STATE OF NEVADA
BOB MILLER
Governor

PETER G. MORROS
Director

L. H. DODGION
Administrator

Administration	**(702) 687-4670**
Air Quality	**687-5065**
Mining Regulation and Reclamation	**687-4670**
Waste Management	**687-5872**
Federal Facilities	**687-3880**

Wastewater Treatment Services	**687-5870**
Water Permits and Compliance	**687-4670**
Water Quality Planning	**687-4670**
FAX	**885-0868**

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL PROTECTION

333 W. Nye Lane
Carson City, Nevada 89710

April 9, 1992

Mr. Mark Calhoun
Public Works Director
City of Henderson
240 Water Street
Henderson, Nevada 89015

Pilot Study Approval

RE: BMI/Kerr McKee

Dear Mr. Calhoun:

Andco Environmental Processes, Inc. of Amherst, New York proposes to conduct a pilot study at the Kerr McKee facility in conjunction with a Federal EPA program which seeks to document innovative remediation technologies. The process involves addition of iron and hydroxide ions to contaminated ground water through an injection well and therefore requires an Underground Injection Control (UIC) permit from the Nevada Division of Environmental Protection. The Division intends to issue a temporary permit so that the 10-day pilot study can proceed.

A copy of the proposal is enclosed for your information and review. The permitting process will take approximately two weeks. If you care to comment, please do so within that time period.

You may reach this office by mail at 333 West Nye Lane, Carson City, Nevada 89710, by telephone at 687-4670 or by FAX at 885-0868.

Sincerely,

James R. Smitherman
Environmental Management Specialist
Bureau of Water Pollution Control

enclosures

cc: Marcia Greybeck
Jeff Dennison

RECORD OF COMMUNICATION	☐ DISCUSSION ☐ FIELD TRIP ☐ CONFERENCE ☑ PHONE CALL ☐ OTHER (SPECIFY) (Record of item checked above)	
TO: File	FROM: Jim Smitherman	DATE 4/09/92 TIME 10:00 AM

SUBJECT
Andco Env. Processes, Inc. Remediation Pilot Study at Kerr McKee, Henderson

SUMMARY OF COMMUNICATION

I telephoned Mr. Jack Reich of Andco at approximately 10:00 AM on Thursday 4/09/92 to ask questions that came up during conversations with John Nelson, Marcia Greybeck and Jeff Dennison. The following exchange between myself and Mr. Reich:

Q: Have you talked w/ the City of Henderson?
A: No - that's up to Allen Gaddy
Q: Is Allen Gadi your contact person at Kerr McKee?
A: Yes
Q: How is EPA involved, are they funding this?
A: Yes, EPA's ~~SITE~~ SITE program is set up to fund, test and document new and inovative remediation technologies, primarily for Superfund projects.
Q: What is the composition of the electrode material?
A: Cold rolled carbon steel, I'll send the specs.
Q: Is the $Cr^{6+} \rightarrow CrOH_2$ reaction reversable?
A: No, the end product is very stable. It would take a substantial electromotive force to reverse the reaction.
Q: Will you actually be injecting through a well?
A: Yes

I FAX'd and mailed UIC permit applications, regs, etc. on 4/09/92

CONCLUSIONS, ACTION TAKEN OR REQUIRED

- Contact City of Henderson

ROUTE TO: 1_____ 2_____ 3_____ File ✓

Andco Environmental Processes, Inc.
595 Commerce Drive, Amherst, NY 14228-2380 (716) 691-2100/Fax (716) 691-2880

March 24, 1992

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
123 West Nye Lane
Capitol Complex
Carson City, NV 89710

Attention: Mr. Jim Smitherman

Subject: **Andco Heavy Metal Removal System**
Re: SITE Proposal

Dear Mr. Smitherman:

I appreciate the time you took out of your busy schedule to talk with me regarding the SITE proposal that Andco has submitted to the EPA for work at the Kerr McGee Chemical Corporation Plant in Henderson, Nevada.

As we discussed, Andco is looking to run a pilot study for the SITE program to prove that the electrochemical technology can reduce hexavalent chrome and immobilize other heavy metal contaminants simultaneously in an in-situ process. The main purpose is to prove that this is a viable process so that our existing and future groundwater clients will not have to dispose of a filter cake in either an industrial or hazardous waste landfill.

After discussing this proposal with the personnel at Kerr McGee, they mentioned that the State of Nevada has implemented some recent underground injection control regulations and that these regulations may conflict with the goal of our testing. I am asking your department to review the proposal we have made to the EPA and determine if indeed there is a conflict of interest between our pilot study and your new regulations. I would ask that you please send me a letter documenting your concerns or stating that there is no conflict with your regulations and that if we are accepted into the SITE program then we could use the Kerr McGee site to run the study.

John N.
Monitor for Cr species
Monitor for iron
composition of electrodes
conc of Fe in soln
conc of Cr^{6+} to $3+$
solubility of wells

Jeff D.
Needs to talk to Allen Gaddy
City of Henderson needs notification
— city mgr
— public works director
who is funding this? EPA

Marcia
Is the rxn reversable
under any forseeable
conditions?

Please keep in mind that the new wells and pilot plant will physically be placed between the source plume and Ker McGee's intercept wells for the existing groundwater treatment system. Therefore, if anything should not go as expected, the water will be re-treated through the groundwater facility.

