

NDEP Las Vegas Office
TREX-011121

AUTHORITY TO CONSTRUCT APPLICATION
Kerr-McGee Chemical LLC
Perchlorate Remediation Process Air Emission Sources

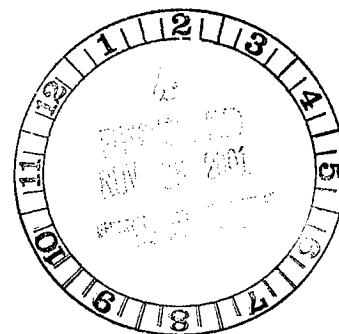
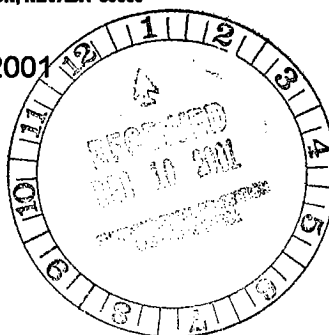
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Read
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KERR-McGEE CHEMICAL LLC

POST OFFICE BOX 66 - HENDERSON, NEVADA 89009

November 21, 2001



Mr. David Albright
EPA Region IX
Permit Office Air -3
75 Hawthorne St.
San Francisco, CA 94105

Dear Mr. Albright:

Subject: ATC Application – Perchlorate Remediation Process Air Emission Sources

Kerr-McGee Chemical LLC (Kerr-McGee) has committed to a remediation project, which will address perchlorate concentrations in the groundwater in the vicinity of their Henderson operations. Integral to the remedial process is an ion exchange resin regeneration process, which includes the use of two brine heaters. These two brine heaters are supplied heat from natural gas fired burners, for which Clark County Department of Air Quality Management air permits will be required.

Attached is the Kerr-McGee's request for an Authority to Construct the two emission sources. We are forwarding this document directly to your office to expedite the review process and would appreciate to opportunity to answer any questions you might have related to this document. Please feel free to call me at (702) 651-2234 at your earliest opportunity. In addition, while we can answer any question you might have, there are others within Region IX which background they share with you as well. These are Mitch Kaplan and Larry Bowerman.

Thank you for your consideration and we hope to talk with you soon.

Sincerely,

[Handwritten signature: Susan M. Crowley]

Susan M. Crowley
Staff Environmental Specialist

cc: LKBailey
Todd Croft, NDEP (Las Vegas)
Robert Reinhard, Morrison and Foerster



KERR-McGEE CHEMICAL LLC

POST OFFICE BOX 66 - HENDERSON, NEVADA 89009

November 21, 2001

Ms. Catherine MacDougall
Assistant Director
Department of Air Quality Management
500 S. Grand Central Pky
Las Vegas, NV 89155-1776

Dear Ms. MacDougall,

Subject: ATC Application - Perchlorate Remediation Process Air Emission Sources

Enclosed is Kerr McGee Chemical LLC's (Kerr-McGee) application for an Authority to Construct (ATC) two brine heaters necessary for operation of our groundwater perchlorate remediation process. This remediation project is progressing under the oversight of Nevada Division of Environmental Protection (NDEP), in accordance with an Administrative Order on Consent (AOC), which is enclosed as well. The proposed brine heater burners will, combined, emit less than one ton/year of carbon monoxide (CO) and less than four tons/year of nitrogen oxides (NO_x). These low emission levels will, therefore, qualify the brine heaters to be within the category of emissions that DAQM rules define as below the "offset de minimus threshold" for purposes of Sections 0 and 12 of the regulations. Because the emission levels are de minimus, no offsets are required under Section 12. In addition, because the relevant emissions fall below 10 tons/yr of CO a public notice of the ATC is not required under Section 12 regulations.

We request prompt action on the ATC so as to be able to install the brine heaters on a schedule that will yield environmental benefits as soon as practicable. The very low level of CO and NO_x emissions allows us to propose a system for approval that DAQM rules recognize for simple administration as we describe. Please feel free to call me at (702) 651-2234 at your earliest convenience to discuss this ATC application or to provide any additional details you find helpful. Thank you.

Sincerely,

Susan Crowley
Staff Environmental Specialist

cc: Paul Durr, DAQM
LKBailey
PSCorbett
FRStater
RLWaters
Robert Reinhard, Morrison and Forester
Todd Croft, NDEP (Las Vegas)
Charles Albright, EPA (Region IX)

ADMINISTRATIVE ORDER ON CONSENT

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

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

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

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

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

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

I. STATEMENT OF PURPOSE

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

II. WORK TO BE PERFORMED

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

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

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

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

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

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

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

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

III. STIPULATED PENALTIES

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

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

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

IV. DISPUTE RESOLUTION

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

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

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

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

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

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

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

V. FORCE MAJEURE

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

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

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

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

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

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

VI. REPORTING REQUIREMENTS

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

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

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

VII. REIMBURSEMENT OF OVERSIGHT COSTS

1. Kerr-McGee shall reimburse the Division for costs reasonably incurred for the oversight of this AOC, following the effective date and for the effective period of this AOC.

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

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

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

ATTENTION: Chief, Bureau of Corrective Actions

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

VIII. RESERVATION OF RIGHTS

1. The Division reserves all of its statutory and regulatory powers, authorities, rights, and remedies, both legal and equitable, which may pertain to Kerr-McGee's failure to comply with any of the requirements of this AOC or of any requirement of federal or state laws, regulations, or permit conditions. Except as provided in Section VIII (Other Claims; Covenant Not to Sue), this AOC shall not be construed as a covenant not to sue, release, waiver, or limitation of any rights, remedies, powers, and/or authorities, civil or criminal, which the Division has under any applicable statutory or common law authority of the State. This AOC in no way relieves Kerr-McGee of its responsibility to comply with any federal, state or local law or regulation.

2. The Division reserves the right to disapprove work performed by Kerr-McGee pursuant to this AOC subject to Dispute Resolution under Section IV.

3. The Division reserves any and all legal rights and equitable remedies available to enforce (1) the provisions of this AOC, or (2) any applicable provision of state or federal law.

4. Kerr-McGee reserves all rights, claims and/or defenses it may have in any action brought or taken by the Division, the EPA or any third party pursuant to applicable law, with

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

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

IX. OTHER CLAIMS: COVENANT NOT TO SUE

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

X. APPLICABLE LAW

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

XI. EFFECTIVE DATE

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

XII. TERMINATION

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

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

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

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

XIII. SIGNATORIES

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

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

THE STATE OF NEVADA
DIVISION OF ENVIRONMENTAL
PROTECTION

KERR-McGEE CHEMICAL LLC

By: 

Name: ALLEN BIAGETTI

Title: ADMINISTRATOR

By: 

Name: W. P. Woodward

Title: Sr. Vice President Chemical

APPROVED AS TO FORM ONLY this 4th day of October, 2001.


ATTORNEY GENERAL

**Kerr McGee Chemical, LLC
Henderson, Nevada**

**Application for Authority to
Construct Certificate
for Two Brine Heaters**

ENSR

November 2001

Document Number 4020-011-200

**Application for Authority to Construct Certificate
for Two Brine Heaters**

ENSR Document 4020-011-200

Prepared for

**Kerr McGee Chemical, LLC
Henderson, Nevada**

**ENSR
1220 Avenida Acaso
Camarillo, CA 93012**

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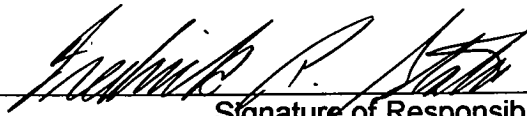
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2	Buildings and Structures Diagram
3	Process Flow Diagram
4	Process & Instrumentation Diagram
5	Zoning Map
6	Air Emissions Calculations
7	Equipment Diagrams and Information

Certification

I certify that, based on information and belief formed after reasonable inquiry, the statements contained in this document are true, accurate, and complete.



