plan. In that Work Plan we proposed to conduct a recovery test on a well near the Pittman Lateral to determine the aquifer properties of the channel alluvium. We presented the test results as an attachment to the above mentioned report.

Although the data from the pump test look normal we are concerned that the nature of the discharge may have rendered the data invalid. The permeability and transmissivity values derived from the test are not consistent with the anticipated underflow in the channel and the expected groundwater velocity in the area. The test, however, did demonstrate the difficulty of recovering water from the channel in this area with conventional well pumps.

We are looking into alternative testing approaches to obtain credible aquifer characteristics as well as determining the cause of the unusual characteristics of the water we recovered. We will keep you advised. If you have any questions please feel free to call me at (405) 270-2654.

Sincerely,

Thomas W. Reed

Thomas W. Reed
Staff Hydrologist

cc: SM Crowley
PS Corbett
Kevin Mayer, Region IX, USEPA

Ken McGee Meeting July 23, 1998

Kay Brothers Doug Zimmerman Susan Crowley
Verne Rasse Burda Pohlmann Pat Corbett

- Not comfortable w/ pump test data, seems mismatched. Believe material may have had an effect, #'s too low for expected permeability. Saw drawdown 25' away.

- Are concerned about chemical effect on treatment technology.

- Where are we headed?
Want to allow water to run for 24 hours before taking sample.

- After pump test sampled water to [illegible] and mystery chemical was found nothing. Will try it again after pumping for 24 hours. Sample taken from pump test well, PC-55. Pat suggests not just purging + sampling this one, but also check surrounding wells. PC19, PC18 + K4 suggested by Tom.

- Kay requested getting data in GIS format. Having problems w/ time constraints. There's a table in the map w/ GPS data points. Susan + Pat will work on getting electronic format to Kay.

- High conductivity plume may be where other contaminants may be located. Timing? Brief workplan to us? Susan concerned about characterizing contamination that may be someone else's problem. Wants to stick to CCl4 only.

- Kay asked what KMCC is planning to do w/ H_2O once it's treated for ClO_4^-. Based on TDS, probably can't discharge anyway.

- Tom agrees that there may be some interference w/ analytical method. Kay concerned that the Cal DHS method is suspect once you have TDS values above 1500.
Pepcon has some well also showing low ClO_4^- where EC is high.

- KMCC suggests generating a workplan to do work in high EC plume to find out what else is out there.

- X-Section A-A'
Doug would like to see additional work in that area. In this area, nearly entire well is screened. Doug wonders if fresh water from COH might be concentrated in bottom of saturated zones. Want to do an EC profile in well borings. Will do all of the wells along the line. Will do it next week and not wait to put it into the workplan.

If there is stratification, we want to look at pumping only in low zone where ClO_4^- is.

- Think T+K should have been higher at PL than they saw. Doesn't make sense + want to repeat pump test.
Tom thinks results were 1 or 2 orders of magnitude too low.

- What is in TDS plume?
  Chlorine + caustics
  agricultural plant

- Get BOR Salinity study and look at TDS plume.

Summarize

- Conductivity profile
- Workplan for new pump test at PL
- review how to get more info on PL like a slug test and maybe sinking a few more wells
- PL water to go into systems for treatability studies
- Get Kay GPS data points
- Brenda to call Dave Terri or Howard Okamoto

- Doug stressed that evaporation needs to be looked at for long-term treatment.

- Doug requested actual data from sampling for mystery chemical. Will send data report w/ chromatograms.

- Finnish chemicals no longer interested in buying KMCC.

Kerr McGee Meeting

- Jon Reed back in the field
- need to go below RTBs + find paleochannel & find out if diluted

- Dudley to sick well for pump test - week of 18th
- Doug got samples
- Kevin M. + Mitch Kaplan
- Bob Hall will be at meeting
- 90 people registered

- 27th Henderson quarterly
- pond construction - flood control district wants flood study should be functional by late summer

- this week sampling all on-site wells

- N

Need water level for 1-12
for all wells sampled

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

July 20,1998

Mr. Robert C. Kelso
Supervisor, Remediation Branch
Bureau of Corrective Actions
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89710

Dear Mr. Kelso:

Subject: KMCC Environmental Conditions Investigation Quarterly Report

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

Activities Conducted 04/01/98 to 06/30/98

- Site visit by Tom Whalen, NDEP.
- Received conditional approval of August 1997 Phase II Environmental Conditions Assessment Report.
- Draft fact sheet prepared in coordination with other HISSC members and submitted to NDEP for review and comment.
- No further Action request for the Black Mountain Industrial Center submitted to NDEP.

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 (07-98) Progress Report to Kelso.doc

cc: ALDooley
PSCorbet
PBDizike
RHJones
HISSC Technical Subcommittee
HISSC Legal Subcommittee
RANapier
TWReed
RSimon (ENSR)
JTSmith (Covington & Burling)
Doug Zimmerman (NDEP)

interoffice
MEMORANDUM

to: Jim Williams, Joe Livak
from: Catherine R. Pool, P.E.
subject: Kerr McGee NV0000078
date: June 30, 1998

At an inspection conducted by Nadir Sous yesterday, it was determined that Kerr McGee is out of compliance with their permit, specifically I.A.9. This condition requires that Kerr McGee submit quarterly reports on volume, rate and chemical composition of fluids found in and pumped from the leak detection sumps of their ponds. At the inspection, we were informed that Pond AP-6 (ammonium perchlorate pond) has so much fluid in the leak detection sump (LDS) that even if they pumped continuously, they could not dry up the sump. In their view this was the justification as to why they don't know the rate of pumping from the LDS. They weren't aware of the permit condition that requires them to submit the information. Additionally, I reviewed their leak detection records and it seems that AP-3 has had on-going problems with sustained levels of 7' in the LDS. WC-east and west also have had leaks according to their records. They did not have anything more current than March to show me so we should get the new info ASAP.

I recommend that we pursue enforcement action against them as they have been aware of this leakage for at least 2 years and have not repaired or maintained the pond . At a minimum they need a compliance schedule to fix the pond.

cc: Doug Zimmerman, NDEP
Nadir Sous, NDEP
Darrell Rasner, NDEP

PETER G. MORROS, Director
L.H. DODGION, *Administrator*
(702) 687-4670
TDD 687-4678
Administration
Mining Regulation and Reclamation
Water Pollution Control
Facsimile 687-5856

STATE OF NEVADA
BOB MILLER
Governor

Waste Management
Corrective Actions
Federal Facilities
Air Quality
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 89706-0851

June 17, 1998

Patrick S. Corbett
Plant Manager
Kerr McGee Chemical Corp.
P.O. Box 55
Henderson, NV 89009

RE: MODIFICATION OF NPDES PERMIT #NV0000078

In response to comments made in your May 1, 1998 letter the above permit was modified. The modifications include requiring Total Perchlorate instead of ammonium and sodium perchlorate due to analytical methods. NDEP is aware that perchlorate may not be found in all of the Outfalls and that Outfall 003 has not had a discharge. Additionally, as Kerr McGee has notified NDEP that perchlorate will not longer be produced, the permit was modified to allow for a reduction in the monitoring requirements for perchlorate after a sufficient number of samples have been collected and are non-detect. These modifications are considered to be minor in nature and will not require a public notice.

Please submit any comments you may have to either myself or Jim Williams at the above address. If there are any questions please do not hesitate to call at 702/687-4670 ext. 3050.

Sincerely,

Catherine R. Pool, P.E.
Permits Branch Supervisor
Bureau of Water Pollution Control

cc: (w/attachments)
Nadir Sous, NDEP LV
Jim Williams, NDEP, CC
Doug Zimmerman, NDEP, CC
Terry Oda, EPA

Nevada Division of Environmental Protection

AUTHORIZATION TO DISCHARGE

In compliance with the provisions of the Federal Water Pollution Control Act as amended, (33 U.S.C. 1251 et. seq; the "Act"), and Chapter 445 of the Nevada Revised Statutes,

Kerr-McGee Chemical Corporation
P.O. Box 55
Henderson, NV 89015

is authorized to discharge from a facility located at

8000 Lake Mead Drive
Henderson, Nevada

Discharge Serial Number		
001	Non-contact cooling water, domestic or stabilized water and storm water runoff	Latitude 36° 02' 52" Longitude 115° 00' 27"
002	Non-contact cooling water, domestic or stabilized water and storm water runoff	Latitude 36° 02' 59" Longitude 115° 00' 30"
003	Stormwater runoff	Latitude 36° 03' 17" Longitude 115° 00' 06"

to receiving waters named

Las Vegas Wash via Pittman Bypass pipeline or BMI siphon.

in accordance with effluent limitations, monitoring requirements, and other conditions set forth in Part I, II and III hereof.

This permit shall become effective on February 14, 1995.

This permit and the authorization to discharge shall expire at midnight, February 14, 2000.

Signed this 18 day of June, 1998.

James B Williams Jr.
James B. Williams, Jr., P.E.
Chief, Bureau of Water Pollution Control
Bureau of Water Pollution Control

Part I

A. EFFLUENT LIMITATIONS, MONITORING REQUIREMENTS AND CONDITIONS

1. During the period beginning on the effective date of this permit, and lasting until the permit expires, the permittee is authorized to discharge from outfall serial number 001; domestic or stabilized water due to water leaks, pipe repairs, instrument calibration and fire hydrant testing, non-contact cooling water and storm water runoff.

   Samples taken in compliance with the monitoring requirements specified below shall be taken at the following location(s): outfall serial number 001.

   The discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT LIMITATIONS	DISCHARGE LIMITATIONS 30-day Ave.	Daily Max	MONITORING REQUIREMENTS Measurement Frequency	Sample Type
Non-contact Cooling Water and Domestic or Stabilized Water				
Flow[a]	-	-	Continuous	Recorder
pH	Not less than 6.5 standard units nor more than 9.0 standard units		Once per Discharge	Discrete
Temperature	33°C	37°C	Continuous	Recorder
Total Dissolved Solids[b] (Allowed increase above water supplied to BMI)	1000 lbs/day	In no case shall the net TDS exceed 175 tons/yr.	Once per discharge	Discrete
Total Perchlorate	Monitor and Report		"	"
Stormwater				
Flow (c)	Monitor and Report		Continuous	Recorder
pH	"		Once per discharge	Discrete
Total Suspended Solids	Monitor and Report		"	"
Chemical Oxygen Demand	"		"	"
Oil and Grease	"		"	"
Nitrate and Nitrite (as N)	"		"	"
Ammonia (as N)	"		"	"
Total Phosphorus	"		"	"
Total Dissolved Solids	"		"	"
Total perchlorate	"		"	"

a. Total flow for each month shall be reported.
b. Both the intake water supply and the effluent shall be sampled to determine the net increase.
c. Stormwater discharge is defined as the period between the onset of measurable precipitation and the cessation of flow at monitoring points that are known to convey stormwater runoff. Total flow for each discharge shall be reported.

Part I (Continued)

A. EFFLUENT LIMITATIONS, MONITORING REQUIREMENTS AND CONDITIONS

2. During the period beginning on the effective date of this permit, and lasting until the permit expires, the permittee is authorized to discharge from outfall serial number 002; domestic or stabilized water due to water leaks, pipe repairs, instrument calibration and fire hydrant testing, non-contact cooling water and storm water runoff.

Samples taken in compliance with the monitoring requirements specified below shall be taken at the following location(s): outfall serial number 002.

The discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT LIMITATIONS	DISCHARGE LIMITATIONS 30-day Ave.	Daily Max	MONITORING REQUIREMENTS Measurement Frequency	Sample Type
Non-contact Cooling Water and Domestic or Stabilized Water				
Flow[a]	-	-	Continuous	Recorder
pH	Not less than 6.5 standard units nor more than 9.0 standard units		Once per Discharge	Discrete
Temperature	33°C	37°C	Continuous	Recorder
Total Dissolved Solids[b] (Allowed increase above water supplied to BMI)	1000 lbs/day	In no case shall the net TDS exceed 175 tons/yr.	Once per discharge	Discrete
Total Perchlorate	Monitor and Report		"	"
Stormwater				
Flow (c)	Monitor and Report		Continuous	Recorder
pH	"		Once per discharge	Discrete
Total Suspended Solids	"		"	"
Chemical Oxygen Demand	"		"	"
Oil and Grease	"		"	"
Nitrate and Nitrite (as N)	"		"	"
Ammonia (as N)	"		"	"
Total Phosphorus	"		"	"
Total Dissolved Solids	"		"	"
Total perchlorate	"		"	"

a. Total flow for each month shall be reported.
b. Both the intake water supply and the effluent shall be sampled to determine the net increase.
c. Stormwater discharge is defined as the period between the onset of measurable precipitation and the cessation of flow at monitoring points that are known to convey stormwater runoff. Total flow for each discharge shall be reported.

PART I.A (continued)

A. EFFLUENT MONITORING REQUIREMENTS AND CONDITIONS

3. During the period beginning on the effective date of this permit, and lasting until the permit expires, the permittee is authorized to discharge stormwater runoff from outfall serial number 003.

   Samples taken in compliance with the monitoring requirements specified below shall be taken at the following location: outfall serial number 003.

EFFLUENT CHARACTERISTICS	MONITORING REQUIREMENTS*	
	Measurement Frequency	Sample Type
pH	Once/per discharge	Discrete
TDS	"	Discrete
Sulfate (as SO_4)	"	Discrete
Manganese (Total as Mn)	"	Discrete
Total perchlorate	"	Discrete

*Minimum requirements. Any alternative sampling method which results in a more representative sample may be used.

4. The monitoring frequency for perchlorate may be reduced after a request by the permittee after one year of data with no detects. This modification may be done without a major permit modification.

5. Process waters and wastewaters other than those listed above shall be controlled in lined ponds or disposed of in accordance with other written authorization issued by the Division.

   The following is a listing of the ponds with a general description of their intended use. The use of the ponds may, with approval of the Division , be varied from time to time as the needs of the plant processes dictate.

PART I.A. (continued)

SUMMARY DESCRIPTION OF PROCESS/WASTEWATER PONDS

SINGLE LINER SYSTEMS

POND AP-2

Liner	: PVC Bottom, reinforced butyl side
Surface Area	: 14,000 ft^2
Volume	: 400,000 gallons
Process Waste	: Sodium perchlorate purification and ammonium perchlorate process purification filter wash liquor. Total recycle.

DOUBLE LINER SYSTEMS

POND C-1

Liner	: Bottom liner: 40 mil HDPE Side liner: Geo-Net polypropylene 40 gm/m^2 Top liner: 60 mil HDPE
Surface Area	: 69,000 ft^2
Volume	: 3,125,000 gallons
Process Waste	: Boron Neutralization Waste. Evaporation

POND AP-1

Liner	: Bottom liner - 40 mil HDPE (high density polyethylene). Side underliner - geo-textile polypropylene 40 gm/m^2. Top liner - 60 mil HDPE.
Surface Area	: 14,000 ft^2
Volume	: 370,000 gallons
Process Effluent	: Sodium perchlorate purification and ammonium perchlorate process purification filter wash liquor. total recycle.

POND AP-3

Liner	: Bottom liner - 40 mil HDPE Side underliner - geo-textile polypropylene 40 gm/m^2. Top liner - 60 mil HDPE.
Surface Area	: 2,000 ft^2
Volume	: 65,000 gallons
Process Effluent	: Sodium perchlorate purification and ammonium perchlorate process purification filter wash liquor. total recycle. This pond is used as a pump basin for AP-1.

PART I.A. (continued)

POND AP-4

Liner	: Bottom liner - 40 mil HDPE Side underliner - geo-textile polypropylene 40 gm/m^2. Top liner - 60 mil HDPE.
Surface Area	: 20,000 ft^2
Volume	: 720,000 gallons
Process Effluent	: Ammonium perchlorate cooling tower waste; salt crystallizer washout. Total recycle.

POND AP-5

Liner	: Bottom liner - 40 mil HDPE Side underliner - geo-textile polypropylene 400 gm/m^2. Top liner - 60 mil HDPE.
Surface Area	: 35,000 ft^2
Volume	: 1,817,000 gallons
Process Effluent	: Ammonium perchlorate cooling tower waste; Total recycle.

POND AP-6

Bottom Liner	: 40 mil HDPE
Side Liner	: Geo-Net polypropylene 40 gm/m^2
Top Liner:	: 60 mil HDPE
Surface Area	: 67,500 ft^1
Volume	: 3,700,000 gallons
Process Effluent	: Sodium perchlorate and ammonium perchlorate process purification filter wash liquor. Recycle.

POND P-2

Liner	: Bottom liner - 30 mil PVC unreinforced Side underliner - geo-textile polypropylene Top liner - two layers; first - 36 mil Hypalon polyester reinforced, second - 60 mil HDPE
Surface Area	: 13,000 ft^2
Volume	: 675,000 gallons
Process Effluent	: Sodium chlorate solution due to wash down, storm water collection, and excess above that the process vessels can handle. Total recycle.

POND Mn-1

Liner	: Bottom - 4" - 6" compacted bentonite clay, 10^{-8} cm/sec. permeability Side underliner - geo-textile polypropylene 40 gm/m^2. Top liner - 60 mil HDPE.
Surface Area	: 53,000 ft^2
Volume	: 3,500,000 gallons
Process Waste	: MnO_2 cell feed filter waste, potassium phosphate cathode wash solution. Evaporation.

PART I.A (continued)

POND WC-EAST (Formerly WC-2)

Liner	: Bottom liner - 40 mil HDEP Side liner - 105 mil geotextile polypropylene - HDPE netting - 40 mil HDPE Top liner - 60 mil HDPE UV Protective liner - 40 mil HDPE
Surface Area	: 88,580 ft^2
Volume	: 19,658,500 gallons
Process Waste	: RCC composite consisting of Unit 3 and Unit 5 cooling tower blowdown, steam generation blowdown, process waste softeners, MnO_2 wash solution, and process seal water/filter flush. Solution from this pond will be processed through a Vapor Recompression Unit to produce clean water for cooling and process uses. Evaporation and recycle.

POND WC-WEST (Formerly WC-1)

Liner	: Bottom liner - 40 mil HDEP Side liner - 105 mil geotextile polypropylene - HDPE netting - 40 mil HDPE Top liner - 60 mil HDPE
Surface Area	: 67,600 ft^2
Volume	: 12,515,200 gallons
Process Waste	: RCC Unit Effluent. Treatment plant received water from WC-East pond. Evaporation

5. The permittee shall provide the Director by January 28 of each year a description of the process waste stream received by each pond, a chemical analysis of each process waste stream and the annual average flow of each waste stream.

6. Holding Pond conditions: The construction of any new ponds for process and wastewater control or modifications to existing ponds identified above must be approved by the Division prior to commencement of construction. Such new ponds, existing ponds or modifications to existing ponds shall be located and constructed such as to:

   a. contain with no discharge the once-in-one-hundred years flood at said location;

   b. withstand with no discharge the once-in-one-hundred years flood at the location; and

   c. prevent the escape of wastewater by leakage.