If you should have any questions regarding the information contained in this proposal, please contact either Mike Brewster, Senior Research Chemist, or me at(716) 691-2100.

Sincerely,

ANDCO ENVIRONMENTAL PROCESSES, INC.

Jack I. Reich
Sales Engineer

JIR/cs

Andco Environmental Processes, Inc.
595 Commerce Drive, Amherst, NY 14228-2380 (716) 691-2100/Fax (716) 691-2880

February 24, 1992

US EPA, MS-215
Risk Reduction Engineering Laboratory
26 W. Martin Luther King Drive
Cincinnati, OH 45268

Attention: Mr. Reinaldo Matias

Subject: **SITE-007 Proposal**

Dear Mr. Matias:

It was a pleasure meeting you and attending the SITE presentation on January 28, 1992. From our discussions, I realized how applicable our treatment process is to your SITE program.

As I mentioned, we have already located a site that fits our treatment needs. Identification of the client has been included with the technology fact sheets. Since they are already treating groundwater with a pump and treat system that we provided, site characteristics are well documented and understood. We feel strongly that the proposed process will decrease their treatment duration while achieving lower final chromium concentrations. From our client, everything indicates that management approval to conduct such tesing will be granted. If it is not, we are confident that we can use already established contacts to assist you in finding a site that fits our testing criteria.

During our meeting, I tried to explain where our idea fits into the SITE program. Since we remove water from the ground, you are probably inclined to include it with pump and treat technologies. To refute this, please take note that the water is returned to the aquifer after adding nothing but ferrous and hydroxyl ions. Thus, no dilution figures into the treatment scheme. In-situ chromate reduction occurs due to the addition of extra ferrous ions.

Thus, the process can be classified as in-situ or chemical. Immobilization of other contaminant heavy metals by adsorption allows the scheme to also fit into some stabilization categories. Finally, utilization of the soil matrix as a means of filtration allows me to convey that physical processes will be important in successful chromium reduction/removal at sites employing such a treatment process.

In addition to your required information, I have provided photographs of some test equipment that could be utilized for our prescribed tests. Figure 5 was provided to show the size and design of our 20 GPM pilot system that we would use in the SITE program. The pump and treat system shown in Figure 6 was used at a Superfund Site to demonstrate removal of arsenic, copper, lead, zinc, and chromium to well below required discharge limits. Also, a client list has been included to show you where our wide variety of systems have been implemented to handle diverse problems and a wide range of flowrates (3 GPM - 1600 GPM).

We are looking forward to working with you to demonstrate the system's benefits. If you have any questions or comments, please call me at (716) 691-2100.

Sincerely,

ANDCO ENVIRONMENTAL PROCESSES, INC.

Michael D. Brewster

Michael D. Brewster
Research Chemist

MDB/cs

COVER PAGE
SITE-007 PROPOSAL

PROPOSAL NUMBER ____
(Provided by EPA)

DATE SUBMITTED: 2/24/92 (MDB)

DATE RECEIVED: ____
(To Be Completed by EPA)

PROPOSAL TITLE: Electrochemical In-Situ Chromate Reduction and Heavy Metal Immobilization

DEVELOPER: Andco Environmental Processes, Inc.

ADDRESS: 595 Commerce Drive
Amherst, NY 14228

CONTACT PERSON: Michael D. Brewster

PHONE NUMBER: (716) 691-2100

CATEGORY OF TREATMENT:
X PHYSICAL/CHEMICAL
__ BIOLOGICAL
__ THERMAL
__ SOLIDIFICATION/STABILIZATION
__ MATERIALS HANDLING
__ COMBINATIONS OF UNIT OPERATIONS

TYPE OF WASTE CONTAMINANTS TREATED (HAZARDOUS WASTES, RADIOACTIVE WASTES, VOLATILES, SEMI-VOLATILES, METALS, PCBs, CONTAMINATED SOILS, ETC.):

Metals

TYPE OF WASTE MEDIA (SOIL, SLUDGE, LIQUID, GAS):

Water/Groundwater

8. **Describe physical/chemical waste characteristics (e.g., particle size, pH, debris, moisture content, viscosity, compounds, and their concentrations) that may interfere with the process.**

See Page 8 and Figure 4!

9. **Identify pre-treatment and/or post-treatment requirements.**

If initial pH is below 9, no pre-treatment will be needed. But, if pH <6, post-treatment pH adjustment using a stoichiometric amount of hydroxide may be required to achieve desired results.

10. **Give the suggested duration of the demonstration.**

Two weeks or less.

11. **Identify size of area needed for the demonstration equipment.**

Groundwater flow velocity and monitoring program (wells) will dictate. We intend to keep the test area below one acre.

12. **Identify support facilities for field demonstration (e.g., power and water other site requirements).**

a) 480 volt power source and;
b) Fresh Water

13. **Identify the types and quantities of by-products generated from the process.**

a) Virtually no waste if done as proposed!

b) A small amount (appr. 25 gallons) of 10% HCl used to assure that the surfaces of the electrodes are clean before initiating treatment.

14. **Estimate the shortest time required to have the technology ready for field demonstration. Take into account treatability studies, site characterization, equipment set up and shakedown time, scheduling, etc.**

If our primary site is selected/available, only 5-10 days will be needed for implementation.