Signature of Responsible Official

Fredrick R. Stater, Plant Manager

Typed Name and Title



Date

EXECUTIVE SUMMARY

This permit application for an Authority to Construct (ATC) Certificate is submitted by Kerr McGee Chemical, LLC (KMC LLC) for two new combustion units at its Henderson, Nevada facility. An overview of the requested permitting action is presented in this Executive Summary; the New Source Review application follows.

KMC LLC is a chemical company located in Henderson, Nevada specializing in the manufacture of ammonium perchlorate, boron trichloride, elemental boron and manganese dioxide. KMC LLC has been operating the facility since 1967.

KMC LLC is required to install a groundwater treatment system to remediate contaminated groundwater. The remediation effort is being conducted under the oversight of the Nevada Division of Environmental Protection (NDEP, the lead agency for the project) and U.S. Environmental Protection Agency. An Administrative Order on Consent has been signed by NDEP and KMC LLC requiring the treatment system be operational by February 28, 2002. The groundwater treatment system is designed to remove perchlorate contamination from groundwater using a proprietary ion exchange technology. Once the ion exchange resins become saturated with perchlorate ions, the resins are regenerated with a brine solution. The brine solution is in turn regenerated using a high temperature catalytic process. The equipment proposed in this application includes two process heaters specifically engineered to heat the brine solution in the brine regeneration step of the process. The brine heaters utilize natural gas fired, low NO_x burners to heat heat-transfer coils containing the brine solution. There are no other sources of air emissions from the groundwater treatment system.

The brine heaters have been designed for high heat transfer efficiency to minimize fuel consumption, utilizing burners with a specific flame configuration. There are two heaters in the system, each equipped with one (1) 10 MMBtu/hr burner to meet the process requirements. The burners selected for installation in the brine heaters are low NO_x burners with an expected emission rate of nitrogen oxide (NO_x) emissions of 30 ppmv or less. The heaters are equipped with flue gas recirculation (FGR) to control NO_x, if necessary. However, the burners are expected to meet 30 ppmv NO_x without FGR during normal operations, and therefore KMC LLC does not expect to operate the FGR on a routine basis. The carbon monoxide emissions are expected to be 15 ppmv or less. The burner technology is considered Best Available Control Technology (BACT) for NO_x emissions and Lowest Achievable Emission Rate (LAER) for CO emissions for process heaters of this general design. The fuel used in the equipment is exclusively natural gas, which meets BACT for small combustion sources for volatile organic compound (VOC), sulfur oxide (SO_x) and particulate matter (PM₁₀) emissions.

KMC LLC plans to operate the equipment 8760 hours per year. The maximum potential to emit (PTE) for each regulated air pollutant is given in Table E-1.

Table E-1
Potential to Emit

Pollutant	Tons/year
NO _x	3.23
CO	0.98
PM ₁₀	0.65
SO _x	0.05
VOC	0.47

Based on these PTE emission rates, the combined emission units are below the "offset 'de-minimis' thresholds" for all pollutants. The burners comply with Clark County Rules. Based on the PTE emission levels, ambient air quality modeling, Continuous Emissions Monitoring, pre-construction and post-construction ambient air quality monitoring, and additional impact analysis are not required for this equipment.

KMC LLC is requesting that the permit conditions reflect the emission rates in pounds per hour (lbs/hr), pounds per day (lbs/day) and tons per year (tons/yr) for each pollutant, as presented in this application. Further, KMC LLC is requesting that compliance with the permit limitations be based on monitored fuel consumption.

KMC LLC is requesting the ATC be approved and issued by November 30, 2001. KMC LLC is planning to commence operation of the equipment on water containing perchlorate by February 28, 2002 (equipment check firing is needed earlier in February). Fees in the amount of \$978.56 have been included with this application.

Based on the need for the equipment to implement the groundwater remediation plan, the low emission levels of the equipment, compliance with Clark County's rules and regulations, including BACT for NO_x, SO_x, PM₁₀ and VOC and LAER for CO, KMC LLC is requesting approval of this permit application and an issuance of an ATC Certificate for the equipment.

Facility ID# A095 (if modification)Date: October 19, 2001**I. Applicant's name address and phone number: (Please Print or Type)**Name: Kerr McGee Chemical CompanyAddress: P.O. Box 55
City: Henderson State: NV Zip: 89009Phone Number: (702) 651-2200 FAX: (702) 651-2310Land Owner: Kerr McGee Chemical, LLC Phone: (702) 651-2200**II. Company name, address and phone number, if different from the applicant: (Please Print or Type)**Name: Same As Above

Address: _____

City: _____ State: _____ Zip: _____

Phone Number: () _____ FAX: () _____

III. Facility name and address: (Please Print or Type)Name: Same As Above

Address: _____

City: _____ State: _____ Zip: _____

Phone Number: () _____ FAX: () _____

Plant Manager: Fredrick R. Stater Phone: (702) 651-2200

Mobile: () _____

IV. Person responsible for Air Quality Control matters:Name: Susan M. Crowley Phone Number: (702) 651-2234**Person responsible for Signing of Documents:**Name/Title: Fredrick R. Stater, Plant Mgr. Phone Number (702) 651-2200**Person responsible for Billing matters:**Name: Susan Crowley Phone Number: (702) 651-2234**Billing Address, if different from the Company: *(Please Print)***Address: Same

City: _____ State: _____ Zip: _____

Phone Number: () _____ FAX: () _____

V. To comply with the preconstruction application requirements of Section 12 of the Department of Air Quality Management Regulations, the applicant shall submit the following information:

(a) Stationary Source location map showing the property boundary with a legal description of the proposed site location:

The KMC LLC facility is located within the central portion of the Black Mountain Industrial (BMI) complex, in an unincorporated portion of Clark County, Nevada, and is completely surrounded by the City of Henderson, Nevada. The site location is shown in Figure 1 in Attachment 1.

(b) Stationary Source site map identifying all buildings or structures on the site:

Buildings and structures on the KMC LLC facility are shown in Drawing A-00-1-106. (Due to the size of the facility, two sheets are required to show sufficient detail of the property, identified as Figures 29 and 30).

(c) A general flow diagram identifying all processes located at the Stationary Source:

A Simplified Process Flow Diagram for Perchlorate Removal and Destruction and a Process and Instrumentation Diagram are included in Attachment 3.

(d) A complete detailed flow diagram of each process at the Stationary Source listing all Emissions Units associated with the process:

A preliminary Process and Instrumentation Diagram (P&ID) for Perchlorate Removal and Destruction is included in Attachment 4.

It is important to note that although the P&ID shows the installation of Flue Gas Recirculation (FGR) in the combustion train, FGR is not required to meet the emission specifications outlined in this application, and it will not be operated on a routine basis. In addition, process heat load shown in the P&ID is the nominal process heat uptake, not the burner capacity. Where a discrepancy exists between the text of this application and the P&ID, the data presented in the text is the correct data.

(e) Location of nearest residence and distance from the proposed Stationary Source:

The nearest residence is located approximately 1/2 mile from the process building.

(f) Zoning approved by local municipality, or a copy of a currently approved zoning map:

A current Zoning Map is attached as Attachment 5.

(g) Copy of application for Use Permit, or decision of the zoning authority:

The building was previously permitted for use of perchlorate. The installation of the proposed equipment does not introduce any new hazards for which a new Use Permit is required.

(h) Any new PM₁₀ or CO Major Stationary Source proposing to locate in the non-attainment area, or any existing PM₁₀ or CO Major Stationary Source located in the non-attainment area that proposes a Major PM₁₀ or Major CO Modification, shall perform an analysis of alternative sites, sizes, production processes, fuel burned, and emission control techniques that demonstrate that the benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction, or Modification. The required analysis shall be based on EPA guidance or applicable regulations:

The proposed equipment does not constitute a major modification to the existing source, and therefore an alternatives analysis is not required.

(i) Identification of all Regulated Air Pollutants emitted from each Emissions Unit:

This source will emit products of combustion: nitrogen oxides (NO_x), sulfur oxides (SO_x), carbon monoxide (CO), volatile organic compounds (VOC), and particulate matter less than 10 microns (PM₁₀).