Part I.A. (continued)

7. The permittee shall conduct a monitoring program to determine pond leakage, in accordance with the following schedule:

   Monitoring Wells

   1. Monitoring wells - M-17, M-25 and M-89 shall be sampled for depth to water, pH, specific conductivity, NaCl, Total Perchlorate.

   2. All monitoring wells shall be sampled Quarterly.

8. There shall be no discharge of substances that would cause a violation of water quality standards of the State of Nevada.

9. The permittee shall submit to the Director and Regional Administrator a report of the results obtained from the pond leakage detection system in accordance with Part 1.B.2 of the permit. The report shall include: (a) name of pond, (b) volume and rate of leakage and (c) analysis of leakage for chemical constituents contained in the pond.

10. The permittee shall report the quantities by type of all waste material removed from the holding ponds during the three month reporting period, in the DMR. The report shall include the name and location of the final disposal site.

11. There shall be no discharge to surface impoundments that is not in compliance with the above Holding Pond Conditions.

12. All solid waste shall be disposed of at a site which meets with the approval of the appropriate control authority.

13. All flows identified under Parts I.A.1, I.A.2, and I.A.3 are to be discharged to the Las Vegas Wash via the Pitman Bypass or BMI siphon except:

    a. when flows exceed the capacity of the Bypass; or
    b. when the Bypass is not available to receive the discharge; or
    c. when flows are diverted for irrigation or landscape vegetation or for use as construction water pursuant to plans approved by the Division.

14. The fourth quarter report shall contain a plot, on non-logarithmic paper, of date (x-axis) versus concentration (y-axis) for each analyzed constituent from the monitoring wells. The plot shall include data from the preceding five years, if available. Any data point from the current year that is greater than the limits in Part I.A.1 must be explained by a narrative.

PART I.A. (continued)

15. There shall be no discharge from the collection, treatment and disposal facilities except as authorized by this permit.

16. The collection, treatment and disposal facilities shall be constructed in conformance with plans approved by the Division. The plans must be approved by the Division prior to the start of construction. All changes to the approved plans must be approved by the Division.

17. The facility shall be operated in accordance with the Operations and Maintenance (O&M) Manual which must be approved by the Division.

18. There shall be no discharge of floating solids or visible foam in other than trace amounts.

19. The permittee shall remit an annual review and services fee in accordance with NAC 445.144 starting July 15, 1995 and every year thereafter until the permit is terminated.

20. A signed copy of all Discharge Monitoring Reports and any other reports shall be submitted to the Regional Administrator at the following address:

Regional Administrator, W-4-1
Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, CA 94105

21. The permittee shall achieve compliance with the effluent limitations upon issuance of the permit.

B. MONITORING AND REPORTING

1. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. Analysis shall be performed by a State of Nevada certified laboratory. Results from this lab must accompany the Discharge Monitoring Report, unless otherwise directed by the Division.

2. **Reporting**

Monitoring results obtained during the previous three (3) months shall be summarized for each month and reported on a Discharge Monitoring Report (DMR) Form received in this office no later than the 28th day of the month following the completed reporting period. The first report is due on _____, 19_____. An original signed copy of these, and all other reports required herein, shall be submitted to the State at the following address:

PART I.B. (Continued)

Division of Environmental Protection
Bureau of Water Pollution Control
ATTN: Compliance Coordinator
333 West Nye Lane
Capitol Complex
Carson City, Nevada 89710

3. **Definitions**

a. The "30-day average discharge" means the total discharge during a month divided by the number of samples in the period that the facility was discharging. Where less than daily sampling is required by this permit, the 30-day average discharge shall be determined by the summation of all the measured discharges divided by the number of samples during the period when the measurements were made.

b. The "daily maximum" is the highest measurement during the monitoring period.

c. The "30-day average concentration", other than for fecal coliform bacteria, means the arithmetic mean of measurements made during a month. The "30-day average concentration" for fecal coliform bacteria means the geometric mean of measurements made during a month. The geometric mean is the "n^{th}" root of the product of "n" numbers.

If fewer than four measurements are made during a month, the compliance or noncompliance with the 30-day average concentration limitation shall not be determined.

d. A "discrete" sample means any individual sample collected in less than 15 minutes.

4. **Test Procedures**

Test procedures for the analysis of pollutants shall conform to regulations (40 CFR, Part 136) published pursuant to Section 304(h) of the Act, under which such procedures may be required unless other procedures are approved by the Division.

5. **Recording the Results**

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. the exact place, date, and time of sampling;
b. the dates the analyses were performed;
c. the person(s) who performed the analyses;
d. the analytical techniques or methods used; and
e. the results of all required analyses.

Part I.B.(continued)

6. **Additional Monitoring by Permittee**

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form. Such increased frequency shall also be indicated.

7. **Records Retention**

All records and information resulting from the monitoring activities required by this permit, including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation, shall be retained for a minimum of three (3) years, or longer if required by the Administrator.

8. **Modification of Monitoring Frequency and Sample Type**

After considering monitoring data, stream flow, discharge flow and receiving water conditions, the Division, may for just cause, modify the monitoring frequency and/or sample type by issuing an order to the permittee.

9. All laboratory analysis conducted in accordance with this discharge permit must have detection at or below the permit limits.

PART II

A. MANAGEMENT REQUIREMENTS

1. **Change in Discharge**

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, or treatment modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Any changes to the permitted treatment facility must comply with Nevada Administrative Code (NAC) 445.179 to 445.181. Pursuant to NAC 445.174, the permit may be modified to specify and limit any pollutants not previously limited.

Part II.A. (continued)

2. **Facilities Operation**

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities, collection systems or pump stations installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

3. **Adverse Impact**

The permittee shall take all reasonable steps to minimize any adverse impact to receiving waters resulting from noncompliance with any effluent limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

4. **Noncompliance, Unauthorized Discharge, Bypassing and Upset**

a. Any diversion, bypass, spill, overflow or discharge of treated or untreated wastewater from wastewater treatment or conveyance facilities under the control of the permittee is prohibited except as authorized by this permit. In the event the permittee has knowledge that a diversion, bypass, spill, overflow or discharge not authorized by this permit is probable, the permittee shall notify the Division immediately.

b. The permittee shall notify the Division within twenty-four (24) hours of any diversion, bypass, spill, upset, overflow or discharge of wastewater other than that which is authorized by the permit. A written report shall be submitted to the Administrator within five (5) days of diversion, bypass, spill, overflow, upset or discharge, detailing the entire incident including:

(1) time and date of discharge;
(2) exact location and estimated amount of discharge;
(3) flow path and any bodies of water which the discharge reached;
(4) the specific cause of the discharge; and
(5) the preventive and/or corrective actions taken.

c. The following shall be included as information which must be reported within 24 hours: any unanticipated bypass which exceeds any effluent limitation in the permit; any upset which exceeds any effluent limitation in the permit; and violation of a limitation for any toxic pollutant or any pollutant identified as the method to control a toxic pollutant.

Part II.A. (continued)

d. The permittee shall report all instances of noncompliance not reported under Part II.A.4.b. at the time monitoring reports are submitted. The reports shall contain the information listed in Part II.A.4.b.

e. An "upset" means an incident in which there is unintentional and temporary noncompliance with the permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

f. In selecting the appropriate enforcement option, the Division shall consider whether or not the noncompliance was the result of an upset.

g. The burden of proof is on the permittee to establish that an upset occurred.

In order to establish that an upset occurred, the permittee must provide, in addition to the information required under paragraph II.A.4.b. above, properly signed contemporaneous logs or other documentary evidence that:

(1) The facility was at the time being properly operated as required in paragraph II.A.2. above; and

(2) All reasonable steps were taken to minimize adverse impacts as required by paragraph II.A.3. above.

5. **Removed Substances**

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of waste waters shall be disposed of in a manner such as to prevent any pollution from such materials from entering any navigable waters.

6. **Safeguards to Electric Power Failure**

In order to maintain compliance with the effluent limitations and prohibitions of this permit the permittee shall either:

a. provide at the time of discharge an alternative power source sufficient to operate the wastewater control facilities;

b. halt or reduce all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities.

Part II.A. (continued)

B. RESPONSIBILITIES

1. **Right of Entry**

The permittee shall allow the Administrator and/or his authorized representatives, upon the presentation of credentials:

a. to enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. at reasonable times, to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to perform any necessary sampling to determine compliance with this permit or to sample any discharge.

2. **Transfer of Ownership or Control**

In the event of any change in control or ownership of facilities from which the authorized discharge emanates, the permittee shall notify the succeeding owner or controller of the existence of this permit, by letter, a copy of which shall be forwarded to the Administrator. ALL transfer of permits shall be approved by the Division.

3. **Availability of Reports**

Except for data determined to be confidential under NRS 445.311, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the office of the Division. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in NRS 445.337.

4. **Furnishing False Information and Tampering with Monitoring Devices**

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 NRS 445.131 to 445.354, 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 NRS 445.131 to 445.354, 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. This penalty is in addition to any other penalties, civil or criminal, provided pursuant to NRS 445.131 to 445.354, inclusive.

Part II.B (continued)

5. **Penalty for Violation of Permit Conditions**

Nevada Revised Statutes (NRS) 445.317 provides that any person who violates a permit condition is subject to administrative and judicial sanctions as outlined in NRS 445.324 through 445.334.

6. **Permit Modification, Suspension or Revocation**

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. violation of any terms or conditions of this permit;

b. obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. a change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

7. **Toxic Pollutants**

Notwithstanding Part II.B.6. above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

8. **Liability**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable Federal, State or local laws, regulations, or ordinances.

9. **Property Rights**

The issuance of this permit does not convey any property rights, in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

Part II.B (continued)

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provisions of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

PART III

A. OTHER REQUIREMENTS

1. **Reapplication**

If the permittee desires to continue to discharge, he shall reapply not later than 180 days before this permit expires on the application forms then in use.

2. **Signatures required on application and reporting forms.**

a. Application and reporting forms submitted to the department must be signed by:

(i) A principal executive officer of the corporation (of at least the level of vice president) or his authorized representative who is responsible for the overall operation of the facility from which the discharge described in the application or reporting form originates.

(ii) A general partner of the partnership.

(iii) The proprietor of the sole proprietorship.

(iv) A principal executive officer, ranking elected official or other authorized employee of the municipal, state or other public facility.

b. Each application must contain a certification by the person signing the application that he is familiar with the information provided, that to the best of his knowledge and belief the information is complete and accurate and that he has the authority to sign and execute the application.

c. **Changes to Authorization.** If an authorization under paragraph b. of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph b. of this section must be submitted to the Division prior to or together with any reports, information, or applications to be signed by an authorized representative.

From: Tina Leahy
To: Everyone Group
Subject: Board of Examiners

===URGENT=NOTE========6/18/98==1:32pm==
The NEW associated deadlines for the
next TENTATIVE Board of Examiners
meeting are as follows:

Meeting Date:	08/06/98
Deadline to Budget:	07/02/98
Deadline to OFPM:	06/22/98

Please call me at x3110 with questions.

PETER G. MORROS, Director
H. DODGION, *Administrator*

(702) 687-4670
TDD 687-4678

Administration
Mining Regulation and Reclamation
Water Pollution Control
Facsimile 687-5856

STATE OF NEVADA
BOB MILLER
Governor

Waste Management
Corrective Actions
Federal Facilities

Air Quality
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 89706-0851

June 10, 1998

Susan Crowley
Staff Environmental Specialist
Kerr-McGee Chemical Corporation
P.O. Box 55
Henderson, NV 89009

RE: Review of Phase II Environmental Conditions Assessment

Dear Ms Crowley:

In accordance with Section VI of the Consent Agreement, we have reviewed the Phase II Environmental Conditions Assessment, dated August 1997, for the Kerr-McGee Chemical Corporation Facility located at Henderson, Nevada. The Report is approved subject to the conditions noted in this letter. Where specified, information requested and workplans for additional environmental conditions investigations activities or remedial alternatives studies shall be submitted (postmarked) to NDEP within 60 days of your receipt of this letter. Of significance is our recommendation to develop a site conceptual model. The conceptual model is a three-dimensional representation of the source areas, groundwater flow, and solute transport system based on available geological, biological, geochemical, hydrological, climatological and analytical data for the site.

2.3.2 Hydrogeology

A reference is given for the Nevada Department of Water Resources. Please provide the citation for this information.

3.1 Trade Effluent Settling Ponds

Is LOU item Number 2 the area described as "S-8" in the July 1980 US EPA photo analysis?

3.1.1 Background

Please provide an analysis of the data from the post-closure monitoring program for the closed landfill.

Please explain the conditions of the NDEP permit and provide an analysis of any monitoring program.

3.5.1 Background

Please provide the location of the leachfield and any groundwater evaluations conducted in the vicinity. Also, please be more specific about "appropriate disposal facility" for hazardous solutions.

3.8 Unit 1 Tenant Stains

Please provide results of the resampling of the area.

4.1 Trade Effluent Settling Ponds

We agree that project objectives for this area have been met.

In this and some of the following sections in the report, reference is made to the American Society of Testing Materials publication "Cleanup Criteria for Contaminated Soil and Groundwater." [Please correct the citation for this publication in the list of references.] The publication contains average concentration and natural range of metals in the United States. The ranges in the publication are very broad and represent a large variety of geologic and soil conditions.

The report makes the implied assumption that because RCRA metals values fall "within the range of the average concentration of these constituents in soils," there is not an impact from KMCC or predecessor operations at the site. The ASTM ranges are very broad (for example, chromium ranges from 2 to 3,000 milligrams per kilogram, or three orders of magnitude). To determine impacts to the environment from facility operations, the Nevada cleanup standards or actual background soil metals concentrations should be used.

NDEP's soil and Ground Water Remediation Policy of 1992 was superseded on October 3, 1996 by NAC 445A.226-445A.22755. NDEP no longer requires Subpart S calculations. However, Subpart S may be appropriate in some cases. Also, background values must be determined prior to establishing cleanup levels!

4.2 Old P-2, Old P-3 Ponds

We agree that further work is required. More areal and subsurface definition is required. Please provide a workplan for the proposed work.

4.3 Truck Unloading Area

Based on the data presented in the report, no further investigative work needs to be conducted at the site at this time.

4.4 Diesel Fuel Storage Tank

We agree that further work is required to determine the affected volume of soil. Please submit a workplan for this work.

We agree that groundwater from M-21 does not appear to be impacted by diesel; consequently no further monitoring well installation is required. However, TPH should be routinely sampled from M-21 in the future.

4.6 J.B. Kelly, Inc. Trucking Site

Although concentration of total chromium is below action levels, where did it come from and what is the migration through soil?

4.7 A.P. Satellite Accumulation Point - AP Maintenance Shop

We agree that the removal action was effective in removing soil affected by diesel fuel compounds. However, please explain any motor oil concentrations. Based on the data presented in the report, no further investigative work needs to be conducted at the site at this time.

4.8 Unit 1 Tenant Site

We agree with the report regarding the effectiveness of the removal action. Based on the data presented, no further investigative work needs to be conducted at the site at this time.

4.9 AP-1, AP-2, and AP-3 Ponds

We agree that additional investigative work is required to determine the source of elevated levels of elemental nitrogen in the existing monitor wells M-17, M-89 and M-25. Please submit a workplan for this additional investigative work.

Considering that monitoring well M-25 is located about 280 feet to the Northwest (ostensibly downgradient) of monitoring well M-89, the volume of affected groundwater could be extensive. Additional work should address the potential lateral extent of affected groundwater. Analysis of groundwater samples for ammonium perchlorate should be included in any sampling scheme.

4.10 Hardesty Chemical Site

We agree that the removed underground storage tanks did not affect groundwater.

5.0 Data Validation and Review

Please explain the impact of numerous sample qualifications on future remedial decisions.

Sincerely,

[redacted]
Remediation Branch
Bureau of Corrective Actions

TAW:kmf

cc: Barry Conaty, Cutler & Stanfield, 700 Fourteenth St., NW, Washington, DC 20005
David L. Gerry, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012

PETER G. MORROS, Director
L.H. DODGION, *Administrator*
(702) 687-4670
TDD 687-4678
Administration
Mining Regulation and Reclamation
Water Pollution Control
Facsimile 687-5856

STATE OF NEVADA
BOB MILLER
Governor

Waste Management
Corrective Actions
Federal Facilities
Air Quality
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 89706-0851

June 1, 1998

Ms. Susan M. Crowley
Staff Environmental Specialist
Kerr McGee Chemical LLC
P.O. Box 55
Henderson, NV 89009

RE: Pump Test - Pittman Lateral Area

Dear Ms. Crowley:

The Nevada Division of Environmental Protection (NDEP) has received your request for approval to conduct a pump test in the vicinity of the Pittman Lateral. This letter serves as authorization to discharge groundwater generated during a pump test from well PC-55 in the Pittman Lateral area for up to 48 hours with an anticipated flow rate of 10 to 100 gpm. Please be aware that discharge directly into the Las Vegas Wash is not acceptable and that discharged water must be returned, by percolation, to the shallow groundwater system.

Please feel free to contact me at (702) 687-4670 ext. 3140 if you have any questions concerning this matter.

Sincerely,

James B Williams P.

Jim Williams, P.E.
Chief
Bureau of Water Pollution Control

cc: Doug Zimmerman
[redacted]
Kay Brothers

PETER G. MORROS, Director
L.H. DODGION, *Administrator*
(702) 687-4670
TDD 687-4678
Administration
Mining Regulation and Reclamation
Water Pollution Control
Facsimile 687-5856

STATE OF NEVADA
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Facsimile 687-6396

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL PROTECTION

333 W. Nye Lane, Room 138

Carson City, Nevada 89706-0851

May 20, 1998

MEMORANDUM

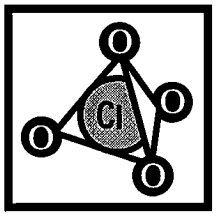
TO: L. Dodgion

THROUGH: V. Rosse, D. Zimmerman

FROM: R. Kelso

SUBJECT: Minor Modification to EMAR Contract to Include Divisions 88 and 89 (Perchlorate)

Budget Divisions 88 and 89 have been created to allow tracking and cost recovery of expenditures associated with oversight of perchlorate activities at the former PEPCON (American Pacific Corporation) and Kerr-McGee facilities in Henderson. Consent agreements, patterned after the BMI consent agreement, are being negotiated with both parties to provide for cost reimbursement. Expenses through the remainder of the fiscal year are estimated to be $75,000.00. Your concurrence with the addition of Divisions 88 and 89 as revenue sources for the EMAR Contract will ensure correct receipt and dispersal of funds to support these oversight activities.



I P S C

INTERAGENCY PERCHLORATE STEERING COMMITTEE

Stakeholder Forum on Perchlorate Issues scheduled for May 19-21, 1998

The Interagency Perchlorate Steering Committee (IPSC) will be holding a two and a half day stakeholder forum on May 19-21, 1998 in Henderson, Nevada. The IPSC is a working partnership of governmental agencies chartered to facilitate and coordinate issues related to potential perchlorate contamination in the environment.