15. **Identify any candidate sites for the demonstration, and explain follow up needed to pursue these sites. If a non-Superfund site is proposed, are all required permits in place?**

See Page 8!

16. If this technology is similar to ones already in the program, state why it should be tested in addition to these other technologies.

To our knowldege, the EPA has not evaluated such processes or even similar ideas.

TECHNOLOGY FACT SHEET
(Do not include confidential information)

Proposal Title: See Page 4!

Developer: See Page 4!

1. **Brief description of the technology:**

See pages 4 and 5!

2. **Specific types of waste that can be treated and concentration ranges for contaminants:**
Groundwater containing hexavalent chromium (1-50 ppm) and other heavy metals (2-10 ppm) including zinc, copper, nickel, lead, and antimony.

3. **Waste most preferred for the demonstration.**
Unconfined porous aquifer with hexavalent chromium concentration between 1 and 20 ppm.

4. **Size and scale of available unit(s):**
   4a. **Unit throughput:** 20 GPM

   4b. Is unit field-ready? _X_ Yes ____ No

   4c. If not, date when unit will be field-ready:

5. **Is financial assistance (a client) needed for demonstration funding.**

   ____ Yes _X_ No

   5a. If private funding is needed, are arrangements for same firmly in place?

   NA Yes NA No

   5b. Explain
   NA

6. Identify waste media to be processed: soil____, sludge____, aqueous liquid (e.g.,leachate____, groundwater__X__, surface water_____), non-aqueous liquid_____, gas_____ (explanation if necessary).

7. If process is for material handling, identify what types of material are best suited for the operation.

Not Applicable!

TECHNOLOGY FACT SHEET

Proposal Title: Electrochemical In-Situ Chromate Reduction and Heavy Metal Immobilization

Developer: Andco Environmental Processes, Inc.
Amherst, New York 14228

1. Brief description of the technology:

For many years, Andco Environmental Processes, Inc. has provided systems for reduction of hexavalent chromium and removal of heavy metals from industrial wastewater and contaminated groundwater. By electrochemically introducing highly reactive ferrous ions to the waste streams, optimum reduction conditions were provided and excellent removal efficiencies obtained.

Figure 1 is a schematic of Andco's patented electrochemical cell. As process water is pumped through the cell, it flows through gaps in contact with the electrodes. As direct current flows from electrode to electrode through the process water, ferrous and hydroxyl ions are given off opposite sides of each sacrificial electrode. If pH conditions are correct, hydrous iron oxide will result. Simplified reactions are given below.

$$Fe^{0} + 2H_2O \xrightarrow[\text{Current}]{\text{Electrical}} Fe(+2) + 2\,OH^{-}$$

$$Fe(+2) + 2\,OH^{-} \longrightarrow Fe(OH)_2 \text{ (active precipitant)}$$

With ferrous ions present, chromate (Cr^{+6}) reduction will readily occur and result in the formation of Cr^{+3}. Once again, if a sufficient concentration of hydroxyl ions are present, precipitation will occur. Thus, highly toxic hexavalent chromium will be converted to minimally toxic and insoluble chromium hydroxide.

Until now, only basic chemistry has been discussed. How Andco's process differs from conventional iron salt treatments and why you (EPA) should include our treatment process in the SITE program will be explained.

At a site where the predominant contaminant is hexavalent chromium, we intend to extract water from an unconfined aquifer and pass it through our electrochemical cell. Ferrous iron addition will be in excess of the amount needed to totally reduce the chromium which came in contact with the electrodes. Resulting water containing instantaneously reduced chromium (Cr^{+3}) and soluble ferrous ions will be reinjected upstream. We will rely on the pumping of water to maintain flow direction and velocity. If the initial pH is between 6.5 and 8.0, we expect some hydrous ferric oxide to precipitate and be filtered out in the soil. Small, soluble ferrous ions will continue to move until they come in contact with soluble chromate species, chromate containing solids (ex: barium chromate) or chromate ions adsorbed at the soil : water interface.

While pump and treat systems work well to reduce chromium concentrations in the aqueous phase, they do have limitations. Chromate containing solids and adsorption hold Cr^{+6} in the soil to be released slowly over time. This is the main reason why such systems require long periods of time to achieve required limits. By performing in-situ chromate reduction as prescribed, treatment times will be drastically shortened, sludge handling minimized or completely eliminated, treatment efficiency maximized and toxicity reduced. Another benefit is that hydrous iron oxide is an ideal adsorbent of many other heavy metals. By immobilizing iron solids in the soil, many other contaminants once found in the aqueous phase will show significant (or total) drops in concentration.

The Andco process will not add anything to the groundwater except iron and hydroxyl ions. This will be a significant advantage over iron salts which must add sulfates and chlorides along with the iron. As you can see, conventional schemes will significantly contaminate the aquifer with TDS and Andco's proposed process will not. Also, since the treatment will be enclosed and short, no air oxidation of iron will occur and maximum reduction capability will be maintained. Thus, an excellent control for reduced iron dosing is built into the system.

The flexibility of the process is infinite. After reducing <u>all</u> hexavalent chromium below the ground's surface, it may be desirable to extract water for industrial uses. The same process can be converted to act as a pretreatment step. Another option is to employ a combined system. For instance, use the majority of the flow for in-situ chromate reduction while discharging a portion so that aquifer volume is continually being reduced or controlled.