(j) Brief general description of the new Stationary Source or Modification:

The overall process is a groundwater treatment system designed to remove perchlorate contamination from groundwater using a proprietary ion exchange technology. Once the ion exchange resins become saturated with perchlorate, the resins are regenerated with a brine solution. The brine solution is in turn regenerated using a high temperature catalytic process. The equipment proposed in this application are two process heaters specifically engineered to heat the brine solution in the brine regeneration step of the process. The brine heaters are a double helix, water tube design. The burners are natural gas fired, low NO_x burners installed in a down-fired configuration.

(k) Complete description of all processes by Standard Industrial Classification [SIC]:

The SIC code for the facility is 2917.

(l) Complete description of all Emissions Units by Source Classification Code [SCC]:

SCC: 39900601, based on the source description of Level 1: Industrial Process; Level 2: Miscellaneous Manufacturing Industries; Level 3: Process Heater / Furnace; Level 4: Natural gas

(m) Type of fuel utilized in each Emissions Unit [if applicable]:

The fuel for the brine heaters is exclusively pipeline natural gas. No other devices in the process use fuel of any kind. The expected natural gas consumption for the two burners with a combined maximum firing rate of 20 MMBtu/hr is presented in Table 1.

**Table 1
Natural Gas Consumption**

Load	Fuel Usage		
	Scf/Hr	Scf/Day	Scf/Yr
100.0%	19,608	470,588	171,764,706
84.0%	16,471	395,294	144,282,353
50.0%	9,804	235,294	85,882,353

- (n) **Estimate of total annual fuel usage from all Non-Road Engines [gasoline and diesel]; Such information may be used by the District for modeling and emission inventory purposes, but shall not be included as a condition in the Authority to Construct:**

There are no non-road engines associated with the proposed equipment.

- (o) **Maximum Potential to Emit of all Regulated Air Pollutants for each Emissions Unit in [lbs/hr, lbs/day, and ton(s)/yr]:**

The predicted maximum potential to emit emissions are presented in Table 2. A discussion of the emission calculation methodology and emission calculations are presented in Attachment 6.

**Table 2
Brine Heater Emissions - Maximum Potential to Emit
(Combined Two Heaters)**

Pollutant	Lbs/hr	Lbs/day	Tons/year
NO _x	0.96	23.01	3.23
CO	0.29	7.00	0.98
PM ₁₀	0.19	4.65	0.65
SO _x	0.02	0.37	0.05
VOC	0.14	3.36	0.47

Note: Lb/hr and Lb/day figures include a factor of 1.3 to account for short term variations in emission rates.

Maximum Potential to Emit Emissions of all Regulated Air Pollutants for each Non-Road Engine utilized within a permitted facility in [lbs/hr, lbs/day, and ton(s)/yr]. Such Emissions may be used by the District for modeling and emission inventory purposes and shall not be included in the facility Potential to Emit:

There are no emissions from non-road engines associated with this project.

- (p) Stack data: location, height above grade, diameter [I.D. or effective], exhaust gasses, flow rate [ACFM], and temperature:**

Stack data is presented in Table 3.

**Table 3
Brine Heater Stack Data**

Parameter	Data
Height Above Grade ^a	50 ft.
Diameter	14 in.
Exhaust Gas Flow Rate (maximum)	3376 scfm
Temperature	1240 °F
^a Stack height is approximate, subject to field verification. Stack has horizontal orientation.	

- (q) Maximum rated design production capacity:**

The brine heaters have a maximum process rate of approximately 130 gallons/min (74,712 lbs/hr), with a design maximum temperature rise for the brine solution of 50 °C. There are two (2) heaters, each with one burner with a capacity of 10 MMBtu/hr, for a total capacity of 20 MMBtu/hr.

(r) Expected production capacity:

The brine heaters have a normal process rate of approximately 100 gallons/min (57,470 lbs/hr), with a design temperature rise for the brine solution of 30 °C. The brine heaters will operate between 50% and 84% load, or a total load of between 10 and 16.8 MMBtu/hr for the two burners.

(s) Schedule of operation [hrs/day, days/wk, wks/yr]:

The equipment will operate 24 hours per day, 7 days per week, 52 weeks per year.

(t) Description of air pollution control equipment, for each Emissions Unit:

The burners installed in the brine heater are low NO_x burners expected to achieve <30 ppmv NO_x and <15 ppmv CO at 3% O₂. The manufacturer's product specification sheet is included in Attachment 7. The combustion train will include FGR, however, the burners are expected to achieve the stated emission levels without FGR, and the FGR is not expected to operate on a routine basis.

(u) Analysis of compliance with requirements for Best Available Control Technology [BACT], Lowest Achievable Emission Rate [LAER], Maximum Achievable Control Technology [MACT], as applicable:

The equipment is functionally similar to a boiler or steam generator - its purpose is to heat water. The brine heaters will meet the emissions standards of 30 ppmv NO_x (at 3% O₂) to satisfy BACT for boilers and steam generators consistent with applicable standards in Clark County Rule 49.3.1. An emission rate of 15 ppmv (at 3% O₂) for CO is expected to satisfy LAER for process heaters. BACT for VOC, PM₁₀ and SO_x is natural gas as fuel. The source will burn natural gas exclusively.

(v) Pre-construction measurements of existing air quality, as required by other subsections of Section 12:

Due to the (low) emission levels of each regulated air pollutant, pre-construction monitoring of ambient air quality is not required.

(w) Results of modeling for each Regulated Air Pollutant [if applicable]:

Due to the (low) emission levels of each regulated air pollutant, modeling is not required.

(x) Description of post construction ambient air monitoring systems for each Regulated Air Pollutant [if applicable]:

Due to the (low) emission levels of each regulated air pollutant, post-construction monitoring of ambient air quality is not required.

(y) Description and general specifications of continuous emissions monitoring systems for each Regulated Air Pollutant, [if applicable]:

Due to the (low) emission levels of each regulated air pollutant, continuous emissions monitoring is not required.

(z) Additional impact analysis of soils, visibility, vegetation, secondary air quality as required by other subsections of Section 12:

Due to the (low) emission levels of each regulated air pollutant, additional impact analysis of soils, visibility, vegetation, and secondary air quality is not required.

(aa) Anticipated construction schedule including the estimated initial start-up date:

KMC LLC is requesting approval of the ATC by November 30, 2001. Start-up is anticipated for February 28, 2002.

(bb) Statement of statewide compliance of existing facilities operated by applicant:

Other facilities and emission sources operated by the applicant are in compliance with Clark County Rules and Regulations.

(cc) Information on the air pollution control equipment installed at similar facilities owned or operated by the applicant, applicable to sources subject to public notice requirements:

The applicant does not own or operate any similar facilities subject to public notice requirements.