PURPOSE: The purpose of this stakeholder forum is to disseminate information on the key scientific issues, to identify additional issues, and to hear stakeholder concerns. The forum will cover a broad range of topics including:

background and occurrence,
health effects, toxicology studies, and the assessment and peer review process,
analytical techniques,
ecological impacts,
treatment technologies,
regulatory and policy issues, and
future stakeholder involvement.

Background materials on perchlorate issues will be sent in advance of the forum to those who register with the EPA Safe Drinking Water Hotline by May 8, 1998. The IPSC is seeking input from State and Tribal drinking water programs, the regulated community (public water systems), public health organizations, academia, environmental and public interest groups, engineering firms, and the public on a number of issues related to perchlorate contamination in the environment

The IPSC encourages the full participation of stakeholders at the forum.

DATES: The stakeholder forum on perchlorate issues will be held on Tuesday, May 19, 1998 from 8:30 a.m. to 5:30 p.m. PDT, Wednesday, May 20, 1998 from 8:30 a.m. to 5:00 p.m. PDT, with an additional public outreach evening session from 7:00 p.m. to 9:00 p.m. PDT, and Thursday, May 21, 1998 from 8:30 a.m. to 12:00 p.m. PDT.

LOCATION & REGISTRATION: The stakeholder forum will be held at the Henderson Convention Center (200 Water Street) in Henderson, Nevada. To register for the forum, please contact the EPA Safe Drinking Water Hotline at 1-800-426-4791 or 703-285-1093 between 9:00 a.m. and 5:30 p.m. EDT. **There is no registration fee for the stakeholder forum, but participants should pre-register. Those registered by May 13, 1998, will receive a draft agenda, logistics information, and discussion papers prior to the forum.**

Members of the public who cannot attend the forum in person may participate via conference call and should also register with the EPA Safe Drinking Water Hotline by May 8, 1998. Please provide your name, organization, title, mailing address, telephone number, facsimile number, and e-mail address for EPA to connect the caller via conference call, if applicable, for the "Perchlorate Forum." Conference lines will be allocated on the basis of first-reserved, first served.

FOR FURTHER INFORMATION CONTACT: For additional information on forum logistics, please contact the EPA Safe Drinking Water Hotline at 1-800-426-4791.

A Federal Register notice of the stakeholder forum on perchlorate issues was published on April 29, 1998.

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

May 15, 1998

Mr. Doug Zimmerman
Chief, Bureau of Corrective Actions
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89706-0866

Dear Mr. Zimmerman:

Subject: Pump Test - Pittman Lateral Area

Kerr-McGee Chemical LLC (KMC) requests Nevada Division of Environmental (NDEP) approval for a groundwater discharge generated during an anticipated pump test from 6-inch well, PC-55, in the vicinity of the Pittman Lateral. The water will be directed to the nearby storm channel, which ultimately discharges onto BMI property. Please see Figure 1. Based upon the berming in the area of the discharge it is not expected that this groundwater will reach the Las Vegas wash for direct discharge.

The pump test is expected to be completed between May 26 and June 12, 1998. The test is expected to run for up to 48 hours at a flowrate of 10 to 100 GPM. KMC personnel will monitor the flow and surrounding monitor well water level elevations to determine the transmissivity of the area alluvium.

If you have any questions please call me at (702) 651-2234 or Tom Reed at (405) 270-2654. Thank you for your consideration and assistance.

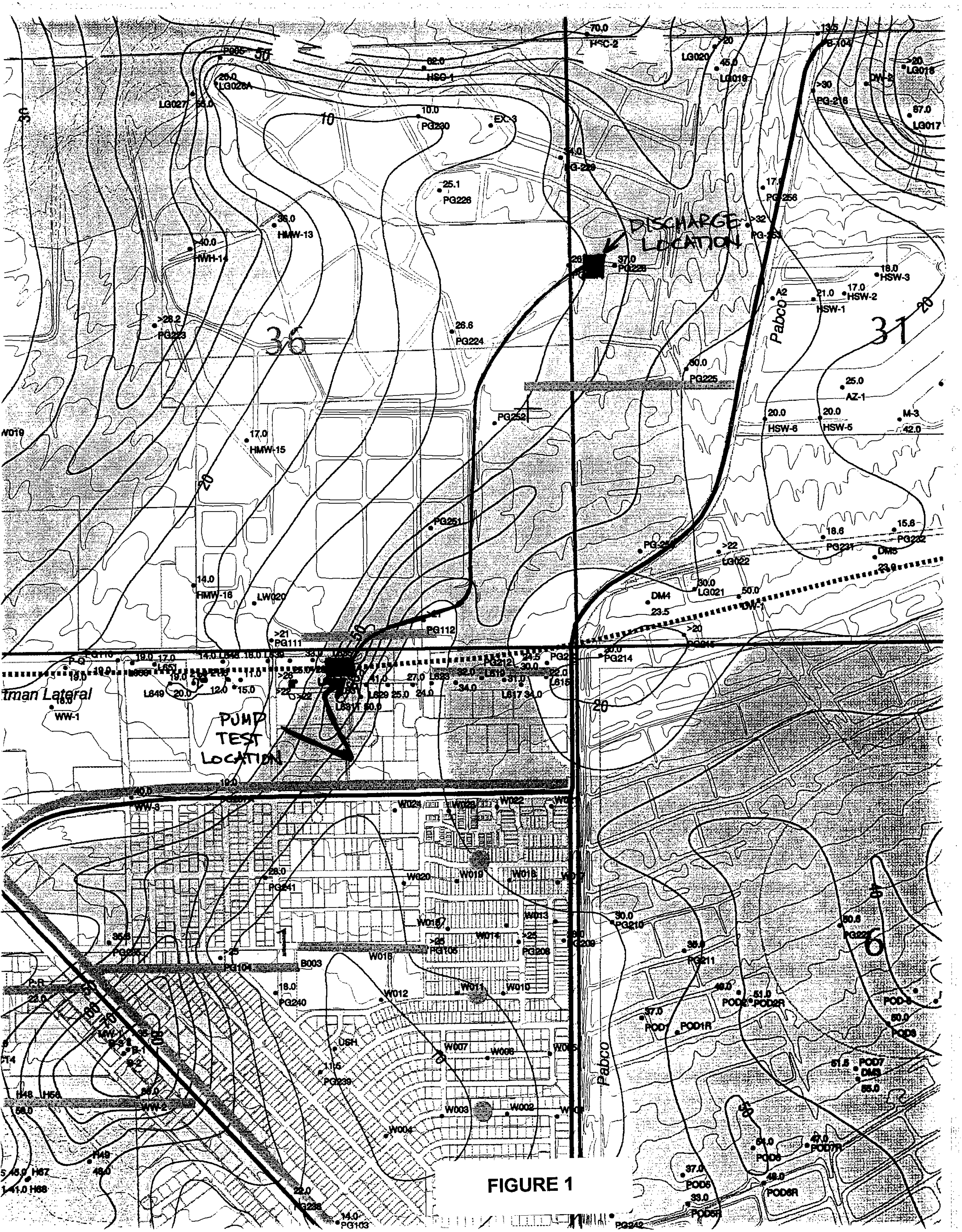
Sincerely,

SM Crowley

Susan M. Crowley
Staff Environmental Specialist

Attachment
By certified mail
cc: PSCorbett
TWReed
PBDizikes
ALDooley
EMSpore

SMC\PUMP TEST APPROVAL REQUEST.DOC


DISCHARGE LOCATION
PUMP TEST LOCATION
36
31
1
6
Pabco
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PG230
PG226
PG224
PG225
PG252
PG251
PG112
PG111
PG214
PG210
PG209
PG241
PG240
PG239
PG103
HMW-13
HMW-14
HMW-15
HMW-16
LW020
LG027
LG028A
LG020
LG019
LG017
LG022
LG021
HSC-1
HSC-2
HSW-1
HSW-2
HSW-3
HSW-5
HSW-6
AZ-1
DM4
WW-1
WW-3
WW-2
POD1
POD1R
POD2R
POD5
POD6R
POD7
POD7R
FIGURE 1

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

May 14, 1998

Mr. Robert Kelso
Supervisor Remediation Branch
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89706-0866

Dear Mr. Kelso:

Subject: Exclusion Request for Black Mountain Industrial Center - KMC Property

Kerr-McGee Chemical LLC(KMC) requests a no further action determination and a written assurance regarding future liability for a portion of KMC's property (the Property) within Clark County, Nevada, also within the limits of the City of Henderson. The Property is more fully described in the legal description, which is attached as Exhibit A and incorporated by this reference. KMC also requests release of the Property from the terms, requirements, and obligations of the Consent Agreement entered into by the NDEP respecting the Kerr-McGee Chemical Corporation Henderson facility, dated August 12, 1996.

KMC's request is based on an assessment of the Property, the Environmental Conditions Assessment (ECA), Kerr-McGee Chemical Corporation, Henderson, Nevada (Kleinfelder, Inc., April 15, 1993). In addition, NDEP has previously issued a no further action determination (to the City of Henderson) on a parcel immediately adjacent to the Property. The adjacent parcel is included in the Warm Springs right-of-way. KMC believes the ECA report and the characterization of the adjacent parcel, with its subsequent NDEP release, provide an adequate characterization of the environmental conditions relating to the Property which this exclusion request covers and fulfills the environmental assessment requirements of the NDEP's letter to Basic Management, Inc, dated March 8, 1994. The letter states, "if the environmental assessment for a particular parcel indicates no public health or environmental problems are present, the Division will issue a letter indicating development may proceed on the property." KMC desires to allow development of the property and requests a letter stating that no further actions are necessary with respect to the Property, certifying that development may proceed without environmental restriction and assuring third parties that the NDEP will not seek to hold them liable for any environmental conditions on the Property.

If you have any questions please call me at (702) 651-2234. Thank you for your consideration and assistance.

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

Attachment
By certified mail
cc: PSCorbett
PBDizikes
RHJones
RANapier
TWReed
Gregory W. Schlink, BMI
SThornhill

SMC\EXCLUSION REQUEST SNAP KM.DOC

EXHIBIT A

BOUNDARY DESCRIPTION
FOR
BLACK MOUNTAIN INDUSTRIAL CENTER
KER MCGEE - 4.99 ACRES

A PORTION OF APN 178-12-601-001, BEING A PORTION OF SECTION 12, TOWNSHIP 22 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA, MORE PARTICULARLY DESCRIBED AS FOLLOWS.

BEGINNING AT THE NORTHWEST CORNER OF THE SOUTH HALF (S ½) OF THE NORTHWEST QUARTER (NW ¼) OF SAID SECTION 12; THENCE SOUTH 89°53'06" EAST, ALONG THE NORTH LINE OF THE SOUTH HALF (S ½) OF THE NORTHWEST QUARTER (NW ¼) OF SAID SECTION 12, A DISTANCE OF 770.16 FEET TO THE NORTHWEST CORNER OF ASSESSOR'S PARCEL 178-12-601-002; THENCE DEPARTING SAID NORTH LINE, ALONG THE EAST LINE OF SAID PARCEL 178-12-601-002, SOUTH 09°19'23" EAST, A DISTANCE OF 547.01 FEET; THENCE NORTH 57°48'55" WEST, A DISTANCE OF 90.97 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 15050.00 FEET; THENCE ALONG SAID CURVE TO THE LEFT, THROUGH A CENTRAL ANGLE OF 3°32'03" AN ARC LENGTH OF 928.30 FEET; THENCE NORTH 00°29'56" EAST, A DISTANCE OF 34.48 FEET TO THE POINT OF BEGINNING.

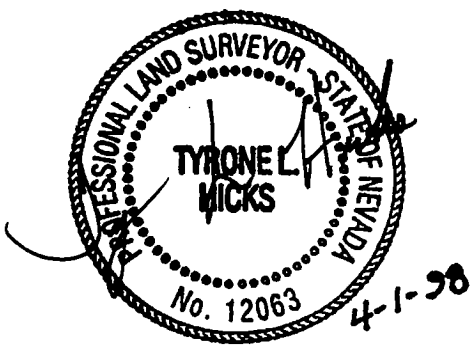
SAID PARCEL CONTAINING APPROXIMATELY 4.99 ACRES.

BASIS OF BEARINGS

THE BASIS OF BEARING FOR THIS LEGAL DESCRIPTION IS GRID NORTH AS DEFINED BY THE NEVADA COORDINATE SYSTEM OF 1983 (NC83) EAST ZONE (2701).

NOTE:

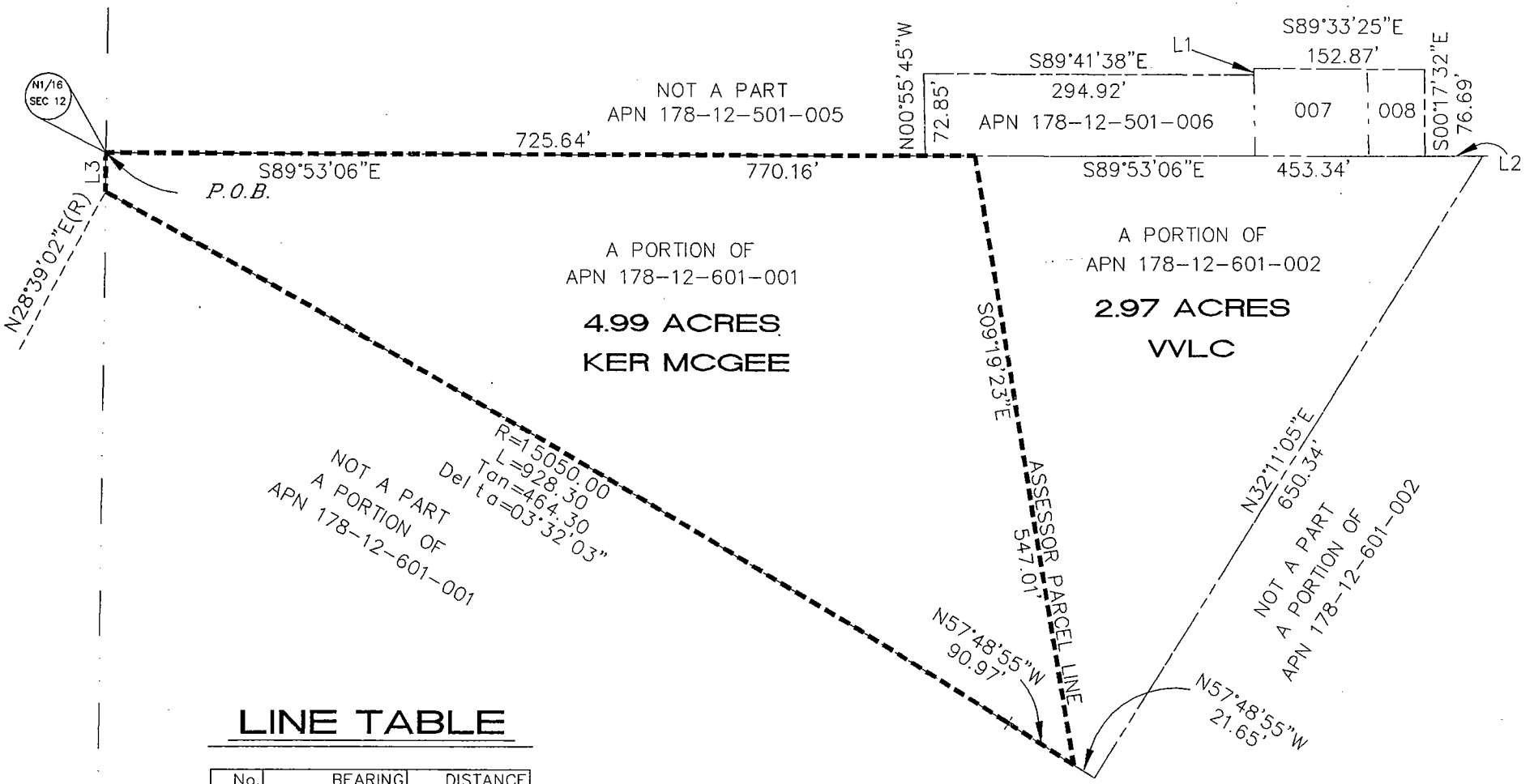
THE ABOVE BOUNDARY DESCRIPTION DOES NOT REPRESENT A LEGAL PARCEL OF LAND PER NEVADA REVISED STATUTES, CHAPTER 278, UNTIL SUCH A TIME A SUBDIVISION MAP IS RECORDED.



C:\LEGAL\51330\330KM.LGL
March 31, 1998 - bfk sr.

BLACK MOUNTAIN INDUSTRIAL CENTER
EXHIBIT TO ACOMPANY LEGAL DESCRIPTION

A PORTION OF SECTION 12,
TOWNSHIP 22 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA



LINE TABLE

No.	BEARING	DISTANCE
L1	S00°55'45"E	5.71'
L2	S89°53'06"E	50.95'
L3	N00°29'56"E	34.48'

N

NOT TO SCALE:

SHEET 1 of 1

330KM

POST, BUCKLEY, SCHUH & JERNIGAN
907 North Green Valley Parkway
Suite 100
Henderson, Nevada 89074
Telephone: 702/263-7273
Fax: 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

STATE OF NEVADA

PETER G. MORROS
Director

BOB MILLER
Governor

L. H. DODGION
Administrator

(702) 486-2850

FAX (702) 486-2863

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL PROTECTION

(Las Vegas Office)

555 E. Washington, Suite 4300

Las Vegas, Nevada 89101-1049

May 13, 1998

Ms. Susan Crowley
Staff Environmental Specialist
Kerr McGee Chemical LLC
P.O. Box 55
Henderson, NV 89009-7000

RE: Copies of Kerr McGee Chemical LLC Reports

Dear Ms. Crowley:

The following agencies have expressed an interest in receiving copies of reports generated by Kerr McGee Chemical LLC concerning the perchlorate investigation as soon as they are available. When the investigation report is submitted to NDEP, please send copies to the following:

Southern Nevada Water Authority
attn: Ms. Pat Mulroy
1001 S. Valley View Blvd.
Las Vegas, NV 89153

Metropolitan Water District of Southern California
attn: Ms. Jeanne-Marie Bruno
700 N. Moreno Avenue
La Verne, CA 91750-3399

US Environmental Protection Agency
attn: Mr. Kevin Mayer
75 Hawthorne Street, H-6-4
San Francisco, CA 94105

City of Henderson
c/o: Mr. Barry Conaty
Cutler & Stanfield
700 Fourteenth Street, N.W.
Washington D.C. 20005

Please feel free to contact me at (702) 486-2857 if you have any questions regarding this request.

Sincerely,

Brenda Pohlmann
Remedial Action Program Supervisor
Las Vegas Bureau of Corrective Actions

BLP:blp

cc: Mr. Doug Zimmerman, Chief, Bureau of Corrective Actions
Ms. Pat Mulroy, Southern Nevada Water Authority
Mr. Kevin Mayer, US Environmental Protection Agency
Mr. Barry Conaty, Cutler & Stanfield
Ms. Jeanne-Marie Bruno, Metropolitan Water District of Southern California

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

OFFICE OF THE
REGIONAL ADMINISTRATOR

11 MAY 1998

Lew Dodgion
Administrator
Nevada Division of Environmental Protection
Department of Conservation and Natural Resources
333 W. Nye Lane, Suite 138
Carson City, Nevada 89706-0851

Dear Mr. Dodgion:

We are providing you with information that we have recently received on locations where the chemical perchlorate may have been used in Nevada. EPA and environmental officials in your state have been working on perchlorate contamination of water resources. This information identifies a number of locations that were not previously known to us. We recommend that serious consideration be given to testing soil and water supplies which could be affected by major facilities on the enclosed lists. We also want you to be aware of a national stakeholder forum on perchlorate which will address many of the uncertainties surrounding this relatively new environmental and public health issue.