8. Describe physical/chemical waste characteristics . . .

To adequately evaluate the proposed process, pH and soil type will be the main factors influencing iron's mobility and reduction efficiency. It is important to locate a site where sandy soil predominates and pH is between 6.5 and 8.5. Goals of the test program are to maintain uniform flow, maximize precipitation of iron and chromium hydroxide, and use the soil structure as a sand filter. Chemically, there should not be any interferences with this basic treatment scheme. Minor ones may exist, but the treatment mechanisms should easily overcome them.

Please refer to Figure 3 to see firsthand how pH will influence the solubilities of chromium and iron species taking part in oxidation-reduction reactions and being subjected to sand filtration.

15. Identify any candidate sites for the demonstration . . .

Andco Environmental Processes, Inc. currently has an operating groundwater treatment system at the Kerr McGee Chemical Corporation site in Henderson, Nevada. This groundwater site has chrome contamination due to the use of sodium dichromates in their production process. Over the years, the sodium dichromate found its way into the water table, contaminating the aquifer. Currently, they are pumping between 50 and 120 gpm of groundwater, treating it through the electrochemical process, and reinjecting downgradient through an infiltration trench. All necessary permits are in place with the state of Nevada. There is an available area between the plant buildings and the groundwater treatment system to intercept the plume and perform the type of pilot study we wish to consider.