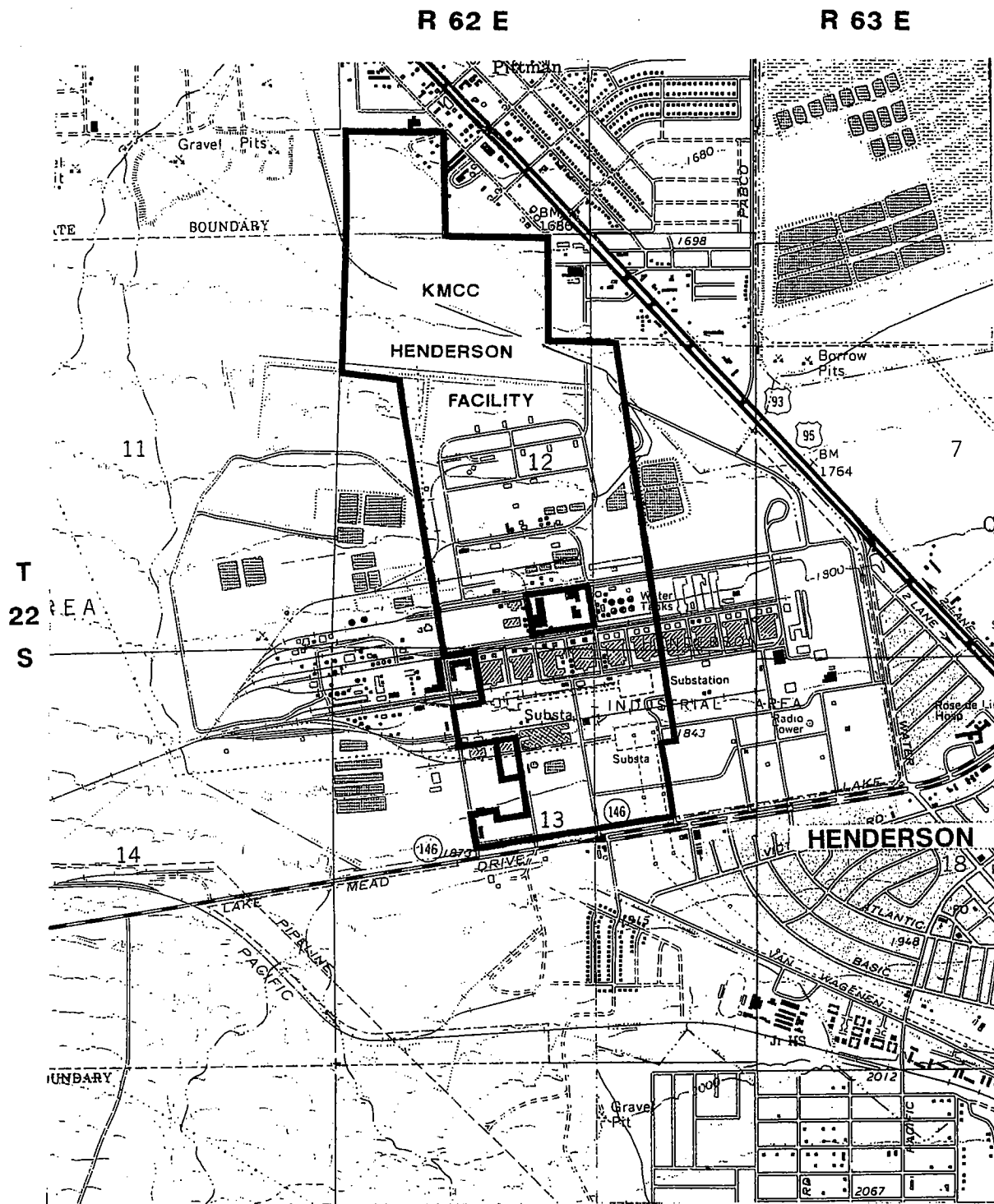
(dd) Payment of all applicable fees pursuant to Section 18 of the Department of Air Quality Management Regulations:

A summary of the fee requirements is presented in Table 3.

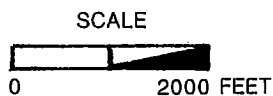
**Table 4
Fees**

Fee Type	Cost / Unit	No. of Units	Total Fee
Application Filing	\$259.00 /application	1 application	\$259.00
Permitting PTE	\$46.30 / ton	5.39 tons	249.56
Permit Emission Unit	185.00/ unit	2 permit unit	370.00
Review Fee	\$100.00 / operating permit	1 operating permit	100.00
Total			\$978.56

ATTACHMENT 1
SITE LOCATION DIAGRAM



SOURCE: U.S.G.S. LAS VEGAS SE / HENDERSON, NEVADA 7.5 MINUTE QUADRANGLES: 1967, 1970



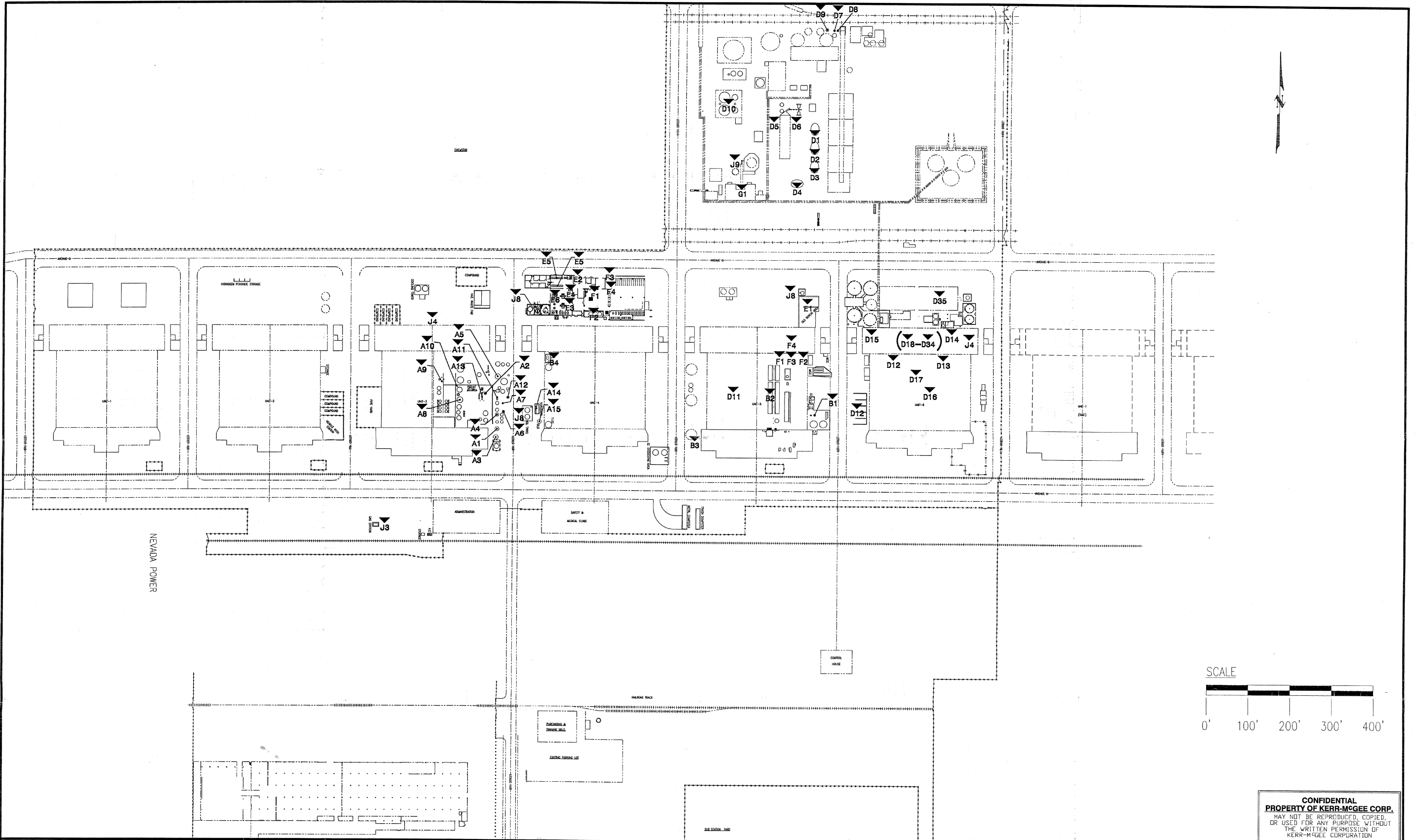
QUADRANGLE LOCATION

FIGURE 1 : LOCATION OF THE KMCC HENDERSON, NEVADA FACILITY

ATTACHMENT 2
BUILDINGS AND STRUCTURES DIAGRAM

NOTE:
SOME "BUSINESS CONFIDENTIAL"
INFORMATION HAS BEEN REMOVED FROM
THIS ATTACHMENT 2.

TO RETRIEVE THIS INFORMATION, PLEASE
CALL KERR-MCGEE CHEMICAL LLC,
FACILITY MANAGER (702) 651-2200.



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 KERR-MCGEE CORPORATION

KERR-MCGEE CHEMICAL CORP.