We requested information about perchlorate shipments (greater than 500 pounds in any one year) from perchlorate manufacturers, and information about major users of perchlorate from the US Air Force. As you can see from the enclosed lists, we have information on over 150 different facilities in more than 35 states where perchlorate has been used, including several in Nevada. Since the 1950s, over 870 million pounds of perchlorate have been manufactured in the US.

Perchlorate (ClO_4^-) is a man-made inorganic salt used in solid rocket fuel, in munitions and in the pyrotechnics industry. Perchlorate in its various chemical forms is essentially as soluble as table salt, can persist for decades in the environment, and easily dissolves and moves through both groundwater and surface water. Perchlorate from at least 12 separate sources has been detected in 110 public water supply wells in California and in detectable concentrations in the Colorado River. Nearly all appear to be related to solid rocket fuel manufacturing and testing. The perchlorate manufacturers estimate that approximately 90% of perchlorate is used for rocket fuel, with most of the rest used for explosives and pyrotechnics.

There remain many uncertainties concerning the toxicity and environmental effects of perchlorate. In high dosages, perchlorate interferes with thyroid activity and may have other health effects, particularly on children and sensitive populations. EPA has established a provisional reference dose in the range of 4 to 18 parts per billion in drinking water, and the State of California has set an action level of 18 ppb in public water supply.

We are also enclosing an announcement for the Interagency Perchlorate Steering Committee Stakeholder Forum which is scheduled for May 19-21 in Henderson, Nevada. Thank you for your participation in co-hosting this national forum on this relatively new environmental and public health issue.

Please feel free to contact Kevin Mayer of my staff at (415) 744-2248 if you have any questions or need additional information.

Yours,

Keiji Takal

fcv Felicia Marcus
Regional Administrator

PETER G. MORROS
Director

STATE OF NEVADA
BOB MILLER
Governor

L. H. DODGION
Administrator

(702) 486-2850

FAX (702) 486-2863

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL PROTECTION
(Las Vegas Office)
555 E. Washington, Suite 4300
Las Vegas, Nevada 89101-1049

April 29, 1998

Mis Susan M. Croweley
Staff Environmental Specialist
Kerr- McGee Chemical LLC
PO Box 55
Henderson, Nevada 89009

RE: Pond Installation Plan - Henderson Nevada Facility

Dear Mis Crowley:

The Plans for the above referenced project were received. I can not conduct a complete review until we receive a complete set of technical specifications to include the items listed below:

1- A geotechnical investigation report of the proposed site prepared by a registered Nevada professional engineer including the information requested in the WTS-37 guidance document.

2- The hydrological study and engineering computation demonstrating that the basin would easily withstand , without release, a 25 year, 24 hour storm event at the site.

3- The hydraulic and engineering computations for the channels that will be incorporated in the project to protect the basin from floodwater.

4- The calculation of the water balance demonstrating storage capacity of the basin within the required freeboard.

5- The plans and methods to aerate the basin.

6- The liner material specification.

7- The geotechnical data on the foundation and slope stability analysis.

If you have question about this decision, please feel free to contact me at (702) 486-2853.

Sincerely

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

cc: Jim Williams, NDEP/BOWPC Carson City
Darrel Rasner, NDEP/BOWPC Carson City
Allen Biaggi, NDEP Carson City
Brenda Pohlmann, NDEP/BCA Las Vegas

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

April 21, 1998

Nadir Sous
Nevada Division of Environmental Protection
555 E. Washington Ave.
Suite 4300
Las Vegas, NV 89101-1049

Dear Mr. Sous:

Subject: Pond Installation - Henderson Nevada Facility

Kerr-McGee Chemical LLC (KMCLLC) has agreed to build an on-site retention basin to hold groundwater impacted by perchlorate. This 11-acre pond is to be built on the north end of KMCLLC's Henderson operating facility. Drawings are attached. Information requested in WTS-37, "Guidance Document for Design of Wastewater Detention Basins," is attached as well.

KMCLLC has been on an accelerated schedule since last fall, characterizing and addressing perchlorate related issues. We hope for any assistance you can provide in reviewing and approving these drawings. We await your approval before moving forward with construction of this retention basin. Please feel free to call me at (702) 651-2234, if you have any questions or need additional information.

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

smc/Pond Drawings to NDEP.doc
cc: PSCorbett w/o draw
ALDooley "
TWReed "
PBDizikes "
EMSpore "
BBMarshall "
MJPorterfield "
Brenda Pohlmann "

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

April 21, 1998

Mr. LaVerne Rosse
Deputy Administrator
State of Nevada
Division of Environmental Protection
333 W. Nye Lane
Carson City, NV 89710

Dear Mr. Rosse:

Subject: Closed Hazardous Waste Landfill - 1997 Post Closure Monitoring Results

Kerr-McGee Chemical Corporation's (KMCC) Henderson facility conducted RCRA groundwater monitoring as required by 40 CFR 265.92 (d)(1) in June, 1997. The wells sampled are associated with the post closure requirements of the on-site closed hazardous waste landfill. Analytical results were compared with 1982/83 baseline values as required under 40 CFR 265.93 (c). All significant changes in water quality represented a movement towards improved quality.

Notice of a statistically significant change of an upgradient well groundwater quality parameter is made herein pursuant to 40 CFR 265.93 (c)(1). There is no indication the landfill has impacted water quality parameters in the vicinity of the landfill.

In 1982, a monitoring program was established with one upgradient and three downgradient wells to follow the groundwater quality in the closed hazardous waste landfill area. M-5A was the upgradient well. M-6A, M-7A and H-28 were the downgradient wells. During the June, 1997 post closure sampling, a statistically significant change from baseline of the historical **upgradient** well M-5 was detected for parameters of pH, specific conductance (SpCd), and total organic halides (TOX or TOH). Please see Table 1. A higher SpCd was detected in the upgradient well M-5, however the change from baseline was trending towards a **quality improvement** for parameters of pH and TOX. The trend toward a quality improvement is consistent with past sampling efforts. This same trend has been apparent from 1987 to present time.

All statistically significant changes from baseline detected in the **downgradient** monitoring wells described below reflect a groundwater **quality improvement** when compared to the 1982/83 baseline values of upgradient well M-5. Please see Table 1. All parameters, pH, SpCd, TOC and TOX moved in the direction of quality improvement in all three downgradient wells, M-6, M-7 and H-28. Additional groundwater samples were collected, as required under 40 CFR 265.93 (c)(2), and analyzed for pH, SpCd, TOC and TOX at each well showing a significant difference from the historical upgradient well concentrations.

Statistically, analysis of the resampled parameters did show support for:

1. An increase in pH in M-5A, M-6A, M-7A and H-28, compared to baseline values in M-5.
2. A decrease in SpCd in M-6A, M-7A and H-28, compared to baseline values in M-5.
3. A decrease in TOC in M-5A, M-6A, M-7A and H-28, compared to baseline values in M-5.
4. A decrease in TOX in M-5A, M-6A, M-7A and H-28, compared to baseline values in M-5.

The downgradient change from baseline was trending towards a **quality improvement** for parameters of pH, SpCd, TOC and TOX. This change is consistent with past sampling efforts. This same trend has been apparent since 1987 to present time.

Water levels, statistical comparisons and analytical results are attached as Table 1. Resample results are attached as Table 2.

Based on information herein and the information presented since the June 1984 Closure/Post Closure Plan (revised October 1984) was submitted, the closed landfill has been demonstrated to have no impact on groundwater quality.

Please feel free to contact S.M. Crowley at (702) 651-2234, if you have any questions.

Sincerely,

SM Crowley

Susan M. Crowley
Staff Environmental Specialist

smc\Landfill Monitoring to NDEP 0697.doc

cc: PSCorbett
RANapier
MJPorterfield

TABLE 1. KERR-McGEE CHEMICAL CORPORATION - HENDERSON, NV
Hazardous Waste Landfill Post Closure Monitoring
1997

Well #	Date	Water Level (feet)	Total Chromium (ppm)	Iron (ppm)	Manganese (ppm)	Sodium (ppm)	Chloride (ppm)	Sulfate (ppm)	Phenols (ppb)	TOC (ppm)	TOX (ppm)	pH	Specific Conductance (umhos/cm)
M-5A	06/11/97	1708.19	ND	3.1	1.7	1600	5000	1600	<0.25	42.0	20.0	7.21	15000
										41.0	22.0	7.09	15000
										43.0	21.0	7.09	15000
										43.0	22.0	7.09	15000
							M-5A Average			42.3	21.3	7.12	15000
							M-5A Standard Deviation			0.8	0.8	0.05	0
							Background (M-5) *			62.3	47.7	6.34	10469
							M-5A t-Test			**0.81**	**3.17**	**4.11**	**43.87**
M-6A	06/11/97	1680.94	ND	1.4	0.72	1200	2000	1600	<0.25	5.5	10.0	7.62	8260
										2.8	3.0	7.58	8260
										3.1	3.3	7.58	8280
										3.1	3.3	7.58	8270
							M-6A Average			3.6	4.9	7.59	8268
							M-6A Standard Deviation			1.1	2.9	0.02	8
							Background (M-5) *			62.3	47.7	6.34	10469
							M-6A t-Test			**2.38**	**5.10**	**8.14**	**21.31**
M-7A	06/11/97	1684.03	ND	ND	ND	1300	2000	1800	<0.25	2.5	13.0	7.52	8490
										2.2	8.4	7.58	8490
										2.4	8.0	7.53	8500
										2.6	7.7	7.53	8490
							M-7A Average			2.4	9.3	7.54	8493
							M-7A Standard Deviation			0.1	2.2	0.02	4
							Background (M-5) *			62.3	47.7	6.34	10469
							M-7A t-Test			**2.43**	**4.59**	**7.81**	**19.14**
H-28	06/11/97	1689.13	ND	36	1.2	900	2400	580	<0.25	9.5	0.1	6.84	8080
										7.6	0.1	6.87	8020
										7.6	0.1	6.90	8090
										7.6	0.1	6.82	8090
							H-28 Average			8.1	0.1	6.86	8070
							H-28 Standard Deviation			0.8	0.0	0.03	29
							Background (M-5) *			62.3	47.7	6.34	10469
							H-28 t-Test			**2.19**	**5.71**	**3.37**	**23.16**
Field Blank	06/11/97		ND	ND	ND	ND	ND	ND	<10	<1.0	<0.1	6.50	2

* Values are the result of 16 replicates (4 per quarter from 6/82 to 3/83)

TABLE 2. KERR-McGEE CHEMICAL CORPORATION - HENDERSON, NV
Hazardous Waste Landfill Post Closure Monitoring - Resample Results

Well #	Date	Water Level (feet)	TOC (mg/l)	TOX (mg/l)	pH	Specific Conductance (umhos/cm)
M-5A	07/15/97	1708.11	38.00	26.00	6.87	14700
			40.00	19.00	6.88	14700
			42.00	21.00	6.88	14700
			46.00	18.00	6.98	14700
	M-5A Average		41.50	21.00	6.90	14700
	M-5A Standard Deviation		2.96	3.08	0.04	0
	Background (M-5) *		62.3	47.7	6.34	10469
	M-5 t-Test		**0.84**	**3.18**	**3.65**	**40.97**
M-6A	07/15/97	1680.84	3.30	2.00	7.25	8070
			2.90	1.90	7.26	8080
			2.60	1.50	7.26	8140
			2.50	1.70	7.26	8140
	M-6A Average		2.83	1.78	7.26	8108
	M-6A Standard Deviation		0.31	0.19	0.00	33
	Background (M-5) *		62.3	47.7	6.34	10469
	M-6A t-Test		**2.41**	**5.50**	**5.98**	**22.79**
M-7A	07/15/97	1683.86	2.30	12.00	7.30	8500
			2.30	12.00	7.32	8450
			2.30	16.00	7.31	8440
			3.20	13.00	7.30	8400
	M-7A Average		2.53	13.25	7.31	8448
	M-7A Standard Deviation		0.39	1.64	0.01	36
	Background (M-5) *		62.3	47.7	6.34	10469
	M-7A t-Test		**2.42**	**3.82**	**6.28**	**14.75**
H-28	07/15/97	1689.38	6.50	2.20	6.09	7930
			6.90	2.10	6.14	7940
			8.80	2.50	6.00	7900
			6.80	2.30	6.04	7940
	H-28 Average		7.25	2.28	6.07	7928
	H-28 Standard Deviation		0.91	0.15	0.05	16
	Background (M-5) *		62.3	47.7	6.34	10469
	H-28 t-Test		**2.23**	**5.44**	**1.77**	**24.59**
Field Blank	07/15/97		<1.0	<1.0	6.6	<1

* Values are the result of 16 replicates (4 per quarter from 6/82 to 3/83)

WTS-37
Guidance Document for Design of Wastewater Detention Basins
Responses for 11 Acre Groundwater Retention Basin

April 1998

SITE CHARACTERIZATION OF DATA REQUIRED

I-A: A topographical map of the proposed site was developed with the use of survey crews and aerial photography. The drawing was made with contour lines at 1'-0" intervals and a 1" = 40' scale.

I-B: A geotechnical investigation report of the proposed site was prepared by a registered Nevada professional engineer. The report includes the information requested in the guidance document.

I-C: Elevations from the topographical map have allowed the engineer to design flood control to prevent embankment washout. A flood control plan can be seen in detail on the drawings.

GENERAL DETENTION BASIN CONSTRUCTION DETAILS

II-A: Interior embankments for this project shall be 3:1 (horizontal to vertical).

II-B: Liner leakage shall not be present due to a compacted subgrade and two layers, 40 mil and 60 mil, of HDPE geomembrane.

II-C: The basin bottom will have a minimal slope to allow for leak detection in the detection sumps.

II-D: The top of the embankment shall be 20'-0".

II-E: The basin geometry is generally trapezoidal.

II-F: A freeboard of 3-5 feet is planned for this basin.

II-G: The basin would easily withstand, without release, a 25 year, 24 hour storm event at the site.

II-H: The drawings depict channels that will be incorporated in the project to protect the basin from floodwater. New channels will flow into existing, adequate floodwater channels.

II-I: Plans include for weekly measurement by company personnel to check the basin's water level.

II-J: Leak detection is included in the drawings at four places throughout the basin. Double lining and downgradient monitoring pipes will existed.

II-K: A water balance demonstrating storage capacity of the basin within the required freeboard has been calculated.

II-L: Inlet piping will be above the basin liner and wear sheets for the HDPE will be installed for erosion protection.

II-M: Piping will not enter through the basin embankment.

II-N: Plans to aerate the basin are included in the design.

II-O: No conflict exists between the basin contents and the chemically inert geomembrane.

DESIGN ITEMS FOR GEOMEMBRANE LINER SYSTEMS

IV-A: Liner material specifications have been submitted by the contractors.

IV-B: Plans are included for protection of hazards such as sharp objects protruding through the liner, UV attack and wind uplift.

IV-C: Gas generation is not foreseen; however, if required, vents may be placed on the outside of the geomembrane to vent gases between liners.

IV-D: Geotechnical data on the foundation and slope stability has been analyzed by a geotechnical firm.

IV-E: Details of the liner anchoring can been seen on the drawings.

IV-G: QA/QC reports will be issued from a third party inspector during and after installation of the geomembrane. The report will confirm the installation of the liner per liner manufacturer's specifications.

OVINGTON & BURLING
1201 PENNSYLVANIA AVENUE, N. W.
P.O. BOX 7566
WASHINGTON, D.C. 20044-7566
(202) 662-6000

FACSIMILE: (202) 662-6291

J.T. SMITH II
DIRECT DIAL NUMBER
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TELEPHONE: 32-2-549-5230
FACSIMILE: 32-2-502-1598

April 17, 1998

VIA FEDERAL EXPRESS

John Kemmerer
Chief, Superfund Site
Cleanup Branch
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, CA. 94105-3901

Dear Mr. Kemmerer:

This letter responds to your request of March 11, 1998, to Patrick Corbett of Kerr-McGee Chemical LLC (KMCLLC), successor via merger to Kerr-McGee Chemical Corporation, seeking information pursuant to Section 104(e) of CERCLA and Section 3007 of RCRA regarding production and use of perchlorate-containing chemicals. KMCLLC has endeavored to answer each of your questions to the best of its ability, based upon information that could be obtained in the time allowed for KMCLLC to respond.

We are continuing research on the historical ownership and operations of KMCLLC's Henderson, Nevada facility, including the role of the federal government in the period 1945-62. For instance, it appears that during this period the United States Navy played a significant role in ownership and operation of a plant for production of ammonium perchlorate and that a senior naval officer was assigned to this facility until 1962. KMCLLC reserves the right to amend or supplement its answers based upon the fruits of ongoing research.

1. What year did production of perchlorate-containing chemicals begin?

At Henderson, Nevada, production of potassium perchlorate began in 1945, and production of ammonium perchlorate began on a pilot scale basis in 1948, with full commercial scale production beginning in 1951. Also, production of sodium perchlorate began in 1945 for use as a precursor in production of potassium perchlorate.

2. What entities have owned/operated the plant? Please provide the dates when ownership or operating control changed.

KMCLLC's Henderson facility was originally owned and constructed by the Defense Plant Corporation (DPC) acting for the U.S. government in 1941. From August 1942 until November 1944, the plant was operated by Basic Magnesium Incorporated on behalf of the U.S. government to manufacture magnesium that was used in aircraft production. The magnesium plant closed in November 1944, and the federal Reconstruction Finance Corporation (RFC) assumed control of the plant from the DPC. The RFC relinquished custody of the plant to the federal War Assets Administration in October 1946. In June 1949, most of this overall industrial complex was transferred to the Colorado River Commission (CRC), an instrumentality of the State of Nevada. As noted below, the CRC conveyed a portion of the site to Western Electro Chemical Company (WECCO) in 1952. The United States apparently retained or regained ownership of a substantial portion (290.33 acres) for which it did not relinquish ownership finally until March 1962, when this acreage was conveyed to the American Potash and Chemical Corporation (AP&CC).

WECCO was the first privately owned company to operate on the site that was to become the KMCLLC facility. It operated at the site from approximately 1945 through 1955. In May 1945, WECCO contracted with the DPC for the production of perchlorates for the U.S. Department of the Navy. Operations began by June or July 1945, but ceased right after the war's end in August 1945. Subsequently, WECCO resumed operations under a lease from the RFC in February 1946. WECCO acquired portions of the site from the CRC in May 1952.