RK cad file no: E:\MASTER\LAB12690

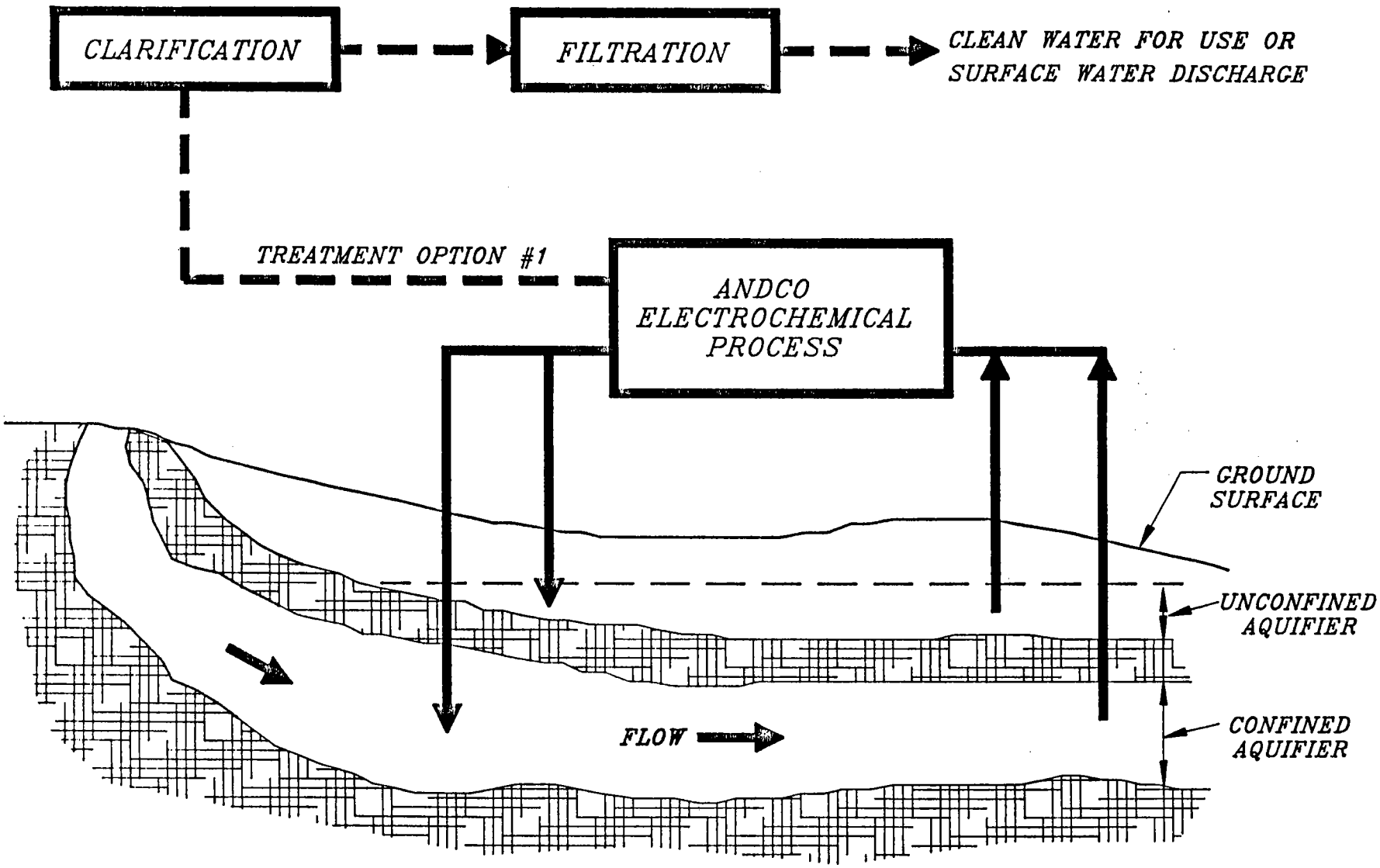

FIGURE #2 – ANDCO'S IN–SITU CHROMATE REDUCTION AND HEAVY METAL IMMOBILIZATION PROCESS

andco

ANDCO ENVIRONMENTAL
AMHERST, NEW YORK

Illustration of Electrochemical Cell

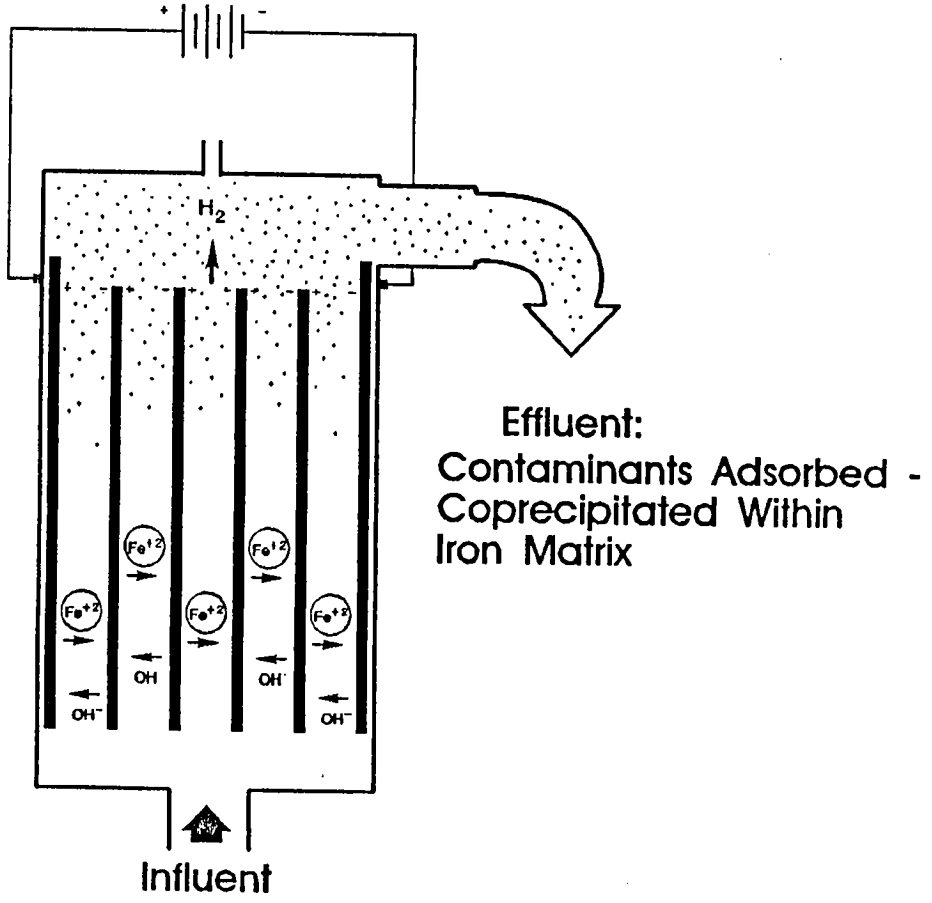

Figure 1:

cad file no. E:\MASTER\L1269001

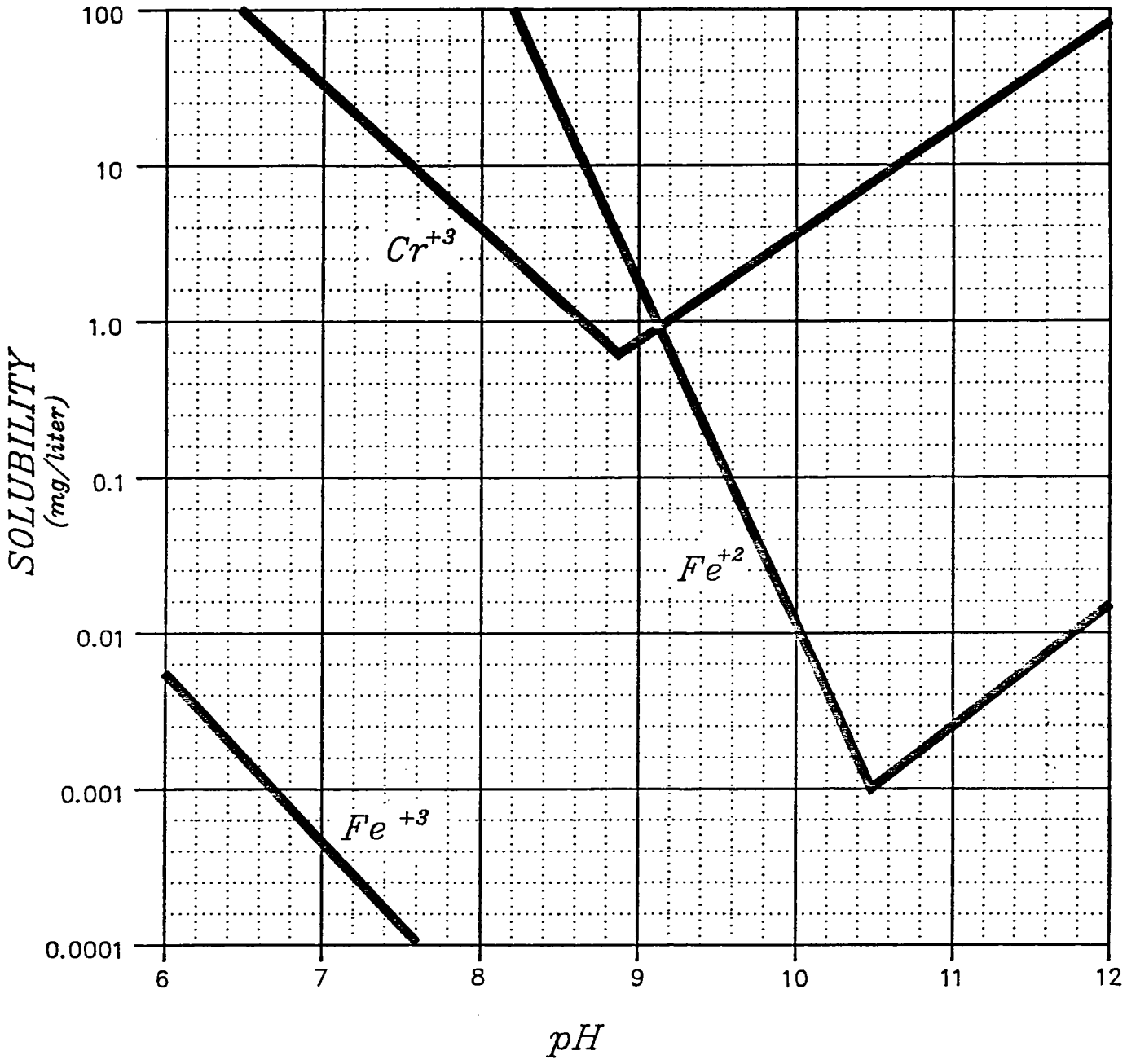

FIGURE #3: SOLUBILITY OF METALS AS A FUNCTION OF pH

andco

ANDCO ENVIRONMENTAL
AMHERST, NEW YORK

plot date: 2/13/92

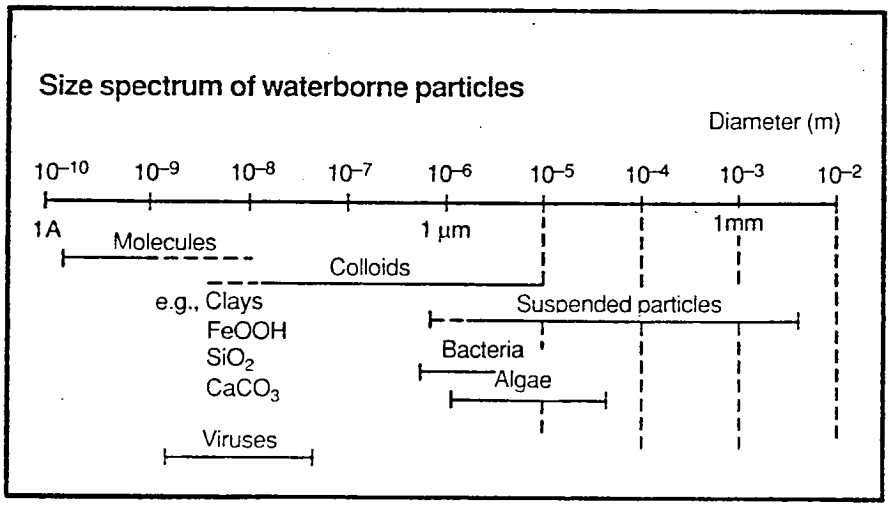

Figure 4: Particle Size Spectrum

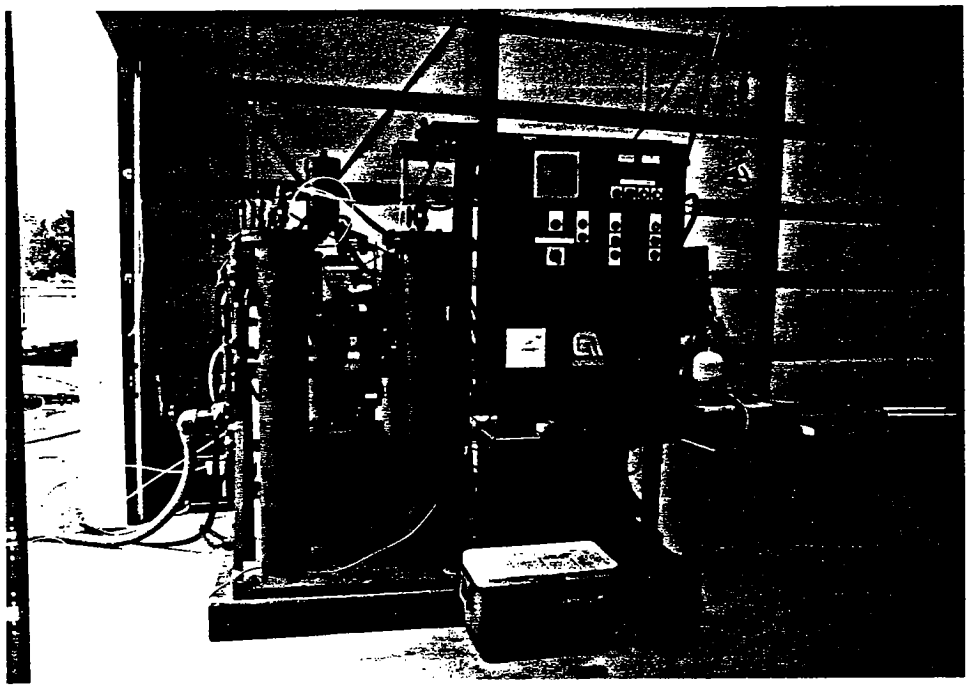

Figure 5 : 20 GPM Electrochemical Pilot Unit

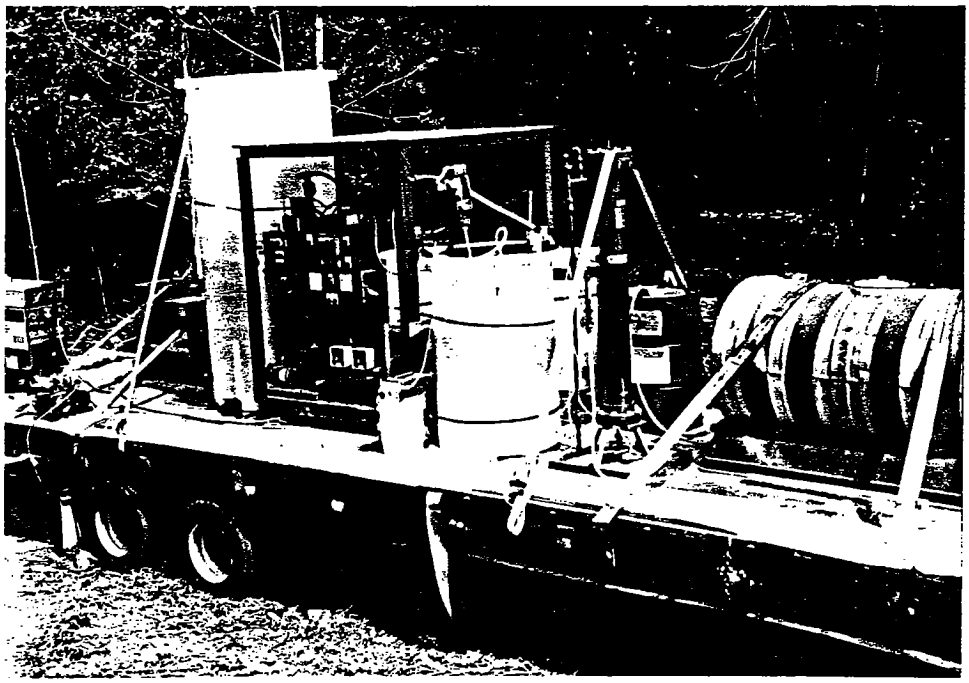

Figure 6 : Metals Removal Pilot Study at a Superfund Site

AND(WASTEWATER AND GROUNDWA SYSTEMS

PARTIAL CUSTOMERS LIST

ACME GALVANIZING
AIR PRODUCTS & CHEM.
ALBERTA GAS CHEMICALS
ALLIED CHEMICALS
ALUMIN ART
ALUMAX
AMERICAN CYANAMID
AMERICAN FUJI SEAL
AMERICAN HOECHST
AMOCO FABRICS
ASHUGANJ FERTILIZER
BATTEN CONVERTER
BELL HELICOPTER
BOEING
BRANEM INDUSTRIES
CALGON CARBON CORP
CAMCO PLATING
CARDINAL ALUMINUM
CATERPILLAR TRACTOR
CENTERLINE CIRCUITS
CHEMICAL WASTE MGMT
CHRYSLER
CIRCRAFT
COLUMBIA NITROGEN
CYANAMID OF CANADA