P.O. BOX 55 HENDERSON, NEV. 89015-0055

AFE No. _____ JOB No. _____

TOLERANCE UNLESS FRACTIONS OTHERWISE SPECIFIED		H H H H	
0.00		H H H H	
0.000		H H H H	

REVISIONS (DESTROY ALL PRINTS OF AN EARLIER DATE THAN LATEST REVISION)			
REV	DESCRIPTION	BY	DATE



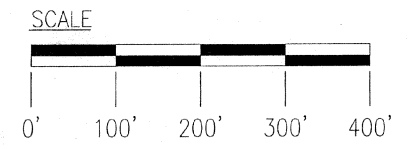
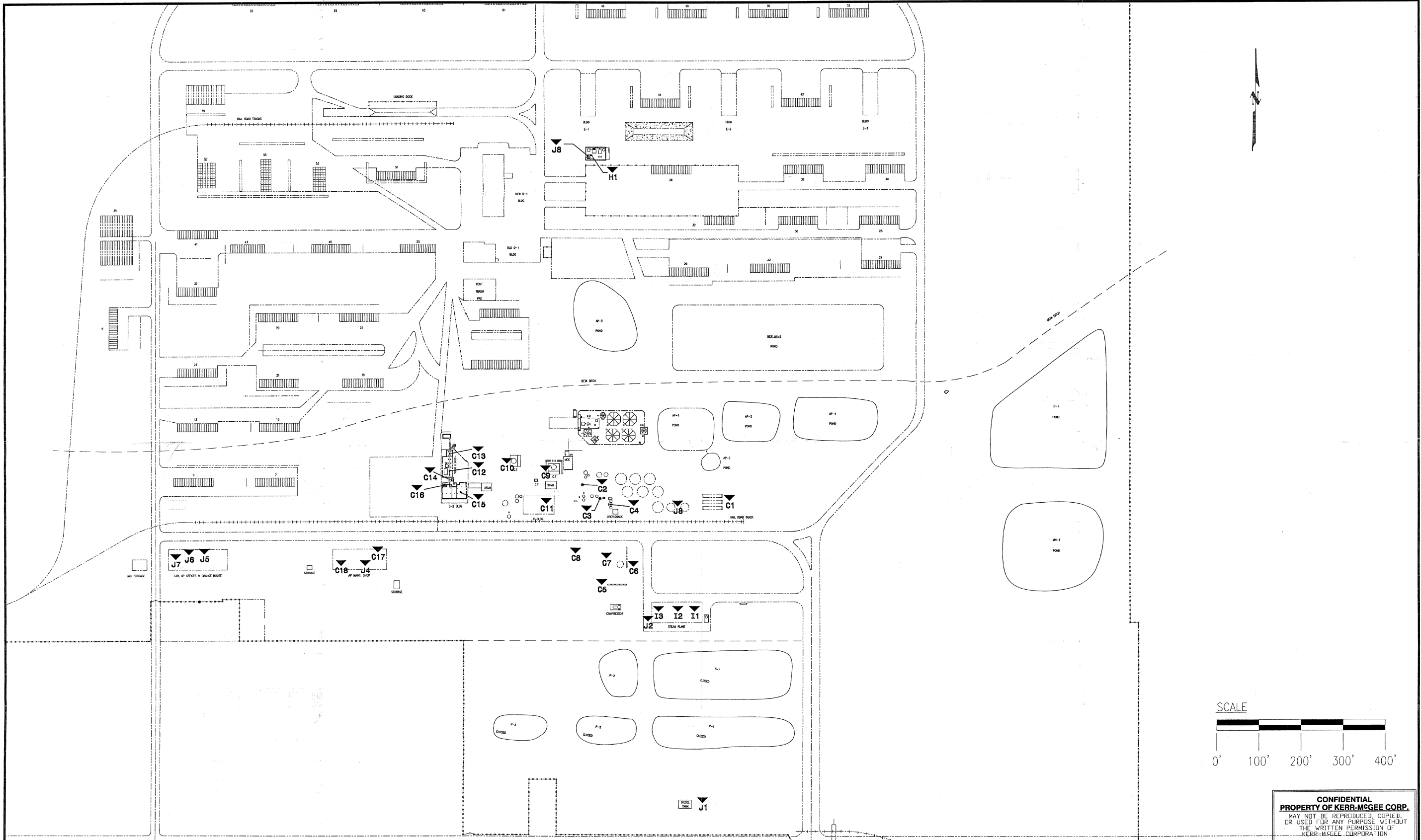
APPROVED FOR CONSTRUCTION				DESIGN			
BY	DATE	BY	DATE	BY	DATE	BY	DATE
SAFETY		PROCESS ENGR.		DRAWN BY	GM BUCO	01-23-96	
ENVIRONMENTAL		PROJECT ENGR.		PROJ. ENGR.	SJC		
OPERATIONS MNGR.		ENGR. MNGR.		ENGR. MNGR.	EM SPORE		
PRODUCTION SUPT		PLANT MNGR.					
Q.LTY. CONTROL							

KMCC HENDERSON FACILITY
EMISSION POINT PLOT PLAN
FIGURE 29

DATE: _____ SCALE: 1" = 120'

DRAWING NO.	SHEET
A-00-1-106	OF
	REVISION

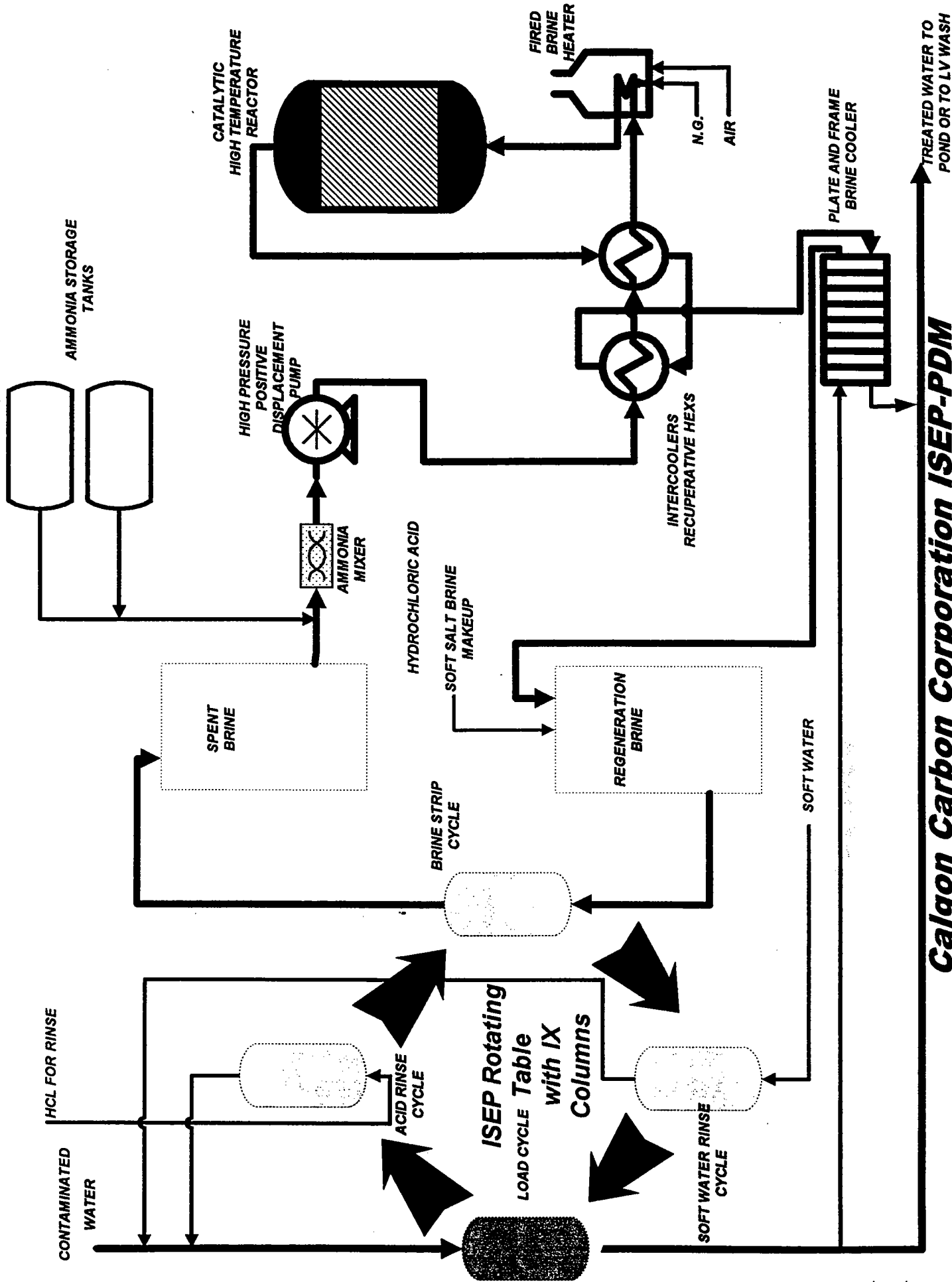
U:\BU\CD\KMR\ENVIRON\S\100110601 Mod Feb 12 14:31:26 1996