As previously noted, the U.S. Navy remained active at the site until 1962. Apparently, the Navy spent $8 million to construct an ammonium perchlorate plant at the site in an area separate from the WECCO-owned chlorate and perchlorate units that were converted from the WW II plant, and it was this plant that was used by KMCLLC to produce ammonium perchlorate. WECCO, and then AP&CC, operated this plant under contract for the Navy, which apparently retained ownership and a supervisory role through a Navy Captain assigned to the site. It is likely that this plant occupied the 290.33 acres for which the United States finally relinquished ownership in 1962.

In 1955, WECCO was merged with AP&CC, and the merged entity continued the production of chlorates and perchlorates. KMCLLC acquired the present facility from AP&CC in 1967 by means of a merger.

3. Which specific perchlorate-containing compounds were manufactured?

Sodium perchlorate, potassium perchlorate, ammonium perchlorate, and magnesium perchlorate.

4. What was the total annual production of perchlorate-containing compounds at the plant in Henderson, Nevada? What was the annual production of each specific perchlorate-containing compound?

See Attachment 1. Figures are not readily available for potassium perchlorate production or ammonium perchlorate production between 1945-1951. Also, as previously noted, sodium perchlorate manufacture began in 1945 as a precursor to the production of potassium perchlorate. No separate production figures exist for such precursor sodium perchlorate. KMCLLC began manufacture of sodium perchlorate for end uses in 1968.

5 & 6. What were the end uses of the perchlorate-containing compounds and what was the approximate percentage of production sold for each of the end uses?

a. Sodium perchlorate -- precursor to potassium and ammonium perchlorate, and explosives.

b. Potassium perchlorate -- solid rocket fuel oxidizer, flares, and pyrotechnics.

c. Ammonium perchlorate -- solid rocket fuel oxidizer, explosives, chemicals and pyrotechnics.

d. Magnesium-perchlorate -- military batteries.

End-use information for 1997 is deemed to be reasonably reflective of historical uses. In 1997, 87% of production went for use as rocket fuel; 8% for

use in explosives, and 5% as a chemical feedstock. Historic use in flares and pyrotechnics would have been relatively small.

7. Please provide the name and address of each entity to whom perchlorate-containing compounds were shipped each year from the Kerr-McGee facility (more than 500 pounds in any year)?

See Attachment 2. The customer names and addresses furnished reflect KMCLLC shipments from 1978 through the present. Customer records antedating 1978 are not readily available. Normal retention of such sales data by KMCLLC is 10 years.

8. Please identify the locations of other perchlorate-containing chemical production facilities owned, operated or previously owned or operated by Kerr-McGee in the United States?

There have been none.

9. Please provide answers to the above questions (1-7) for any other Kerr-McGee facilities producing or previously producing perchlorate-containing compounds.

There are none.

10. EPA has been informed that production of perchlorate-containing compounds in the U.S. is limited to Kerr-McGee and WECCO in Cedar City, Utah (formerly the PEPCON facility in Henderson, Nevada). Please confirm to the best of your knowledge, whether this information is accurate. If you do have knowledge of perchlorate-containing compound production plants in the United States, other than those owned or operated by Kerr-McGee or WECCO, please provide the names, locations and years of operation, if known.

EPA is correct that production of perchlorate-containing compounds in the U.S. is currently limited to the Henderson facility and the Cedar City, Utah facility operated by American Pacific. In addition to the former PEPCON facility in Henderson, which operated from 1958 to 1988, Kerr McGee knows of four

other facilities that have produced perchlorate compounds. (The dates for production at these facilities are estimates.). They are:

1. Western Electro Chemical Company, 1941-48, Los Angeles, California.

2. Hooker Chemicals (now Oxychem), approximately 1940-75, Niagara Falls, New York.

3. HEF, Inc. -- Hooker Chemical & Foote Mineral (now Eka Nobel), 1958-65, Columbus, Mississippi.

4. Pennsalt (Pennwalt), now Elf Atochem, 1958-65, Portland, Oregon.

* * * *

Again, KMCLLC intends to supplement this response with any additional information that its ongoing research may reveal. Please let me know if EPA has any questions about the information furnished in this response.

Sincerely,

John T. Smith II

Attachments (2)

cc: Douglas Zimmerman, NDEP -- By Federal Express

ATTACHMENT 1

Perchlorate Chemical Production - Henderson,NV 1951-1997

4/3/98

YEAR	PRODUCT			
	SODIUM PERCHLORATE	AMMONIUM PERCHLORATE	MAGNESIUM PERCHLORATE	POTASSIUM PERCHLORATE
1951	-	379	-	3,077
1952	-	1,218	-	3,605
1953	-	1,571	-	3,562
1954	-	3,974	-	158
1955	-	3,239	-	651
1956	-	3,738	-	490
1957	-	3,427	-	336
1958	-	6,746	-	309
1959	-	10,888	-	378
1960	-	5,600	-	150
1961	-	10,279	-	122
1962	-	8,511	-	206
1963	-	11,220	-	117
1964	-	9,240	-	222
1965	-	3,841	-	-
1966	-	6,511	-	161
1967	-	8,456	-	304
1968	113	5,893	-	465
1969	71	6,001	12	535
1970	375	7,692	6	516
1971	142	3,835	-	344
1972	61	7,576	180	463
1973	75	6,781	247	526
1974	62	6,163	249	768
1975	41	4,443	42	266
1976	142	5,152	(8)	763
1977	416	5,857	-	949
1978	333	5,151	-	762
1979	804	6,542	-	830
1980	1,383	6,282	-	524
1981	1,567	6,174	-	386
1982	942	7,075	-	359
1983	841	8,531	-	(2)
1984	1,366	12,366	-	-
1985	1,878	14,116	-	-
1986	1,259	14,758	-	-
1987	1,061	14,053	-	-
1988	1,346	15,368	-	-
1989	262	18,033	-	-
1990	279	18,478	-	-
1991	356	10,803	-	-
1992	472	7,179	-	-
1993	734	8,920	-	-
1994	829	10,919	-	-
1995	681	6,010	-	-
1996	684	4,214	-	-
1997	735	5,303	-	-

ATTACHMENT 2

Perchlorate Company Names/Addresses cpa

"Ship to"	Name/address
Alabama	
Huntsville	Thiokol Corporation Plant closed. Current address of related division--PO Box 707, Brigham City, UT 84302-0707
Parrish	Boren Ireco (formerly Gulf & Thermex), 8425 Hwy 269, Parrish, Ala 35580
Redstone	U. S. Army, Redstone Arsenal, Al 35898-5330
Bessemer	Hercules, Inc. Now Alliant Tech –see Utah Division address
Arkansas	
E. Camden	Atlantic Research Corp., PO Box 1036, Camden, AR 71701
E. Camden	Mining Services International, address not available
Woodbury	Hitech Inc., PO Box 3112, East Camden, AR 71701
Midland	SECO Inc., Austin Powder, 25800 Science Park Dr., Cleveland, O 44122
Arizona	
Goodyear	Unidynamics, 102 S. Litchfield Rd., Goodyear, AZ 85338
Mesa	Talley Defense Systems, Inc., PO Box 849, Mesa, AZ 85211
Tempe	Aerodyne Corp., PO Box 725, Tempe, AZ 85281
Chandler	Aerodyne Corp., PO Box 725, Tempe, AZ 85281
Phoenix	Universal Propulsion, 25401 N. Central Ave., Phoenix, AZ 85027
California	
Aliso Viejo	G. G Industies, PO Box 8065, Laguna Hills, CA 92654
Auburn	Mason Holodyne, 90 Pinecrest Dr., Applegate, CA 95703
Barstow	Roy's Gun and Lock, address not available
Barstow	Mojave Pyrotechnic, address not available
China Lake	Naval Air Warfare Center, 671 Nimitz, China Lake, CA 93555
Edwards AFB	Edwards AFB, CA 93523
Gardena	T.O.P.T.H., 2848 E. 208th St., Long Beach CA 90810

Calif. cont.	
Hollister	Quantic Industries, 990 Commercial St., San Carlos, CA 94070
Hollister	FMC, 900 John Smith Rd., Hollister, CA 95023
Hollister	(formerly Holex) Whittaker Ordnance, PO Box 148, Hollister, CA 95024
Huntington Beach	Milco International, address not available
Ione	M. P. Associates, PO Box 546, IOne CA 95640
Llano	Odee Mfg. Co., adress not available
Long Beach	T.O.P.T.H., 2848 E. 208th St., Long Beach CA 90810
Middletown	Reynolds Systems, FMC, PO Box 367, San Jose, CA 95103
Morgan Hill	Olin Corporation, PO Box 727, Morgan Hill, CA 95037
Nimbus	Aerojet Propulsion Division (Gentech), PO Box 1322, Sacramento, CA 95813
Norwalk	Trojan Fireworks, PO Box 2329, Rialto, CA 92376
Ontario	Dynamic Propellant, 4748 Mission Blvd. #D., Ontario, CA 91762
Pasadena	Jet Propulsion Lab, 4800 Oak Grove Dr., Pasadena, CA 91109
Pomona	U. S. Rocket, PO Box 1242, Claremont, CA 91711
Redwood City	Mason Holodyne, 90 Pinecrest Dr., Applegate, CA 95703
Rialto	Astro Pyrotechnics (formerly Trojan Fireworks), PO Box 2329, Rialto CA 92376
Riverside	McKesson Chemical Co., 689 Iowa, Riverside CA 92507
Riverside	Universal Propulsion, 25401 N. Central Ave., Phoenix, AZ 85027
San Jose	Pratt & Whitney (formerly UTC), PO Box 49208, San Jose, CA 95161-9028
Saugus	Hi Shear Industries, 2830 W. Lomita Blvd., Torrance CA 90505
Saugus	Bermite Div., Whittaker Corp., 22116 W. Soledad Canyon Rd., Saugus, CA 91350
Tracy	Lawrence Livermore, U of CA National Lab, PO Box 5001, Livermore, CA 94551
Whittier	Whittier Checmial Co., address not available
Windsor	Starflight Systems, 7714 Bell Rd., Windsor, CA 95492

Colorado	
Englewood	Gateway Safety Products, address n/a
Penrose	Estes Industries, PO Box 227, Penrose, CO 81240
Whitewater	KSI Inc., 1471 Blair Rd. Whitewater, CO 81527
Colo. Springs	Vulcan Systems, PO Box 6099, Colorado Springs, CO 80934
Florida	
Brooksville	Thermex Energy, 13601 Preston Rd., Suite 900 West, Dallas, Tx 75240
Hollywood	CCT, address n/a
Eglin	Eglin AFB, Eglin, FL 32542
Georgia	
Byron	ICI Americas (formerly Pyrotechnic Specialties), PO Box 819, Valley Forge, PA 19482
Idaho	
Pocatello	Firefox Enterprises, 11612 North Nelson Lane, Pocatello, Idaho 83202
Illinois	
Marion	Olin Corp., PO Box 278, Marion IL 62959
Chicago	Harold Dunbar Paper Co., address n/a
South Beloit	Lakeside Fusee, address n/a
Danville	World Fireworks, address n/a
Danville	Star Fireworks, address n/a
Edwardsville	Propellex, PO Box 387, Edwardsville, IL 62025
Joliet	Talley Defence Systems, PO Box 849, Mesa, AZ 85211
Indiana	
Peru	Olin Corp., RR 6 Box 542, Peru, IN 46970
Kingsbury	Melrose Fireworks, PO Box 302, Kingsbury, In 46345
Kingsbury	Aerial Dynamics, PO Box 304, Kingsbury, IND 46345
Kingsbury	Kingsbury Industries, address n/a
Kansas	
Hallowell	Thermex (formerly Gulf Oil), 13601 Preston Rd., Suite 900 W., Dallas TX 75240
Hallowell	Slurry Explosives (formerly El Dorado), PO Box 348, Columbus, KS 66725

Kansas cont.	
Herrington	Hodgdon Powder/ Pyrodex Corp., address n/a
Louisiana	
New Orleans	Bartlett Chemicals, address n/a
Michigan	
Ishpeming	Ireco Inc., 11th Floor Crossroads Tower, Salt Lake City, U 84144
Mississippi	
Foxsworth	Rebel Fireworks, Inc., address not available
Maryland	
Indian Head	Naval Surface Warfare Center, 202 Strauss Ave., Indian Head, MD 20640
Elkton	Thiokol Corp., PO Box 241, Elkton, MD 21922
Elkton	New Jersey Fireworks, Mfg., address n/a
Cumberland	Alliant Tech (formerly Hercules, Inc.), current address W. Va.
Easton	Samuel Jackson Fusee Co., address n/a
Silver Springs	Naval Surface Warfare Center, 10901 New Hampshire Ave., Silver Springs, MD 20903
Minnesota	
Biwabik	Thermex Energy, 13601 Preston Rd., Suite 900 W., Dallas, TX 75240
Biwabik	Nitrochem Energy Corp., PO Box B, Biwabik, Minn 55708
Gilbert	Cook Slurry, Cook Associates, 2026 Beneficial Life Tower, 3650 State St., SLC, Utah 84111
Foley	Aerial Arts, 18355 165th St NE, Foley, Minn 56329
Missouri	
Joplin	Atlas Powder, PO Box 87, Joplin, MO 64801
Joplin	ICI, PO Box 819, Valley Forge, PA 19482
Atlas	Atlas Powder, PO Box 87, Joplin, MO 64801
New Jersey	
Newfield	Shieldalloy Corp., 12 West Blvd., PO Box 768, Newfield, NJ 08344-0768
South Plainfield	Hummel Croton, Inc., PO Box 250, So. Plainfield, NJ 07080
Boonton	Standard RWY Fusee Co., address n/a

New Jersey cont.	
Orange	H. Reisman Corp., 377 Crane St., Orange, NY 07051
Newark	Fairmount Chemical, address n/a
Nevada	
Sparks	Hi Shear Industries, 2830 W. Lomita Blvd., Torrance CA 90505
Las Vegas	Aerotech/ISP, 1955 S. Palm, Suite 5, Las Vegas, NV 89104
Lockwood	Largo Marsino, Defense Supply, 204 Edison Way, Reno, NV 89502
Fernley	BOKMA Resources, PO Box 590, Fernely, NV 89408
New Mexico	
Roswell	Longhorn Mfg. Co., address not available
New York	
Brooklyn	Witco Chemical Corp., 700 Court St., Brooklyn, NY 11231
Delanson	Fireworks by Grucci, One Grucci Lane, Brookhaven, NY 11719
North Carolina	
McCleansville	Gulf Oil, Po Box 183, McCleansville, NC 27301
Riegelwood	Wright Chemical, Atlas Powder, PO Box 271, Tamaqua, PA 18252
North Dakota	
Fargo	Starr Display Fireworks, PO Box 9574, Fargo, ND 58106
Kindred	Dakota Pyrotechnic, 16250 57th S. E., Kindred, ND 58051
Harwood	Starr Display Fireworks, PO Box 9574, Fargo, ND 58106
Ohio	
Columbus	G. F. Smith Chemicals, PO Box 245, Powell, Ohio 43065
Cincinnati	Fanaco Inc., address n/a
Steubenville	Barium & Chemicals, address n/a
Fostoria	Standard RWY Fusee Co., address n/a
Marietta	Servo Dynamics, see Corpus Christi address
Lisbon	Hilltop Energy Inc., An/Gel International, 33 C. St., Salt Lake City, U 84103

Pennsylvania	
Hatfield	Aerial Arts, 18355 165st NE, Foley, Minn. 56329
Telford	Service Checmial Inc., address n/a
Tamaqua	Atlas Powder Co., PO Box 271, Tamaqua, PA 18252
Mt. Carmel	Explo-Tech, Inc., An/Gel Int., 33 C. St., SLC, U 84103
Kittanning	KESCO Inc., PO Box 95, Adrian, Pa 16210-0095
South Carolina	
Columbia	Phillips Components, 6071 St. Andrews Rd., Columbia, SC 29212
Tennessee	
Toone	Kilgore Corp., Kilgore Drive, Toone, TN 38381
Louisville	Southwestern Energy, An/Gel International, 33 C. St., SLC, U 84103
Texas	
Kamack	Thiokol Corp. Plant closed--see address for Utah division
Corpus Christi	Servo Dynamics, Inc., Rt. 1, Box 132 E. Roddfield, Corpus Christi, TX 78414
McGregor	Alliant Tech (formerly Hercules, Inc.) Plant closed--see address for Utah division
Kennedale	Harrison Jet Guns, 6915 Hudson Village Creek Rd., Kennedale, TX 76060
Mansfield	Shaped Charge Specialties, address not available
Marshall	RTF Enterprises, address n/a
Rosharon	Slumberger, PO Box 1590, Rosharon, TX 77583
Houston	Thermex (formerly Gulf), 13601 Preston Rd., Suite 900 West, Dallas, TX 75240
Waco	M & M Chemical, 103 Stovall, Waco TX 76706
Utah	
Magna	Alliant Tech, PO Box 98, Magna UT 84044
Brigham City	Thiokol Corporation, PO Box 707, Brigham City, UT 84302
Logan	Fireworks West, address n/a
Lehi	Dyno Nobel (formerly Ireco), 11th Floor, Crossroads Tower, Salt Lake City, UT 84144
Lehi	Western States Energy, Atlas Powder, 15301 Dallas Parkway, Suite 1200, Dallas, TX 75248

Utah cont.	
Ogden	Defense General Supply, 8000 Jefferson Davis Hwy, Richmond, VA 23297
Ogden	A & B Chemical Co., 2931 Second Ave., Suite 100, Richmond, VA 23222
Utah County	Dyno Nobel, formerly Cook Associates, 2026 Beneficial Life Tower, Salt Lake City, UT 8411
Salt Lake City	Hanex Products, 466 W. 200 South, Salt Lake City, UT 84101
Virgina	
Richmond	2931 Second Ave., Richmond VA 23222
Gainesville	Atlantic Research, 5945 Wellington Rd., Gainesville, VA 22065
Pepper	Hercules, Inc. (see Alliant Tech Utah address)
Yorktown	Defense General Supply, 8000 Jefferson Davis Hwy, Richmond, VA 23297
Duffield	Paige Ireco (formerly Gibson Explosives), PO Box 33, Duffield, VA 24244
Washington	
Olympia	Ireco Inc. (formerly Pacific Powder), 628 Columbia NW, Suite 1-A, Olympia, WA 98501
West Virginia	
Rocket Center	Alliant Techsystems, 210 Star Route 956, Rocket Center, WV 26725
Newell	Newell Specialties, State Route 2, Newell, WV 26050
Romney	Appalachian Explosives, An/Gel Int., 33 C St., Salt Lake City, UT 84103
Wisconsin	
Delafield	Bartolottas Fireworks, PO Box 5, Genesee Depot, WI 53127
Wyoming	
Mills	Thermex (formerly Gulf), 13601 Preston Rd., Suite 900 West, Dallas, TX 75240

Apr. 15, 1998
Susan Crowley, Pat Corbett
Tom Reed, Kim Zikmund, Brenda P., Doug Z.

- Have found channel north of Pittman Lateral - ClO_4^- conc. is 540ppm in channel.