DUPONT
DUPONT TAU LAB
DIXIE ELECTROTYPE
E C D, INC.
EAGLE ELECTRIC
EVERGREEN AIR CENTER
EXXON
FAUJI FERTILIZER
FORD
FORMOSA PLASTICS
FRIT INDUSTRIES
GO/DAN INDUSTRIES
GARRETT TURBINE
GENERAL DYNAMICS
GENERAL ELECTRIC
GENERAL MOTORS
GLEASON WORKS
GROUNDWATER TECH
HARRISON RADIATOR DIV.
HMM ASSOCIATES
HOLLEY CARBURETOR
I C I AMERICAS
I M I
INDUSTRIAL SERVICES
INT'L HARVESTER
KERR McGEE
KOREA IRAN PETROLEUM
KRUEGER MFG
KUKDONG OIL
LEE ROWAN
LONE STAR ARMY DEPOT
LOCKHEED
MADOSA
MAGNAVOX
MARSH PLATING
MICHIGAN CHROME
MUELLER BRASS
OHM CORPORATION
OLYMPIC AIRWAYS
OMNI METALS
OXY CHEM
PACKARD ELECTRIC
PRATT & WHITNEY
PUPUK KUJANG
ROHM & HAAS
SAUDI PETROCHEMICAL
SHELL CHIMIE
SHELL OIL
SINGER KEARFOTT
TERRA CHEMICALS
TEXAS EASTMAN
TEXAS INSTRUMENTS
THERMO KING
C. H. THOMPSON
E.H. TITCHENER
TOYOTA MOTOR MFG.
TRAK MICROWAVE
TRI CITY CIRCUITS
UNION CARBIDE
UPJOHN
WESTERN CURRENCY
WOODWARD CLYDE
XEROX
YOTEC, INC.