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TOLERANCE UNLESS FRACTIONS ± OTHERWISE SPECIFIED 0.00 ± 0.000 ±		KERR-MCGEE CHEMICAL CORP.		P.O. BOX 55 HENDERSON, NEV. 89015-0055		AFE No. _____ JOB No. _____	
REVISIONS (DESTROY ALL PRINTS OF ANY TABLE DATE THAN LATEST REVISION) DESCRIPTION BY DATE		APPROVED FOR CONSTRUCTION SAFETY ENVIRONMENTAL OPERATIONS MNGR. PRODUCTION SUPT. Q.LTY. CONTROL		DESIGN DATE DRAWN BY: GM BUCO 01-23-96 PROJ. ENGR. SJC ENGR. MNGR. EM SPORE		KMCC HENDERSON FACILITY EMISSION POINT PLOT PLAN FIGURE 30	
						DRAWING NO. A-00-1-106	
						SHEET OF REVISION	
						DATE: _____ SCALE: 1" = 120'	

U:\BUCCO\ENGIN\IRON\KERR\001106102 Mon Feb 12 14:30:06 1996



Calgon Carbon Corporation ISEP-PDM
Simplified Process Flow for Perchlorate Removal and Destruction

ATTACHMENT 4
PROCESS & INSTRUMENTATION DIAGRAM

NOTE:
SOME "BUSINESS CONFIDENTIAL"
INFORMATION HAS BEEN REMOVED FROM
THIS ATTACHMENT 4.

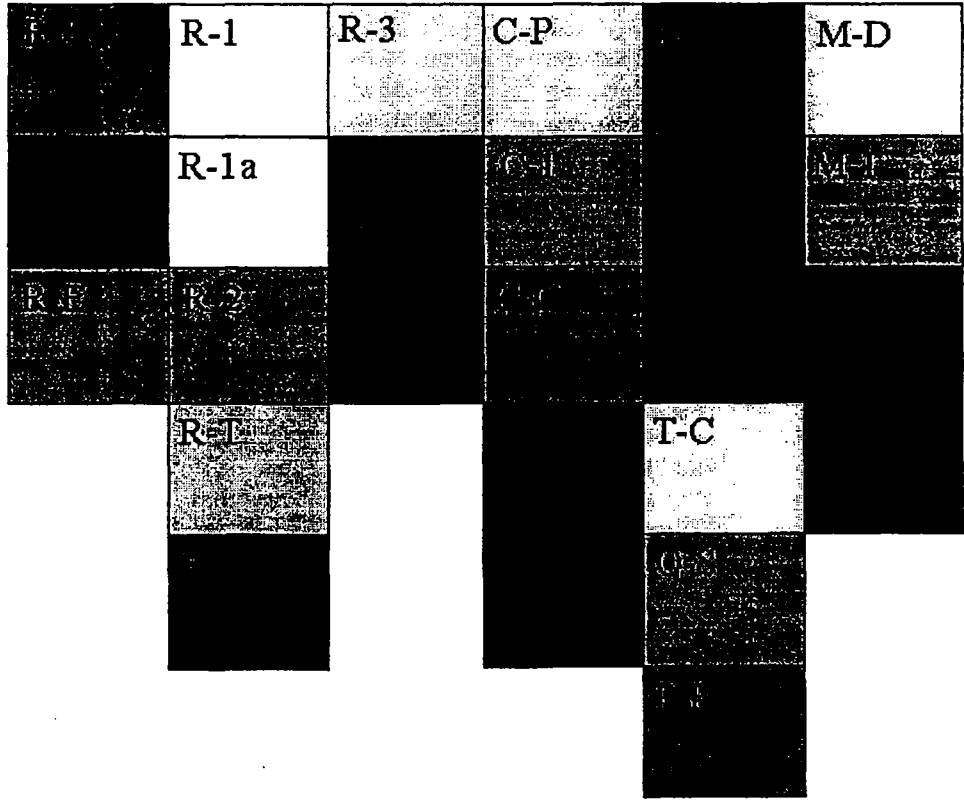
TO RETRIEVE THIS INFORMATION, PLEASE
CALL KERR-MCGEE CHEMICAL LLC,
FACILITY MANAGER (702) 651-2200.

ATTACHMENT 5
ZONING MAP

county as being complete. (Ord. 2068 § 2 (part), 1998)

A-E, airport environs overlay district

The A-E airport environs overlay district is established to provide for a range of uses compatible with airport accident hazards; the handling and transport of live ordnance and noise exposure areas and to prohibit the development of incompatible uses that are detrimental to the public health, safety and welfare in these airport environs. The regulations for the A-E airport environs overlay district shall be supplementary to the regulations of the underlying district and the regulations of the A-E airport environs overlay district shall supersede if there is a conflict. (Ord. 2119 § 6 (part), 1998, Ord. 2068 § 2 (part), 1998)



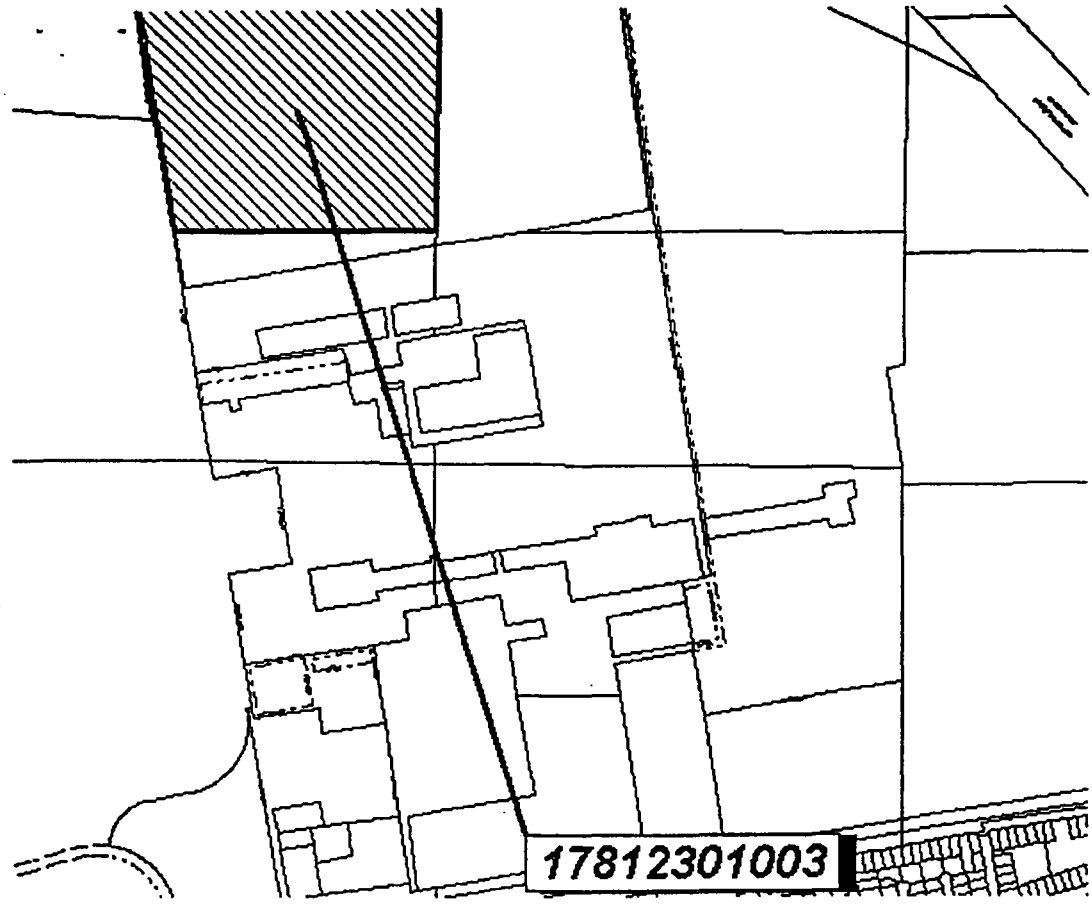


WATER ST.