- Tom is going to focus efforts on area south of Sunset Rd.
- Tom wants to put 4 inch well in channel and do pump test. Wants to put water from pump test into ground. Feels it would just flow into dry wash. Would like to do 24 hr pump test but may be able to do it in 6 hours. Looks like drainage may go through CAH treatment plant ponds + discharge into old pond system. Doug will look into getting a temp. discharge permit for the pump test.

- Drilled wells behind Whats up Bar - 8ppm.
- Want to install 4 inch well by first week of May - want to conduct pump test in May. May ever need 6 inch well.

- Will be using 2 drill rigs last week of April.

LAS
A Subsidiary of SPL Laboratories

LAS LABORATORIES, INC.
975 Kelly Johnson Drive
Las Vegas, NV 89119
(702) 361-0220
(702) 361-6434 Fax

FAX TRANSMITTAL

B/A8187
CAT.04

NO OF PAGES: 6

DATE: 4/15/98

TO: Bob Kelso

FAX NO: 702 687-6396

PHONE NO. 687.4670. EX 3020

FROM: NORMA DORN

FAX NO: (702) 361-6434

PHONE NO: (702) 361-0220 x203

MEMO: Invoice attached
Plz provide
status of payment
left msg @ 0930 4/16/98

per Kendall 4/15/98
OFM records show invoices paid
send out PR payment
2 wks worst case??

INVOICE

ADDRESS INQUIRIES TO:

LAS Laboratories Inc.
975 KELLY JOHNSON DRIVE
LAS VEGAS, NV 89119
PHONE: (702) 361-0220
FAX: (702) 361-8146

BILL TO:

Nevada Division of Environmental Protect
Attn: Ms. Brenda Pohlmann
555 E. Washington Suite 4300
Las Vegas, NV 89101

INVOICE NO.	INVOICE DATE	PAGE
11359	19-NOV-97	1

LAS JOB NO.	LAS QUOTE NO.
L10992	Q731128

CLIENT CONTRACT NO.	LAS PROJECT NO. - PROJECT DESCRIPTION	REPORT SHIP	SALES REP.
	NV - PERCHLORATE - Perchlorate Analysis	13-NOV-97	

LAS ACCOUNT NO.	CLIENT PURCHASE ORDER NO. / WORK AUTH. NO	RECEIVE DATE	SHIP VIA	TERMS
99		07-NOV-97	FEDX	Net 30 days

ITEM	METHOD CODE	METHOD DESCRIPTION	MATRIX	QUANTITY	UNIT PRICE	EXTENDED
1	DAVIS	CSR - Jenny Davis	Water	1	$ 0.00	$ 0.00
2	INORG TYPE 2 RPT	Inorganic Report Package Type	Water	1	$ 0.00	$ 0.00
3	PERCHLORATE BY IC	Detn. of perchlorate by ion chrom.	Water	1	$ 45.00	$ 45.00

REMIT TO:

LAS Laboratories Inc.
P.O. BOX 200541
HOUSTON, TX 77216-0541

PAY THIS AMOUNT $ 45.00

DRAFT COPY

INVOICE

ADDRESS INQUIRIES TO:

LAS Laboratories Inc.
975 KELLY JOHNSON DRIVE
LAS VEGAS, NV 89119
PHONE: (702) 361-0220
FAX: (702) 361-8146

BILL TO:

Nevada Division of Environmental Protect
Attn: Ms. Brenda Pohlmann
555 E. Washington Suite 4300
Las Vegas, NV 89101

INVOICE NO.	INVOICE DATE	PAGE
11416	01-DEC-97	1

LAS JOB NO.	LAS QUOTE NO.
L21055	Q731128

CLIENT CONTRACT NO.	LAS PROJECT NO. - PROJECT DESCRIPTION	REPORT SHIP	SALES REP.
	NV - PERCHLORATE - Perchlorate Analysis	21-NOV-97	

LAS ACCOUNT NO.	CLIENT PURCHASE ORDER NO. / WORK AUTH. NO	RECEIVE DATE	SHIP VIA	TERMS
299		14-NOV-97	FEDX	Net 30 days

ITEM	METHOD CODE	METHOD DESCRIPTION	MATRIX	QUANTITY	UNIT PRICE	EXTENDED
1	120.1 CONDUCTIVITY	Specific Conductance	Water	1	$ 10.00	$ 10.00
2	DAVIS	CSR = Jenny Davis	Water	1	$ 0.00	$ 0.00
3	INORG TYPE 2 RPT	Inorganic Report Package Type	Water	1	$ 0.00	$ 0.00
4	PERCHLORATE BY IC	Detn. of perchlorate by ion chrom.	Water	1	$ 45.00	$ 45.00
	PRODUCT TOTAL ***					$ 55.00
	SURCHARGE	25% SURCHARGE FOR 5 DAY TAT	Water	1	$ 13.75	$ 13.75

REMIT TO:

LAS Laboratories Inc.
P.O. BOX 200541
HOUSTON, TX 77216-0541

PAY THIS AMOUNT $ 68.75

DRAFT COPY

INVOICE

ADDRESS INQUIRIES TO:

LAS Laboratories Inc.
975 KELLY JOHNSON DRIVE
LAS VEGAS, NV 89119
PHONE: (702) 361-0220
FAX: (702) 361-8146

BILL TO:

Nevada Division of Environmental Protect
Attn: Ms. Brenda Pohlmann
555 E. Washington Suite 4300
Las Vegas, NV 89101

INVOICE NO.	INVOICE DATE	PAGE
11416	01-DEC-97	2

LAS JOB NO.	LAS QUOTE NO.
L11055	Q731128

CLIENT CONTRACT NO.	LAS PROJECT NO. - PROJECT DESCRIPTION	REPORT SHIP	SALES REP.
	NV - PERCHLORATE - Perchlorate Analysis	21-NOV-97	

LAS ACCOUNT NO.	CLIENT PURCHASE ORDER NO. / WORK AUTH. NO	RECEIVE DATE	SHIP VIA	TERMS
199		14-NOV-97	FEDX	Net 30 days

ITEM	METHOD CODE	METHOD DESCRIPTION	MATRIX	QUANTITY	UNIT PRICE	EXTENDED

REMIT TO:

LAS Laboratories Inc.
P.O. BOX 200541
HOUSTON, TX 77216-0541

PAY THIS AMOUNT $ 68.75

DRAFT COPY

INVOICE

ADDRESS INQUIRIES TO:

LAS Laboratories Inc.
975 KELLY JOHNSON DRIVE
LAS VEGAS, NV 89119
PHONE: (702) 361-0220
FAX: (702) 361-8166

BILL TO:

Nevada Division of Environmental Protect
Attn: Ms. Brenda Pohlmann
555 E. Washington Suite 4300
Las Vegas, NV 89101

INVOICE NO.	INVOICE DATE	PAGE
11433	01-DEC-97	1

LAS JOB NO.	LAS QUOTE NO.
L11101	Q731128

CLIENT CONTRACT NO.	LAS PROJECT NO. - PROJECT DESCRIPTION	REPORT SHIP	SALES REP.
	NV - PERCHLORATE - Perchlorate Analysis	26-NOV-97	

LAS ACCOUNT NO.	CLIENT PURCHASE ORDER NO. / WORK AUTH. NO	RECEIVE DATE	SHIP VIA	TERMS
:99		21-NOV-97	FEDX	Net 30 days

ITEM	METHOD CODE	METHOD DESCRIPTION	MATRIX	QUANTITY	UNIT PRICE	EXTENDED
1	120.1 CONDUCTIVITY	Specific Conductance	Water	1	$ 10.00	$ 10.00
2	INORG TYPE 2 RPT	Inorganic Report Package Type	Water	1	$ 0.00	$ 0.00
3	KLAINER	CSR = Matt Klainer	Water	1	$ 0.00	$ 0.00
4	PERCHLORATE BY IC	Detn. of perchlorate by ion chrom.	Water	1	$ 45.00	$ 45.00
	PRODUCT TOTAL ***					$ 55.00
	SURCHARGE	5 DAY TAT SURCHARG	1.5%	1	$ 27.50	$ 27.50

REMIT TO:

LAS Laboratories Inc.
P.O. BOX 200541
HOUSTON, TX 77216-0541

PAY THIS AMOUNT $ 82.50

DRAFT COPY

INVOICE

ADDRESS INQUIRIES TO:

LAS Laboratories Inc.
975 KELLY JOHNSON DRIVE
LAS VEGAS, NV 89119
PHONE: (702) 361-0220
FAX: (702) 361-8146

BILL TO:

Nevada Division of Environmental Protect
Attn: Ms. Brenda Pohlmann
555 E. Washington Suite 4300
Las Vegas, NV 89101

INVOICE NO.	INVOICE DATE	PAGE
11433	01-DEC-97	2

LAS JOB NO.	LAS QUOTE NO.
L11101	Q731128

CLIENT CONTRACT NO.	LAS PROJECT NO. - PROJECT DESCRIPTION	REPORT SHIP	SALES REP.
	NV - PERCHLORATE - Perchlorate Analysis	26-NOV-97	

LAS ACCOUNT NO.	CLIENT PURCHASE ORDER NO. / WORK AUTH. NO	RECEIVE DATE	SHIP VIA	TERMS
99		21-NOV-97	FEDX	Net 30 days

TEM	METHOD CODE	METHOD DESCRIPTION	MATRIX	QUANTITY	UNIT PRICE	EXTENDED

REMIT TO:

LAS Laboratories Inc.
P.O. BOX 200541
HOUSTON, TX 77216-0541

PAY THIS AMOUNT $ 82.50

DRAFT COPY

LAS A Subsidiary of SPL Laboratories

LAS LABORATORIES, INC.
975 Kelly Johnson Drive
Las Vegas, NV 89119
(702) 361-0220
(702) 361-6434 Fax

FAX TRANSMITTAL

NO OF PAGES: 6

DATE: 4/15/98

TO: Bob Kelso

FAX NO: 702 687-6396

PHONE NO. 687-4670. EX 3020

FROM: NORMA DORN

FAX NO: (702) 361-6434

PHONE NO: (702) 361-0220 x203

11369 19 Nov
11416 1 Dec
11433 1 Dec

MEMO: Invoice attached
Plz provide
status of payment

LICENSED:
NEVADA, CALIFORNIA,
DISTRICT OF COLUMBIA

FRED D. GIBSON III
ATTORNEY AT LAW
A PROFESSIONAL CORPORATION

SUITE 300
3770 HOWARD HUGHES PARKWAY
LAS VEGAS, NEVADA 89109

TELEPHONE: (702) 735-2200
TELEFAX: (702) 242-5024

April 14, 1998

Mr. John Kemmerer
Chief, Superfund Site Cleanup Branch
Region IX
United States Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105-3801

HAND DELIVERED

Dear Mr. Kemmerer,

Please consider this letter and the companion letter in which a claim for confidentiality of certain information has been made to be a response to your letter dated March 11, 1998, and received by American Pacific Corporation (the "Company") on March 16, 1998.

The Company has provided me with its answers and has done its best to be responsive and timely in its response. Please take special note that the series of explosions and fire the Company experienced on May 4, 1988, at its Henderson, Nevada production facility destroyed most of the Company's business records. Consequently, the historical information presented from December 1958 through May 1988 has been prepared and based upon all available documentation.

The Company's records reflecting its Cedar City, Utah business activity are complete and the Company's responses to questions pertaining to that activity are fully documented. The Company and I also request that we have the opportunity to supplement these responses or answer any questions if you believe such assistance would be helpful.

Respectfully submitted,

Fred D. Gibson III
For American Pacific Corporation

INFORMATION REQUEST - RESPONSES

Questions Concerning the former PEPCON Facility in Henderson, NV

1) What year did production of perchlorate-containing chemicals begin?

Response: December, 1958.

2) What entities have owned and/or operated the plant? Please provide the dates when ownership or operating control changed.

Response: Pacific Engineering and Production Co. of Nevada, PEPCON. In 1982 PEPCON was merged with American Pacific Corporation.

3) Which specific perchlorate-containing compounds were manufactured?

Response: Ammonium Perchlorate, Sodium Perchlorate.

4) What was the total annual production of perchlorate-containing compounds at the plant in Henderson, Nevada? What was the annual production of each specific perchlorate containing compound?

Response: See Attachment A.

5) What were the end uses of the perchlorate-containing compounds (solid rocket fuel, pyrotechnics)?

Response: Oxidizer component in solid rocket fuel. Component in explosive.

6) What was the approximate percentage of production sold for each of the end uses?

Response: 99% Oxidizer. 1% Explosive component.

7) Please provide the name and address of each entity to whom perchlorate-containing compounds were shipped each year from the former PEPCON facility. (more than 500 pounds in any year)

Response: See Attachment B.

Questions Concerning Other American Pacific Production Facilities and Other Producers

8) Please identify the locations of other perchlorate-containing chemical production facilities in the United States that are owned, operated or previously owned or operated by American Pacific including the WECCO plant in Cedar City, Utah.

Response: PEPCON, Henderson, Nevada - 1959 - 1988.
WECCO, Cedar City, Utah - 1989 - Present.

9) Please provide answers to the above questions (1 through 7) for any other American Pacific facilities producing or previously producing perchlorate-containing compounds.

Response: As Follows.

Questions Concerning the WECCO Facility in Cedar City, Utah

(1) What year did production of perchlorate-containing chemicals begin?

Response: 1989.

(2) What entities have owned and/or operated the plant? Please provide the dates when ownership or operating control changed.

Response: WECCO is a wholly owned subsidiary of American Pacific Corporation.

(3) Which specific perchlorate-containing compounds were/are manufactured?

Response: Ammonium Perchlorate. Sodium Perchlorate Solution. Anhydrous Sodium Perchlorate. Potassium Perchlorate.

(4) What was the total annual production of perchlorate-containing compounds at the plant in Cedar City, Utah? What was the annual production of each specific perchlorate containing compound?

Response: See Attachment C.

(5) What were the end uses of the perchlorate-containing compounds (solid rocket fuel, pyrotechnics etc.)?

Response: Oxidizer in solid rocket fuel. Component in explosive. Pyrotechnic. Air bag inflator component. Curing agent.

(6) What was the approximate percentage of production sold for each of end uses?

Response: Oxidizer - 92%
Explosive - 7%
Other - 1%

(7) Please provide the name and address of each entity to whom perchlorate-containing compounds were shipped each year from the WECCO facility. (more than 500 pounds in any year)

Response: See Attachment D.

10) EPA has been informed that production of perchlorate-containing compounds in the US is limited to WECCO in Cedar City, Utah (formerly the PEPCON facility in Henderson, Nevada) and Kerr-McGee. Please confirm, to the best of your knowledge, whether this information is accurate. If you do have knowledge of perchlorate-containing compound production plants in the US other than those owned or operated by American Pacific or Kerr-McGee, please provide the names, locations and years of operation, if known.

Response: GFS, George Frederick Smith, Columbus, Ohio since 1928. Perchlorates and perchloric acid. Mailing Address: P.O. Box 245, Powell, OH 43065.

Internet:

http://www2.thomasregister.com/ss/.409911604/olc/gfschem/gfscat.htm and page /ss/.1223160775/olc/gfschem/gfshist.htm (perchlorates are found on these pages)

ATTACHMENT A

Question 4: What was the total annual production of perchlorate-containing compounds at the plant in Henderson, Nevada? What was the annual production of each specific perchlorate containing compound?

Response: The business records of American Pacific were destroyed as a result of the fire and explosions which occurred May 4, 1988. Based on information available the production of perchlorate products has been reconstructed. For years when the data is less certain the production is estimated and is identified with the letter "e." Nevertheless, we believe that for the purpose of responding to this question the following table is responsive.

Fiscal Year	Perchlorates (lbs.)*	
	Ammonium	Sodium
1959	1,214,000	---
1960	2,500,000e	---
1961	3,900,000e	---
1962	8,275,000	---
1963	15,306,000	---
1964	11,780,000	---
1965	3,795,000	---
1966	6,095,000	---
1967	3,450,000	---
1968	2,070,000	---
1969	5,427,000	---
1970	4,256,000	---
1971	10,768,000	---
1972	11,730,000	---
1973	8,855,000	---
1974	6,900,000	---
1975	4,370,000	---
1976	3,565,000	---
1977	3,910,000	---
1978	3,816,000	---
1979	5,000,000e	---
1980	5,154,000e	---
1981	8,571,000e	---
1982	13,333,000e	---
1983	13,551,000e	---
1984	13,736,000e	---
1985	14,600,000	---
1986	13,981,000e	56,000e
1987	14,344,000e	112,000e
1988	9,649,000e	56,000e

*Data are rounded to the nearest thousand pounds.

ATTACHMENT B

Question (7): Please provide the name and address of each entity to whom perchlorate-containing compounds were shipped each year from the former PEPCON facility. (more than 500 pounds in any year)

Response: The records were destroyed in 1988. Therefore, the list has been reconstructed based on the best information available. The list identifies customers over periods of greater than one year. This list combined with the list in response to the same question for the WECCO facility is believed to be sufficient.