Andco Groundwater Treatment Units

Kerr-McGee - Model 1G - Automatic

	Influent (mg/l)	Effluent (mg/l)
Hexavalent Chrome	10.0	0.05
Total Chrome	10.0	1.71
Flowrate	110 gpm	

Address: Contact: Alan Gaddy

Kerr-McGee Chemical Corporation
800 Lake Mead Road
Henderson, Nevada 89015

Source of contamination:

Groundwater is contaminated with hexavalent chrome which is an integral material in the production of sodium chlorate.

Governing body - State level:

Nevada Division of Environmental Protection
201 South Fall Street
Capitol Complex
Carson City, Nevada 89701

Contact: Laverne Ross

Lockheed - Georgia Company - Model 1G - Automatic

	Influent (mg/l)	Effluent (mg/l)
Hexavalent Chrome	2.0	0.05
Total Chrome	2.0	0.20
Flowrate	15 gpm (groundwater only)	

Address: Contact: Sonny Moore

Lockheed-Georgia Company
4280 Pace Street
Charleston, SC 29405

Source of Contamination

Groundwater is contaminated with hexavalent chrome which comes from their Adhesive Bond Plant wastewater which had migrated through surface impoundments.

The unit was originally designed to handle their contaminated groundwater. However, at the present time, (10/87), they are not treating the groundwater due to low chromium concentrations.

Governing Body - State Level:

South Carolina Dept. of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Note:

This Lockheed facility has a NPDES permit to discharge to Brickyard Creek which flows to the Ashley River. NPDES Permit #SC0001007.

HMM Associates, Inc. Model "1C" - Automatic

	Influent (mg/l)	Effluent (mg/l)
Hexavalent Chrome	1-15	0.005
Total Chrome	5.5-7.0	Not Stated
Flowrate	10-35 gpm	

Address:

HMM Associates, Inc.*
196 Baker Avenue
Concord, MA 01742

Contact: Joe Vitale

*HMM Associates is performing the work at the site on behalf of the responsible party.

Source of Contamination:

This site is a previous Printed Circuit Board manufacturing site. The hexavalent chrome leaked from underground concrete storage vessels into the groundwater.

Walbro Corporation - Model 1B

	Influent (mg/l)	Effluent (mg/l)
Hexavalent Chrome	60.0	0.05
Total Chrome	65.0	1.71
Flowrate	3 gpm	

Address:

Walbro Corporation
1632 West Midland Road
Auburn, Michigan 48611

Source of Contamination:

Groundwater was contaminated with hexavalent chrome from their production process.

Governing Body - State Level:

Department of Natural Resources
411-J East Genesee
Saginaw, Michigan 48607

California Department of Transportation - Model 1G

	Influent (mg/l)	Effluent (mg/l)
Hexavalent Chrome	0.231	0.05
Al	5.1	0.15
Flowrate	140 gpm	

Address:

Groundwater Technology, Inc.
Garden Street Location
Santa Barbara, California

Source of Contamination:

Groundwater is contaminated from former manufacturing operations that were removed for freeway right-of-way.

Governing Body - State level

Air Pollution Control District
Regional Water Quality Board
Santa Barbara, CA

Dept. of Health Services
Sacramento, CA

Frit Industries - Model 2C

	Influent (mg/l)	Effluent (mg/l)
Zn	300.0	0.05
Cu	0.5	0.2
Ni	0.5	0.3
Pb	1.0	0.1
Cd	1.0	0.05
Flowrate	150 gpm - Surface Water	

Address: Contact: Carl Schauble

Frit Industries
Walnut Ridge, Arkansas

Source of Contamination:

Soil and surface water is contamianted by previous owner who produced fertilizer.

Governing body - State level:

Arkansas Pollution Control and Ecology Department
P.O. Box 9583
Little Rock, Arkansas 72219

Client - Confidential - Model 1G

	Influent (mg/l)	Effluent (mg/l)
Cr+6	20	0.05
Cr(T)	20	0.05
Flowrate	60 gpm - Groundwater	

Address:

California

Source of Contamination:

Groundwater contaminated by leaking UST and overall wood preserving operation. Replaces RO system.

Governing body - State level:

California Regional Water Quality Control Board
Department Health Services

Black & Veatch Waste Science & Technology Corporation - Model 2G

	Groundwater Influent (mg/l)	Stormwater Influent (mg/l)	Effluent (mg/l)
Hexavalent Chrome	15.0	0.5-7.5	0.011
Total Chrome	15.0	1.0-8.0	0.050
Copper	0.001-0.01	0.5-8.0	0.0065
Arsenic	--	0.05-0.20	0.01
Flowrate	300 gpm		

Address:

Black & Veatch Waste Science & Technology Corporation
4717 Grand Avenue
Suite 500
P.O. Box 30240
Kansas City, MO 64112

Contact: Kevin Warren

Source of Contamination:

Black & Veatch is acting as consultant for an operating cooling tower company that performed wood preserving activities at the site. The electrochemical system is alternately treating groundwater and storm water run-off.