LAKE MEAD DR.

OVERALL MAP



17812301003

Property Information	
Parcel Number:	17812301003
Owners Name:	AMERICAN POTASH & CHEMICAL CORP
Site Address:	6000 W LAKE MEAD DR 89015
Jurisdiction:	CC Unincorporated
Zoning Classification:	Industrial - Without Dwelling (M-2)
Parcel Details:	Assessor's Information
Parcel Map (PDF):	Assessor's Parcels Map
Tax Bill Details:	Treasurer's Information
Soils Map (PDF):	Building Department Soils Maps
Elected Officials	
Commission District:	A - BRUCE WOODBURY
U.S. Senate:	JOHN ENSIGN, HARRY REID
U.S. Congressional District:	01 - SHELLEY BERKLEY
State Assembly:	23 - RICHARD D. PERKINS
State Senate:	07 - DINA TITUS / TERRY CARE
School District:	A - MARY BETH SCOW
Board of Education:	D - JOHN HAWK
University Regent:	D - MARK ALDEN
Miscellaneous Information	
Subdivision Name:	PT N2 SEC 12 22 62
Township-Range-Section:	22 - 62 - 12
Construction Year:	0
Last Sales Date:	
Last Sales Price:	\$0

Jurisdiction:

This box will list the incorporated cities as appropriate: Boulder City, Henderson, Las Vegas, Mesquite or North Las Vegas. For areas that are within unincorporated Clark County, the box will list CC and the respective township (i.e. CC Paradise, CC Winchester, etc.) [Top](#)

Zoning Classification:

This codes represents the zoning classification as approved by the appropriate governing body (i.e. City Council or County Commission). The hyperlink connects to the jurisdiction's on-line zoning code descriptions. [Top](#)

Overlay District:

If present, these districts impose additional development requirements for a particular property. To better understand the requirements, contact the Planning Department of the appropriate jurisdiction. [Top](#)

Resolution of Intent:

A Resolutions of Intent (ROI) is an ordinance approved by the appropriate governing body (i.e. City Council or County Commission) which modifies the existing zoning classification on a particular property. Each ROI has its own set of conditions which may be obtained by contacting the Planning Department of the appropriate jurisdiction. [Top](#)

Parcel Details:

Connect to the Assessor's Office website to obtain detailed information regarding this parcel. Information includes assessment details and recording document information. [Top](#)

Parcel Map/Soil Map (PDF):

Viewing the PDF files requires that Adobe Acrobat Reader be installed on your machine. To download this free software, [click here](#).

At full size, the dimensions of the PDF are 11" x 17". Each PDF represents cadastral information for approximately 80 acres which includes the selected parcel. [Top](#)

Tax Bill Details:

Payments received by the Clark County Treasurer are listed here. Information includes installment payment information and any penalty, interest or fees that may be applicable. [Top](#)

City Ward:

Ward District for Incorporated Cities. Unincorporated Clark County does not have Ward Districts. [Top](#)

ATTACHMENT 6
AIR EMISSIONS CALCULATIONS

Attachment 6**Air Emissions Calculations****NO_x**

NO_x emissions will be based on the emission rate of 30 ppmv. Exhaust gas flow rate is estimated based on the maximum firing rate for the burners, and a flue gas volume of 10,127 dscf/MMBtu @ 3% O₂. The following formula is used to convert ppm to lbs/hr:

$$\text{Lbs/hr} = (\text{ppm}/10^6) \times (\text{scf}) \times (\text{M.W.}) \times 1.3 / 379 \text{ scf/lbmol}$$

Where:

M.W. = molecular weight of pollutant; M.W. = 46 lbs/lbmol for NO₂

1.3 = Factor to account for short term variations in emission rates

$$\text{Lbs/day} = \text{Lbs/hr} \times 24 \text{ hrs/day}$$

$$\text{Tons/yr} = (\text{ppm}/10^6) \times (\text{scf}) \times (\text{M.W.}) \times (8760 \text{ hrs/yr}) / (379 \text{ scf/lbmol} \times 2000 \text{ lb/ton})$$

CO

CO emissions will be based on the emission rate of 15 ppmv. Exhaust gas flow rate is estimated based on the maximum firing rate for the burners, and a flue gas volume of 10,127 dscf/MMBtu @ 3% O₂. The following formula is used to convert ppm to lbs/hr:

$$\text{Lbs/hr} = (\text{ppm}/10^6) \times (\text{scf}) \times (\text{M.W.}) \times 1.3 / 379 \text{ scf/lbmol}$$

Where:

M.W. = molecular weight of pollutant; M.W. = 28 lbs/lbmol for CO

1.3 = Factor to account for short term variations in emission rates

$$\text{Lbs/day} = \text{Lbs/hr} \times 24 \text{ hrs/day}$$

$$\text{Tons/yr} = (\text{ppm}/10^6) \times (\text{scf}) \times (\text{M.W.}) \times (8760 \text{ hrs/yr}) / (379 \text{ scf/lbmol} \times 2000 \text{ lb/ton})$$

PM₁₀

PM₁₀ emissions are based on the EPA AP-42 emission factor of 7.6 lbs/10⁶ scf and the maximum firing rate of the burners. The heating value of the fuel is assumed to be 1020 Btu/scf.

$$\text{Lbs/hr} = (\text{Emission factor} \times \text{burner capacity} \times 1.3) / \text{heating value of N.G.}$$

$$\text{Lbs/day} = \text{Lbs/hr} \times 24 \text{ hrs/day}$$

Tons/yr = (Emission factor x burner capacity x 8760 hrs/yr) / (heating value of N.G. x 2000 lb/ton)

Where:

1.3 = Factor to account for short term variations in emission rates

SO_x

SO_x emissions are based on the EPA AP-42 emission factor of 0.6 lbs/10⁶ scf and the maximum firing rate of the burners. The heating value of the fuel is assumed to be 1020 Btu/scf.

Lbs/hr = (Emission factor x burner capacity x 1.3) / heating value of N.G.

Lbs/day = Lbs/hr x 24 hrs/day

Tons/yr = (Emission factor x burner capacity x 8760 hrs/yr) / (heating value of N.G. x 2000 lb/ton)

Where:

1.3 = Factor to account for short term variations in emission rates

VOC

VOC emissions are based on the EPA AP-42 emission factor of 5.5 lbs/10⁶ scf and the maximum firing rate of the burners. The heating value of the fuel is assumed to be 1020 Btu/scf.

Lbs/hr = (Emission factor x burner capacity x 1.3) / heating value of N.G.

Lbs/day = Lbs/hr x 24 hrs/day

Tons/yr = (Emission factor x burner capacity x 8760 hrs/yr) / (heating value of N.G. x 2000 lb/ton)

Where:

1.3 = Factor to account for short term variations in emission rates

Emission calculations are presented in Table A6-1.