Year	Customer
1959 - 1965	Aerojet General - Highway 50 and Hazel Avenue, Rancho Cordova, CA 95670 Thiokol - Hwy 83 Bldg M-3 Receiving, Thiokol, Utah 84302
1964 - 1988	UTC - 600 Metcalf Road, San Jose, CA 95318 Thiokol - as above.
1985 - 1988	UTC - as above. Thiokol - as above. ARC - Highland Industrial Park, East Camdenm AR 71701
1986 - 1988	Brazil Europe

Printed 3/30/98

Perchlorate Shipments

For Customers Exceeding 500 Pounds in Any Fiscal Year
Fiscal Year Ending September 30, 1989 to 1998

Customer	Address
Fiscal Year Ending September 30, 1989:	
ARC	Highland Industrial Park, East Camden AR 71701
Thiokol Corporation	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302
UTC	600 Metcalf Road, San Jose CA 95138
Fiscal Year Ending September 30, 1990:	
Aerojet	Highway 50 and Hazel Avenue Rancho Cordova, CA 95670
ARC	Highland Industrial Park, East Camden AR 71701
Failure Analysis	1850 Finnacle Peak Road, Pheonix, AZ 85027
Hercules	Niro Plant, 7900 West 4100 South, West Valley City, UT 84120
Thiokol-Space	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302
UTC	600 Metcalf Road, San Jose CA 95138
Fiscal Year Ending September 30, 1991:	
Aerojet	Highway 50 and Hazel Avenue Rancho Cordova, CA 95670

ATTACHMENT D

Perchlorate Shipments

For Customers Exceeding 500 Pounds in Any Fiscal Year
Fiscal Year Ending September 30, 1989 to 1998

Customer	Address
Thiokol-Space	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302
Thiokol-Strategic	Bldg M3 Receiving Hwy 83, Brigham City UT 84302
Thiokol-Strategic	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302
Thiokol-Tactical	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302

Fiscal Year Ending September 30, 1992:

Aerojet	Highway 50 and Hazel Avenue Rancho Cordova, CA 95670

ATTACHMENT D

Thiokol-Space	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302
UTC	600 Metcalf Road, San Jose CA 95138

Fiscal Year Ending September 30, 1993:

Aerojet	Highway 50 and Hazel Avenue Rancho Cordova, CA 95670
ARC	Highland Industrial Park, East Camden AR 71701

Perchlorate Shipments

For Customers Exceeding 500 Pounds in Any Fiscal Year
Fiscal Year Ending September 30, 1989 to 1998

Customer	Address
Hercules	Bldg 55 Baccus Works, Magna UT 84044
Thiokol-Space	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302
UTC	600 Metcalf Road, San Jose CA 95138
Fiscal Year Ending September 30, 1994:	
Aerojet	Highway 50 and Hazel Avenue Rancho Cordova, CA 95670
ARC	Highland Industrial Park, East Camden AR 71701
Thiokol-Space	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302
UTC	600 Metcalf Road, San Jose CA 95138

ATTACHMENT D

Perchlorate Shipments

For Customers Exceeding 500 Pounds in Any Fiscal Year
Fiscal Year Ending September 30, 1989 to 1998

Customer	Address
Fiscal Year Ending September 30, 1995:	
Aerojet	Highway 50 and Hazel Avenue Rancho Cordova, CA 95670
Alliant TechSystems	Niro Plant, 7900 West 4100 South, West Valley City, UT 84120
ARC	Highland Industrial Park, East Camden AR 71701
Thiokol-Space	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302
Fiscal Year Ending September 30, 1996:	
Aerojet	Highway 50, and Hazel Ave, Rancho Cordova CA 95670
Alliant TechSystems	Niro Plant, 7900 West 4100 South, West Valley City, UT 84120
ARC	Highland Industrial Park, East Camden AR 71701

ATTACHMENT D

Perchlorate Shipments

For Customers Exceeding 500 Pounds in Any Fiscal Year
Fiscal Year Ending September 30, 1989 to 1998

Customer	Address
Thiokol-Space	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302

Fiscal Year Ending September 30, 1997:

Alliant TechSystems	Niro Plant, 7900 West 4100 South, West Valley City, UT 84120
ARC	Highland Industrial Park, East Camden AR 71701
Thiokol-DLV	Bldg M-345 Receiving, Brigham City, UT 84302-0689
Thiokol-Elkton	55 Thiokol Road, Elkton, MD 21921
Thiokol-Space	Hwy 83 Bldg M-3 Receiving Thiokol UT 84302

ATTACHMENT D

Printed 3/30/98

Perchlorate Shipments

For Customers Exceeding 500 Pounds in Any Fiscal Year
Fiscal Year Ending September 30, 1989 to 1998

Customer	Address
Fiscal Year Ending September 30, 1998:	
Aerojet	Highway 50 and Hazel Avenue, Gate 1 Rancho Cordova, CA 95670
Alliant TechSystems	Niro Plant, 7900 West 4100 South, West Valley City, UT 84120
ARC	Highland Industrial Park, East Camden AR 71701
Thiokol-Elkton	55 Thiokol Road Elkton, MD 21921
Thiokol Space	Building M-345 Receiving Brigham City, UT 84302-0689

ATTACHMENT D

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

April 13,1998

Mr. Robert Kelso
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89710

Dear Mr. Kelso:

Subject: KMCC Environmental Conditions Investigation Quarterly Report

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

Activities Conducted 01/01/98 to 03/31/98

There were no activities.

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

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

cc: ALDooley
PSCorbett
PBDizikes
RHJones
HISSC Technical Subcommittee
HISSC Legal Subcommittee
RANapier
TWReed
RSimon (ENSR)
JTSmith (Covington & Burling)
Doug Zimmerman (NDEP)

SMC\QUARTERLY (04-98) PROGRESS REPORT TO KELSO.DOC

KMCC/PMCW.

PETER G. MORROS, Director
L.H. DODGION, *Administrator*
(702) 687-4670
TDD 687-4678
Administration
Mining Regulation and Reclamation
Water Pollution Control
Facsimile 687-5856

STATE OF NEVADA
BOB MILLER
Governor

Waste Management
Corrective Actions
Federal Facilities
Air Quality
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 89706-0851

March 30, 1998

Ms. Susan Crowley
Kerr McGee Chemical Corporation
8000 West Lake Mead Drive
Henderson, NV 89015

RE: Cost Reimbursement for Perchlorate Activities

Dear Ms. Crowley:

This letter is a follow-up to our recent discussions, regarding reimbursement of Division oversight costs for perchlorate and the ongoing activities covered under the existing consent agreement. We plan on discussing this issue with representatives of American Pacific Corporation (AMC) in the near future.

The Division is proposing to remove all IT Corporation charges that are specific to perchlorate activities and bill these equally between Kerr McGee Corporation (KMC) and American Pacific Corporation upon establishment of the new consent agreements on perchlorate. With respect to Division personnel costs for the first three quarters of FY98 (7/1/97 - 3/27/98), these costs will initially be paid by KMC under the existing consent agreement. The costs associated with oversight for ongoing KMC activities will be deducted and the balance will be split equally between KMC and AMC. The exact mechanism for reimbursement to KMC of AMC's portion has not been determined at this time. Preferably, this would occur directly between KMC and AMC.

All perchlorate charges after 3/27/98 will be charged to two new budget divisions

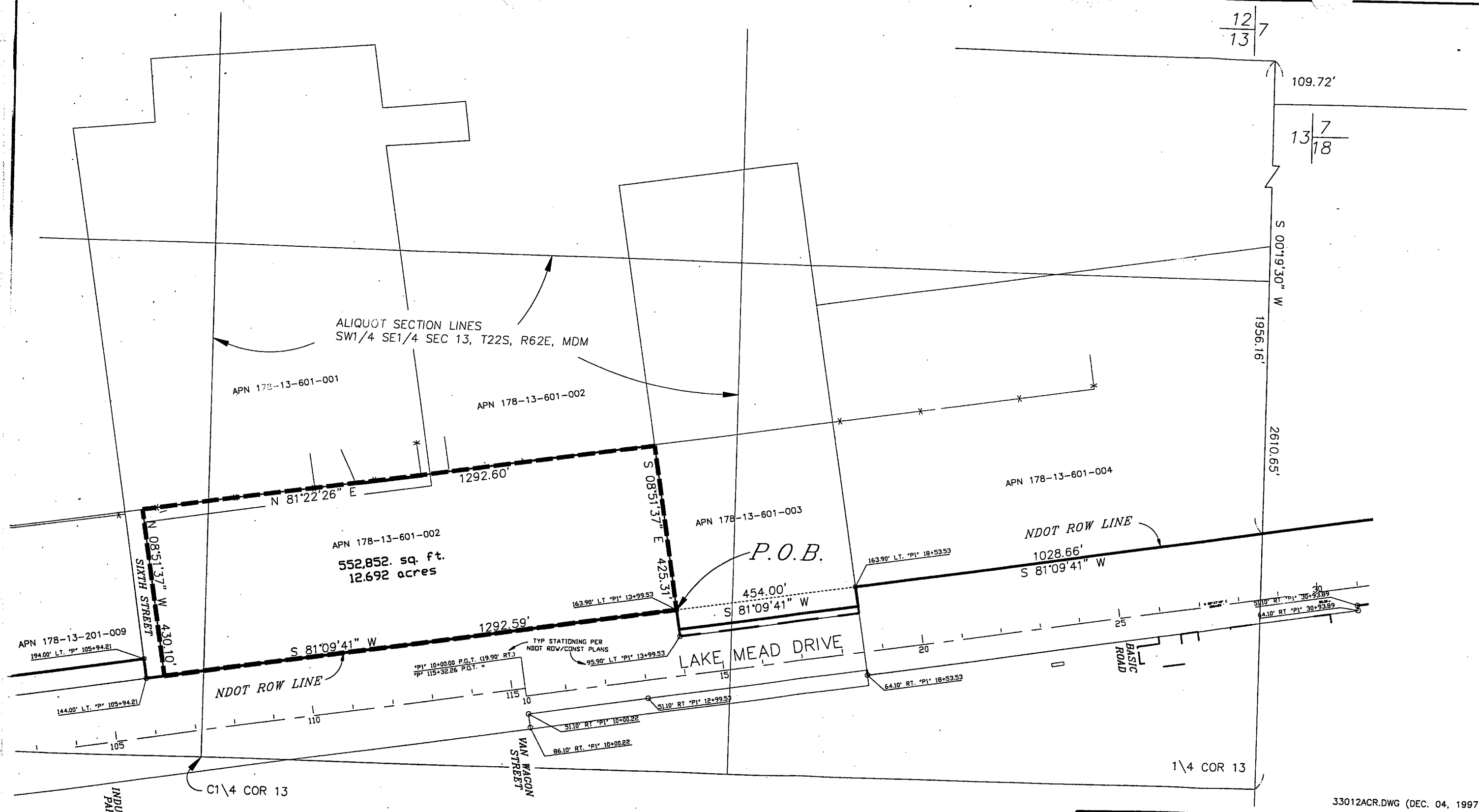
which will separate KMC and AMC activities as well as separating KMC perchlorate activities from all other BMI work.

Your written concurrence, as soon as possible, with this process would be greatly appreciated. Please contact me if you have any questions on this matter.

Sincerely,

Doug Zimmerman
Chief
Bureau of Corrective Actions

cc: John Gibson
Bob Kelso
Brenda Pohlmann
Tammy Meyer



33012ACR.DWG (DEC. 04, 1997)

GENERAL NOTE: THE INFORMATION SHOWN HEREON WAS COMPILED FROM RECORDED DOCUMENTS AND NDOT ROW MAPS.

POST, BUCKLEY, SCHUH & JERNIGAN
901 North Green Valley Parkway
Suite 100
Henderson, Nevada 89014
Telephone: 702/263-7275
Fax: 702/263-7200

ENGINEERING • PLANNING • SURVEYING • CONSTRUCTION SERVICES

51330	DRAWN BFK Sr	DATE 12/04/97	
1 OF 1	CHECKED CDK	SCALE 1"=240'	

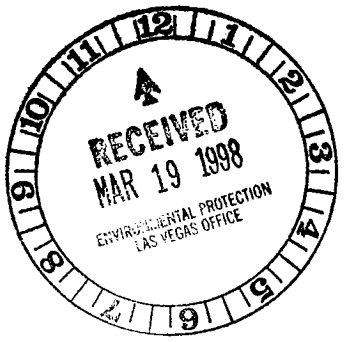
JOB NO.

SHEET NO.

BLACK MTN IND PARK
VICTORY VALLEY LAND
12.69 ACRE SITE

KERR-McGEE CHEMICAL CORPORATION
POST OFFICE BOX 55 • HENDERSON, NEVADA 89009

March 17, 1998



Ms. Brenda Pohlmann
Remediation Branch Supervisor
Nevada Division of Environmental Protection
555 E. Washington, Suite 4300
Las Vegas, NV 89101

Dear Ms. Pohlman:

Subject: Perchlorate Monthly Activity Status

Following is the current status of Kerr-McGee Chemical LLC's activities regarding the perchlorate issue:

- KMC LLC prepared a Historical Information Report related to off-site subsurface geological characterization and submitted this for NDEP review and approval January 16, 1998. This review included a Sampling Plan describing additional field activities necessary to fully characterize the area between the KMC LLC facility and the Las Vegas wash. NDEP comments were received March 1998. After review of NDEP comments, KMC LLC has modified the Sampling Plan to include investigation closer to the Las Vegas Wash. Due to the accelerated work schedule, activities associated with the Sampling Plan have proceeded in anticipation of NDEP final approval. Site access is being pursued from the City of Henderson and Nevada Department of Transportation for subsurface investigation in rights-of-way.

- KMC LLC has sought NDEP approval for the design and construction of an 11-acre containment pond to be located on our site. As we discussed during a meeting on March 10 between KMC LLC and NDEP, this 11-acre containment pond will provide an immediate and effective response to capture and contain perchlorates at the site (an identified source). The containment pond will also allow enough time to fully develop treatment technology(s).

- A draft Perchlorate Consent Agreement has been submitted to NDEP for review. KMC LLC has proposed modification for all but two sections of the template document. Portions of Sections V (cost reimbursement) and XVII (public participation) will require additional modifications by NDEP. NDEP has agreed to keep costs associated with the perchlorate investigation separate from those associated with the on-going HISSC Environmental

Conditions Assessment, currently underway in the Henderson Industrial Complex. Section V of the Perchlorate Consent Agreement should address reimbursement of those costs.

- KMC LLC has initiated an investigation into remedial alternatives for reduction of perchlorate concentrations in water. A status summary of that investigation is attached.

KMC LLC is committed to act responsibly and cooperate fully with local, state, and federal officials in determining appropriate remedial actions. Please feel free to contact me at (702) 651-2200 if you have any questions related to this information. Thank you.

Sincerely,

Susan M. Crowley
Staff Environmental Specialist

Attachment
By certified mail

cc: SMCrowley
EMSpore
TWReed
RANapier
RHJones
PBDizikes
KBailey
ALDooley
Robert Kelso (NDEP)
Doug Zimmerman (NDEP)

SMC\Status to Pohlmann031698_.doc

Kerr-McGee Chemical LLC
Perchlorate Monthly Activity Status
Technology Review

Bioremediation

Testing of the groundwater is nearing completion using bacteria as the source of energy for removal and destruction of perchlorate. These tests have been conclusive in removing perchlorate to very low levels, to the detection limit of perchlorate in a biological matrix, currently 50 ppb. Recently, the research has focused on the use of locally available nutrients as feed with much success. Generation of feed nutrients (yeast) from locally available materials is being completed. A firm which manufactures and engineers wastewater treatment equipment has been contracted to interface the biochemical technology with its standard unit operations. This work is expected to occur over the next eight weeks. Once this work is completed, the final engineering, design, and costing phase will begin.

Electrochemical Catalysis

Electrochemical catalysis research work is continuing with a focus on several very successful catalysts which are applied to the cathode. Currently, the nitrate content of the groundwater causes the catalyst to first reduce the oxygen on the nitrate and then chlorate and perchlorate. Additional work is being completed on the reduction of nitrate to enhance current efficiency and life of the catalyst. A bench scale pilot cell has been obtained and is currently operating. This pilot cell will help define all characteristics of the full operating system. The basic research work continues to show that the catalysts and electrochemistry can work together to complete the reduction and removal of perchlorate from groundwater. Based on the current project schedule, the work is anticipated to be complete in the fourth quarter of 1998.

Aquifer Retention Basin

Work on the 11-acre retention basin is underway. The site has been surveyed, and the topographic aerial information has been collected. The topographic mapping will be completed the week of March 16. Engineering will begin on March 16 and completion is scheduled within two weeks. Submittals are expected to NDEP at that time.

Remark

To date, there have been only two technologies discovered which remove perchlorate from water and destroy this ion. These are biotechnology and electrochemical catalysis. The use of biotechnology has been known since 1989. Electrochemical catalysis has been in development since October 1997. While there are many separation technologies which remove perchlorate from water to various levels, they leave behind a perchlorate contaminated waste which must be disposed of.

KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

March 16, 1998

DZ -
EXTRA!
- Allen

Mr. Lou Dodgion
Nevada Division of Environmental Protection
Capitol Complex
333 W. Nye Lane
Carson City, Nevada 89710

Dear Mr. Dodgion:

Subject: NDEP/KMC LLC Meeting

We appreciate the time you and your staff provided to us during our recent meeting on March 10, 1998.

As a result of our discussions and agreement, KMC LLC has modified our off-site Sampling Plan (Phase II) to include additional work outlined in Doug Zimmerman's letter to me dated March 5. Figure 5a (attached) has been modified to depict the location for this additional work to identify if a low volume, high perchlorate concentration paleochannel is located nearer the Las Vegas Wash. KMC LLC will begin this preparation work immediately, and drilling work will begin on March 23. We plan to complete the entire scope of work outlined in the Phase II characterization by June 1, 1998.

Additionally, KMC LLC will be seeking your approval for the design and construction of an 11 acre containment basin to be located on our site. As we discussed, this 11 acre containment basin will provide an immediate and effective response to capture and contain perchlorates at the site (an identified source). The containment basin will also allow enough time to fully develop treatment technology(s).

Again, we want to thank you for your time and look forward to working with you on this important issue.

Sincerely,

Susan Crowley
Staff Environmental Specialist

xc: Allen Biaggi
Verne Rosse
Al Dooley
Pam Dizikes
Brenda Pohlman
Doug Zimmerman
Tom Reed
Pat Corbett

SMC/Letterhead.doc

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9
75 Hawthorne Street
San Francisco, CA 94105-3901

CERTIFIED MAIL
No. P 765 057 271

March 11, 1998

Patrick S. Corbett
Plant Manager
Kerr-McGee Chemical Corporation
8000 West Lake Mead Drive
Henderson, NV 89015

Dear Mr. Corbett,

The United States Environmental Protection Agency (EPA) requests your assistance in identifying potential sources of perchlorate contamination in soil, groundwater or surface water.

With recent improvements in analytical capability for low concentrations of perchlorate, this chemical has been discovered in the drinking water supplies of communities in California, Nevada and Utah. Eleven of the thirteen confirmed sites where perchlorate has been released to the environment have been associated with operations manufacturing or testing solid rocket fuels for the military or NASA (e.g., Aerojet, NASA-JPL, Lockheed Propellants, Alliant/Hercules, Rocketdyne). The other two known release sites are perchlorate manufacturing facilities in Henderson, Nevada, including Kerr-McGee's current operation.

Perchlorate has the potential for disrupting thyroid hormone activity in humans, and the long-term effects of low concentrations in drinking water are undetermined. EPA established a provisional reference dose range of 4 to 18 parts per billion in drinking water in 1995, and California adopted an interim action level of 18 ppb for perchlorate in drinking water in 1997. Perchlorate salts (such as ammonium perchlorate, potassium perchlorate, sodium perchlorate) are quite soluble in water, exceedingly mobile in aqueous systems and can persist for many decades under typical groundwater and surface water conditions.

Pursuant to Section 104(e) of the Comprehensive Environmental Response, Compensation and Liability Act, 42 USC Section 9604(e) and Section 3007 of the Resource Conservation and Recovery Act, 42 USC Section 6927, we are seeking information on specific locations throughout the United States where uses of perchlorate-containing chemicals may have resulted in the release of perchlorate to soil or water. Due to the persistence of perchlorate in soil and water, we request information on the history of manufacture and usage of perchlorate-containing chemicals.

Specific questions are enclosed as Attachment A. In responding to this Information Request, please indicate for each answer the number of the question to which it corresponds.

While EPA seeks your cooperation in this investigation, compliance with the Information Request

is required by law. There may also be criminal penalties under 18 USC Section 1001 for false, fictitious, or fraudulent statements or representations.

You may consider some of the information EPA is requesting to be confidential. Please be aware that you may not withhold the information upon that basis. If you wish EPA to treat the information confidentially, please advise EPA as to which documents or portions of documents you believe are confidential according to the procedures identified in Attachment B.

We would appreciate your response within the next 30 days. Please contact Kevin Mayer at (415) 744-2248 or Allyn Stern at (415) 744-1372 if you have any questions about this request or to discuss the time frame for providing the information.

Thank you for your continued cooperation in addressing the environmental releases of perchlorate.

Sincerely,

John Kemmerer
Chief, Superfund Site Cleanup Branch

CC:

Douglas Zimmerman, Nevada Division of Environmental Protection

Attachment A

Questions Concerning the Kerr-McGee Facility in Henderson, Nevada

1) What year did production of perchlorate-containing chemicals begin?

2) What entities have owned and/or operated the plant? Please provide the dates when ownership or operating control changed.

3) Which specific perchlorate-containing compounds were manufactured?

4) What was the total annual production of perchlorate-containing compounds at the plant in Henderson, Nevada? What was the annual production of each specific perchlorate containing compound?

5) What were the end uses of the perchlorate-containing compounds (solid rocket fuel, pyrotechnics etc)?

6) What was the approximate percentage of production sold for each of the end uses?

Questions Concerning Consumers

7) Please provide the name and address of each entity to whom perchlorate-containing compounds were shipped each year from the Kerr-McGee facility. (more than 500 pounds in any year)

Questions Concerning Kerr-McGee Production Facilities and Other Producers

8) Please identify the locations of other perchlorate-containing chemical production facilities owned, operated or previously owned or operated by Kerr-McGee in the United States.

9) Please provide answers to the above questions (1 through 7) for any other Kerr-McGee facilities producing or previously producing perchlorate-containing compounds.

10) EPA has been informed that production of perchlorate-containing compounds in the US is limited to Kerr-McGee and WECCO in Cedar City, Utah (formerly the PEPCON facility in Henderson, Nevada). Please confirm, to the best of your knowledge, whether this information is accurate. If you do have knowledge of perchlorate-containing compound production plants in the US other than those owned or operated by Kerr-McGee or WECCO, please provide the names, locations and years of operation, if known.

ATTACHMENT B:

CONFIDENTIAL INFORMATION

You may assert a confidentiality claim covering part or all of the information requested, pursuant to Sections 104(e)(7)(E) and (F) of CERCLA, 42 U.S.C. Sections 9604(e)(7)(E) and (F), and Section 3007(b) of RCRA, 42 U.S.C. Section 6927(b), and 40 C.F.R. Section 2.203(b).

If you make a claim of confidentially for any of the information you submit to EPA, you must prove that claim. For each document or response you claim confidential, you must separately address the following points:

1. the portions of the information alleged to be entitled to confidential treatment;
2. the period of time for which confidential treatment is desired (e.g., until a certain date, until the occurrence of a specific event, or permanently);
3. measures taken by you to guard against the undesired disclosure of the information to others;
4. the extent to which the information has been disclosed to others, and the precautions taken in connection therewith;
5. pertinent confidentiality determinations, if any, by EPA or other federal agencies, and a copy of any such determinations or reference to them, if available; and
6. whether you assert that disclosure of the information would likely result in substantial harmful effects on your business' competitive position, and if so, what those harmful effects would be, why they should be viewed as substantial, and an explanation of the causal relationship between disclosure and such harmful effects.

To make a confidentiality claim, please stamp, or type, "confidential" on all confidential responses and any related confidential documents. Confidential portions of otherwise nonconfidential documents should be clearly identified. You should indicate a date, if any, after which the information need no longer be treated as confidential. Please submit your response so that all non-confidential information, including any redacted versions of documents are in one envelope and all materials for which you desire confidential treatment are in another envelope.

All confidentiality claims are subject to EPA verification. It is important that you satisfactorily show that you have taken reasonable measures to protect the confidentiality of the information and that you intend to continue to do so, and that it is not and has not been obtainable by legitimate means without your consent. Information covered by such claim will be disclosed by EPA only to the extent permitted by CERCLA Section 104(e). If no such claim accompanies the information when it is received by EPA, then it may be made available to the public by EPA without further notice to you.

Mar. 10, 1998

KMCC Meeting

Brenda Pohlmann	NDEP	702-486-2857
Tom Reed	KM - Hydrology	(405) 270-2654
Bill Garnus	KM - Hydrology	(405) 270-2658
Al Dooley	KM - Chemical	405 270-2646.
John Reichenberger	KM Corporate	" " 2875
Everette Spore	KM Chemical	(702) 651-2352
Doug Zimmerman	NDEP	702 687-4670 ext 3127
Al Corbett	KM	702 651 2203
Allen Biaggi	NDEP	(702) 687-4670 x3021
Susan Crowley	KM	(702) 651-2234
Verne Rosse	NDEP	687-4670 x 3045
Lew Dodgion	NDEP	687-4670 x3113

Mar. 10, 1998 KMCCLLC Mtg.

- On-site characterization fairly done
- Need more off-site characterization

- Original plan indicated investigation completed by 6/98 + installation of remedial system by 11/98.

- New info indicates opportunity for immediate response.

- Propose to add 3 new well sites down nat to wash. Exploratory initially - would help determine what would be appropriate for recovery.

- KMCCLLC Proposal:
11 acre containment basin on-site, double-lined, leak detection. Effluent from chromium g-w treatment plant would go into pond.

Characterization
Site Work Complete (Phase I)
Offsite Work (Phase II)
- review of existing data (complete)
- additional work defined (pending review)
Characterization work complete (mid-year 1998)

Treatment Technology
Electrochemical + biological

Looking at combining ARA's treatment technology w/ std wastewater treatment equipment.

Also looking at ICET's electrochemical destruction. Probably would be a staged electrolysis - organics could poison the catalyst

Timeframe

Biochemical reduction	Dec '98
Electrochemical "	Jan '99
Aquifer retention basin	Aug '98

Will do expedited investigation near wash - want to come back and talk once investigation is complete.

PG225 was found - will sample this week
Our preference is to see the initial drilling be concentrated down near the wash. Drilling will commence on 3/23.

Pepcon Report Comments

- Early Pepcon wells - Pepcon moved this which indicates edge of Muddy Creek. UMCC believes that Hatchet well contaminated by easterly flow from Pepcon

- Wells installed w/ minimum of sampling. Drilled down through Muddy Creek & stopped when they hit major amounts of H_2O. May have blown right through a thin flow zone. Feel that they may not truly be measuring Muddy Ck.

PETER G. MORROS, Director

L.H. DODGION, *Administrator*

(702) 687-4670
TDD 687-4678

Administration
Mining Regulation and Reclamation
Water Pollution Control
Facsimile 687-5856

STATE OF NEVADA
BOB MILLER
Governor

Waste Management
Corrective Actions
Federal Facilities

Air Quality
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 89706-0851

March 5, 1998

Susan Crowley
Kerr-McGee Chemical Corporation
8000 West Lake Mead Drive
Henderson, Nevada 89015

RE: Perchlorate Investigation Report

Dear Ms. Crowley:

Division staff have completed review of the report, "Perchlorate Characterization Report: Historical Review Report/Sampling Plan Kerr-McGee Chemical Corporation Henderson, Nevada". In addition, we met with staff of Kerr-McGee Chemical Corporation (KMCC) on 1/21/98 and 2/19/98 to discuss perchlorate activities. The continuing cooperation and assistance of KMCC is appreciated.

Your report and a similar report prepared by American Pacific Corporation provide substantial information with respect to the distribution and potential movement of perchlorate through the subsurface. The additional work proposed by KMCC will assist in filling data gaps and further refine this understanding. However, we are requesting additional investigation and remediation efforts by KMCC in areas closer to Las Vegas Wash. This issue is discussed in more detail below and will be the principal topic of our meeting on 3/10/98.

Our principal comments are that the proposed investigation must result in a level of information which will clearly define the areal extent of the perchlorate plume which originated from the KMCC plant site, the flow paths and fate of the perchlorate and to what extent perchlorate which originated from the KMCC site is discharging to Las Vegas Wash.

As we discussed on 2 /19/98 we are also requesting both companies to expedite remediation activities in the paleochannel located in the vicinity of T. 21 S., R. 63 E., Section 30. We believe this is a location where a significant portion of the perchlorate discharging to the wash is located. This conclusion was reached by using both existing information and making various assumptions about the most likely site conditions that are believed to exist. Additional information will need to be collected to confirm this conceptual model and to support the design of a remediation system in this area. Any water pumped in this area is likely to have a high total dissolved solids content that will eliminate the possibility of discharge to the wash. Evaporation ponds for disposal of this water may be the only viable alternative.

The following information supports our conclusions: 1) perchlorate concentrations in the wash increase significancy in this area, from 10 ppb to 500 ppb; 2) the wash concentration could be changed from 10 to 500 ppb with a relatively small volume (50 g.p.m.) of ground water inflow with a high concentration of perchlorate (1,000 ppm); 3) a principal paleochannel is believed to exist in this area; and 4) calculations of ground water flow through this paleochannel, assuming representative aquifer parameters, yields flows on the order of those described above. Again, we recognize that this is a conceptual model of the hydrologic system, however we believe all existing data supports this conclusion. We expect both companies to participate in the necessary investigations and remediation effort in this area, as appropriate.

Attached are comments from the Southern Nevada Water Authority and the USEPA. Both agencies are also suggesting expedited actions in this same area. The USEPA recommended that remediation systems be operating by June 1, 1998. The Division has proposed that a system be operating within 60 days. We look forward to discussing the technical needs and timing of this effort with both companies.

If you have any questions on these matters please contact me at 687-4670, ext 3127.

Sincerely,

Doug Zimmerman

Doug Zimmerman
Chief, Bureau of Corrective Actions

attachments
cc: [redacted]
David Donnelly
Kevin Mayer

KERR-McGEE CHEMICAL CORPORATION
POST OFFICE BOX 55 • HENDERSON, NEVADA 89009

Mr. Doug Zimmerman

February 17, 1998

Dear Mr. Zimmerman:

Kerr-McGee Chemical Corp. recently signed a letter of intent with Finnish Chemicals, also known as ERIKEM, under which it will sell its electrolytic chemical business. We at Kerr-McGee want to apprise you of this transaction so that you will possess all of the facts pertaining to this decision.

It is ERIKEM's stated intent to acquire the marketing, research and development, plant operations, and other services and personnel associated with this business. Once the transaction is completed, ERIKEM will operate the electrolytic chemical manufacturing plant currently owned by Kerr-McGee at the BMI industrial complex. As a result, we do not expect this decision to immediately impact employees at the Henderson facility.

This sale is part of Kerr-McGee's corporate strategic business decision to concentrate on its oil and gas exploration and production business and its principal chemical business, titanium dioxide pigments. The pending sale of Kerr-McGee's perchlorate business to American Pacific Corp. was also an element of this strategy.

We want to reiterate our ongoing cooperation with the Nevada Department of Environmental Protection (NDEP), which is overseeing environmental remediation efforts associated with the discovery of trace amounts of perchlorate in Lake Mead. We have submitted a consent agreement and work plan to the NDEP for approval. These documents formalize our commitment to participate in the remediation process until it is complete and underscore our resolve to always be a responsible corporate citizen of Southern Nevada.

As a leader in this community, you will likely be expected to have a full understanding of this agreement and its ramifications. If you have any questions, please call me at (702) 651-2200.

Sincerely,

Patrick S Corbett

Pat Corbett
Plant Manager, Henderson Facility
Kerr-McGee Chemical Company

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9
75 Hawthorne Street
San Francisco, CA 94105-3901

February 12, 1998

Susan Crowley
Kerr-McGee Chemical Corporation
8000 West Lake Mead Drive
Henderson, NV 89015

Dear Ms. Crowley,

The United States Environmental Protection Agency EPA requests your assistance in identifying potential sources of soil, groundwater or surface water contamination by perchlorate.

With recent improvements in analytical capability for low concentrations of perchlorate, this chemical has been discovered in the drinking water supplies of communities in California, Nevada and Utah. Eleven of the thirteen confirmed sites where perchlorate has been released to the environment have been associated with operations manufacturing or testing solid rocket fuels for the military or NASA (e.g., Aerojet, NASA-JPL, Lockheed Propellants, Alliant/Hercules, Rocketdyne). The other two known release sites are perchlorate manufacturing facilities in Henderson, Nevada, including Kerr-McGee's current operation.

Perchlorate has the potential for disrupting thyroid hormone activity in humans, and the long-term effects of low concentrations in drinking water are undetermined. EPA established a provisional reference dose range of 4 to 18 parts per billion in drinking water in 1995, and California adopted an interim action level of 18 ppb for perchlorate in drinking water in 1997. Perchlorate salts (such as ammonium perchlorate, potassium perchlorate, sodium perchlorate) are quite soluble in water, exceedingly mobile in aqueous systems and can persist for many decades under typical groundwater and surface water conditions.

Pursuant to Section 104(e) of the Comprehensive Environmental Response, Compensation and Liability Act, 42 USC Section 9604(e) and Section 3007 of the Resource Conservation and Recovery Act, 42 USC Section 6927, we are seeking information on specific locations throughout the United States where uses of perchlorate-containing chemicals may have resulted in the release of perchlorate to soil or water. Due to the persistence of perchlorate in soil and water, we request information on the history of manufacture and usage of perchlorate-containing chemicals in the United States.

Specifc questions are enclosed as Attachment A. In responding to this Information Request, please indicate for each answer the number of the question to which it corresponds.

While EPA seeks your cooperation in this investigation, compliance with the Information Request

is required by law. There may also be criminal penalties under 18 USC Section 1001 for false, fictitious, or fraudulent statements or representations.

You may consider some of the information EPA is requesting to be confidential. Please be aware that you may not withhold the information upon that basis. If you wish EPA to treat the information confidentially, please advise EPA as to which documents or portions of docments you believe are confidential according to the procedures identified in Attachment B.

We would appreciate your response within the next 30 days. Please contact Kevin Mayer at (415) 744-2248 or Allyn Stern at (415) 744-1372 if you have any questions about this request or to discuss the time frame for providing the information.

Thank you for your continued cooperation in addressing the environmental releases of perchlorate.

Sincerely,

Kevin P. Mayer
Superfund Project Manager, SFD-7

Attachment A

Questions Concerning the Kerr-McGee Facility in Henderson, Nevada

1) What year did production of perchlorate-containing chemicals begin?

2) What entities have owned and/or operated the plant? Please provide the dates when ownership or operating control changed.

3) Which specific perchlorate-containing compounds were manufactured?

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7) Please identify where and to whom perchlorate-containing compounds were shipped each year. (more than 500 pounds in any year)

Questions Concerning Other Producers

8) Please identify the locations of other perchlorate-containing chemical production facilities owned, operated or previously owned or operated by Kerr-McGee.

9) Please provide answers to the above questions for any other Kerr-McGee facilities producing or previously producing perchlorate-containing compounds.

10) If you have knowledge of perchlorate-containing compound production plants in the US other than those owned or operated by Kerr-McGee, please provide the names and locations and years of operation, if known. (We are already aware of the PEPCON plant formerly in Henderson and the WECCO plant in Cedar City, Utah.)

11) Please provide any information you have about perchlorate-containing compounds imported into the US (Names and location of production facilities, years of operation, amounts of importation).

ATTACHMENT B:

CONFIDENTIAL INFORMATION

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KERR-McGEE CHEMICAL LLC
POST OFFICE BOX 55 - HENDERSON, NEVADA 89009

January 15, 1998

Mr. Robert Kelso
Nevada Division of Environmental Protection
333 West Nye Lane
Carson City, NV 89710

Dear Mr. Kelso:

Subject: KMCC Environmental Conditions Investigation Quarterly Report

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

Activities Conducted 10/01/97 to 12/31/97

There were no activities.

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

Sincerely,

SM Crowley

Susan M. Crowley
Staff Environmental Specialist

cc: ALDooley
PSCorbett
PBDizikes
RHJones
HISSC Technical Subcommittee
HISSC Legal Subcommittee
RANapier
TWReed
RSimon (ENSR)
JTSmith (Covington & Burling)
Doug Zimmerman (NDEP)

SMC\QUARTERLY (01-98) PROGRESS REPORT TO KELSO.DOC

KERR-McGEE CHEMICAL CORPORATION
POST OFFICE BOX 55 • HENDERSON, NEVADA 89009

January 13, 1998

Ms. Brenda Pohlmann
Remediation Branch Supervisor
Nevada Division of Environmental Protection
555 E. Washington, Suite 4300
Las Vegas, NV 89101

Dear Ms. Pohlman:

Subject: Perchlorate Monthly Activity Status

Following is the current status of Kerr-McGee Chemical LLC's activities regarding the perchlorate issue:

- KMCLLC prepared a Work Plan for off-site characterization and submitted this for NDEP review and approval November 1, 1997. NDEP approval is still pending. Due to the accelerated work schedule, activities associated with the Work Plan have proceeded in anticipation of NDEP approval. Historical review is nearly completed with information summarized in a report. A Sampling Plan to fill in data gaps is currently under development.

- A draft Consent Agreement has been submitted to NDEP for review. KMCLLC has proposed modification for all but two sections of the template document. Portions of Sections V (cost reimbursement) and XVII (public participation) will require additional modifications by NDEP.

- KMCLLC has initiated an investigation into remedial alternatives for reduction of perchlorate concentrations in water. A status summary of that investigation is attached and several treatment technologies are under continued evaluation.

Please note that Kerr-McGee Chemical Corporation (KMCC) has merged into Kerr-McGee Chemical Limited Liability Company (KMCLLC) and KMCC has ceased to exist. KMCLLC is committed to act responsibly and cooperate fully with local, state, and federal officials in determining appropriate remedial actions. Please feel free to contact me at (702) 651-2200 if you have any questions related to this information. Thank you.

Sincerely,

Patrick S. Corbett
Plant Manager

Attachment
By certified mail
cc: SMCrowley
TWReed
RHJones
KBailey
Robert Kelso (NDEP)
EMSpore
RANapier
PBDizikes
ALDooley
Doug Zimmerman (NDEP)

mc\Status to Pohlmann011398.doc

Kerr-McGee Chemical
January 13, 1998

Technology Review

Bioremediation

Testing of the groundwater is nearing completion using bacteria as the source of energy for removal and destruction of perchlorate. These tests have been conclusive in removing perchlorate to very low levels, to the detection limit of perchlorate in a biological matrix. Recently the research has focused on the use of locally available nutrients as feed with much success. Generation of feed nutrients from locally available materials will also be completed. Engineering firms are being reviewed for their capabilities in this technology area. Engineering will begin as soon as a firm is selected to plan and develop this technology to a useful scale and ensure operability.

Electrochemical Catalysis

Electrochemical catalysis research work is continuing with a focus on one very successful catalyst which is applied to the cathode. Full characterization of all necessary parameters for scale up of this specific technology is underway. A bench scale pilot cell has been obtained and will be made operable for determining full flow dynamics and for measuring all pertinent parameters. The basic research work continues to show that the catalyst and electrochemistry can work together to complete the reduction and removal of perchlorate from groundwater. It should be noted that this work is unique and new. Scale up to pilot plant may take several months.

Remark

To date, there have been only two technologies discovered which remove perchlorate from water and destroy this ion. These are biotechnology and electrochemical catalysis. The use of biotechnology has been known since 1990. Electrochemical catalysis has been in development since November 1997. While there are many separation technologies which remove perchlorate from water to various levels, they leave behind a perchlorate contaminated waste which must be disposed of. Future technology reports will contain information on technologies which remove and destroy perchlorate, i.e. biotechnology and electrochemical catalysis.