**Table A6-1
Emission Calculations**

Pollutant	Concentration ppm @3%O2	Emission Factor lbs/MMscf	Emissions	
			Lbs/Hr	Tons/Year
NOx	30	NA	0.96	3.23
CO	15	NA	0.29	0.98
PM10	NA	7.6	0.19	0.65
SOx	NA	0.6	0.02	0.05
VOC	NA	5.5	0.14	0.47

Formulas

Hourly Emissions - NOx and CO lbs/hr = ppm x burner capacity x flue gas flow rate x M.W. x 1.3 / (1,000,000 x 379)
Hourly Emissions - VOC, CO and SOx lbs/hr = emission factor x burner capacity x 1.3 / heating value of N.G.
Daily Emissions Lbs/day = lbs/hr x daily operating schedule
Annual Emissions - NOx and CO Tons/year = ppm x burner capacity x flue gas flow rate x M.W. x annual operating schedule / (1,000,000 x 379 x 2000)
Annual Emissions - VOC, CO and SOx Tons/year = emission factor x burner capacity x annual operating schedule / (heating value x 2000)

Constants

Heating Value of N.G. 1020 Btu/scf
 Flue Gas Flow Rate 10,127 scf/MMBtu
 Burner Capacity 20 MMBtu/hr
 Daily Operating Schedule 24 Hours/Day
 Annual Operating Schedule 365 Days/Year
 M.W. NO2 46 lbs/lbmol
 M.W. CO 28 lbs/lbmol
 NA = not applicable

Note: The 1.3 factor appearing in the emission formulas for hourly emissions is intended to account for peak emission rates from the equipment for short durations. The factor was not used in the annual emissions calculations.

The North American Commitment

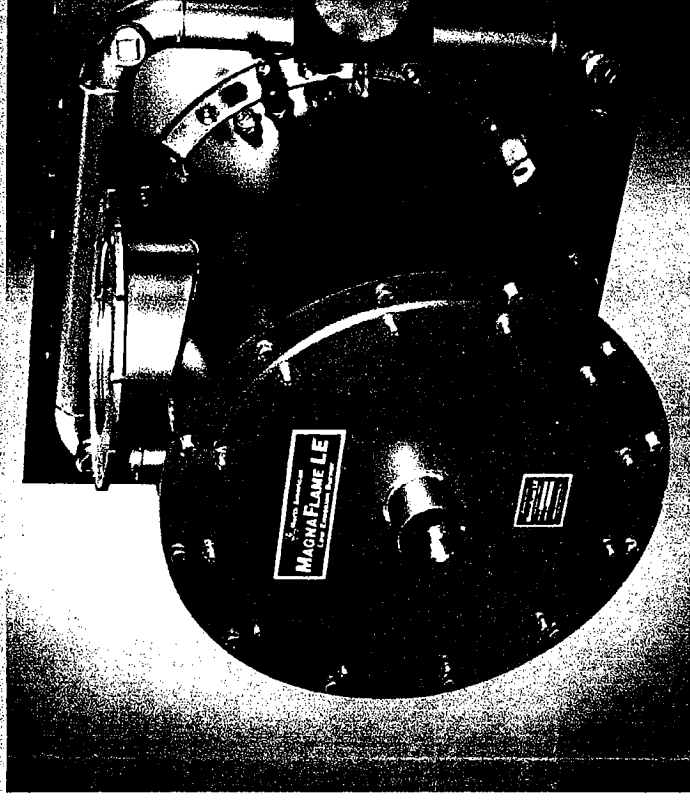
We continuously provide our customers with innovative solutions for all their combustion needs. Our creative energy and engineering expertise come together to provide the latest in combustion technology – supplying breakthrough new products and solutions that improve your facility's performance – and your bottom line.

We provide our customers with full-service support. End-to-end, we ensure every customer is completely satisfied. From initial consultations through field installation and service, North American provides complete customer support throughout the entire process.



North American
Manufacturing Company

4455 East 71st Street • Cleveland, OH
44105-5600 USA
Tel: 216.271.6000 • Fax: 216.641.7852



CUTTING EMISSIONS
THROUGH CUTTING EDGE
TECHNOLOGY

MAGNA-FLAME™ LE



North American
Manufacturing Company

Breakthrough technology for the ultimate in performance.

Applications

- Boilers
- Process heaters
- Incinerators
- Thermal fluid heaters

Unique Patented Design

The Magna-Flame LE provides the ultimate in emission reductions of NOx, CO, and VOCs. The technology uses patented promix and dilute combustion designs to safely combust heat releases up to 250 million Btu/hr.

PATENT NUMBERS:
US 5,407,345
US 5,554,021
US 5,667,376
US 5,730,591
EP 0 804 647 B1
US 5,605,452

LICENSED PATENTS
US 4,945,841
US 5,201,650

Ultra Low NOx without FGR

The Magna-Flame LE uses a lean premix primary flame and dilute secondary combustion to achieve less than 18 ppm (corrected to 3% O₂) NOx without FGR in many applications.

Low NOx without sacrificing low CO and VOC's

In many low NOx burners, CO and VOC emissions increase as NOx emissions decrease. The Magna-Flame LE utilizes a lean premix reaction chamber that changes this relationship and minimizes NOx, CO, and VOCs simultaneously.

Get Even Lower NOx with FGR

When FGR is utilized with the Magna-Flame LE, the NOx emissions can be taken to even lower levels; below 8 ppm (corrected to 3% O₂), 0.01 lb NOx per MMBtu. (see FIG 1)

Preheat efficiencies

The LE's lean premix technology also provides low NOx with preheated air. As the preheat temperature increases, the primary air / fuel ratio adjusts to maintain consistent NOx emissions.

How it works

The unique patented design of the Magna-Flame LE uses a method of lean premix combustion with a controlled reaction zone and dilute secondary combustion in the furnace to achieve ultra low burner NOx, CO, and VOC emissions.

FIG 2 illustrates how the NOx

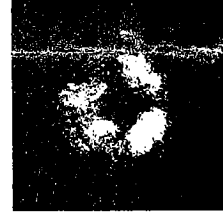
emissions from a premix flame decrease as the amount of excess air is increased. The Magna-Flame LE uses this method to operate at single digit NOx emissions in the reaction chamber.

FIG 3 illustrates how the LE establishes a lean premix and then combusts the mixture in the primary reaction zone. The fuel and air are introduced separately into the

LE Features

- < 20 ppm NOx without FGR
- < 8 ppm, 0.01 lb NOx per MMBtu with FGR
- Low CO and VOC emissions
- High intensity, compact flame
- Sizes from 10 to 250 million Btu/hr
- Turndown up to 10:1
- Available from windbox inserts through packaged systems
- Patented technology
- Robust design
- Rugged and reliable
- No moving parts

burner, where they are intimately mixed within the anti-flashback mixers. This mixture is then directed into the reaction zone where the lean combustion takes place.



Secondary gas is injected into the furnace where it mixes with furnace gases and the products of combustion from the primary reaction zone. The secondary fuel flow provides near stoichiometric overall ratio for the burner.

The entrained oxygen deficient furnace gases are vital to creating a minimal amount of NOx with the secondary jets.

FIG 1

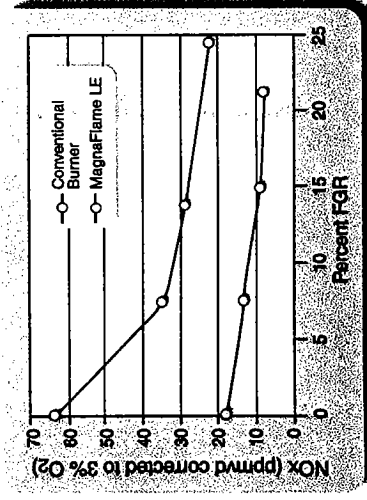


FIG 2

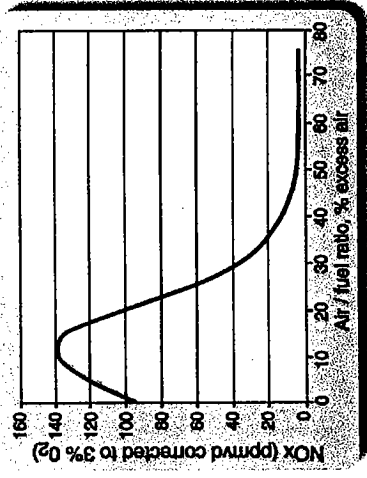


FIG 3 LE - CROSS SECTION

