Exhibits E-H

To the Petition for Review of a decision by the Illinois Environmental Protection Agency, July 2, 2009

(Hillsboro Energy, L.L.C., Deer Run Mine)

Exhibit E:
Baseline Surface Water Sample Site Data

Attachment III.2.C.2. Baseline Surface Water Sample Site Data

Ownership: Name Address	Hillsboro Energy, LLC. 925 South Main, Hillsboro, IL 62049					
Discharge Location #	D-1	D-1	D-1	D-1	D-1	D-1
Date	01/09/07	02/28/07	03/29/07	04/25/07	05/31/07	06/26/07
Water Quality						
Acidity, Total (mg/L $CaCO_3$)		-20	-39	-68	-83	-104
Alkalinity, Total (mg/L $CaCO_3$)		34	74	98	122	126
Chloride (mg/L)		6	15	16	18	17.5
Hardness (mg/L $CaCO_3$)		50	98	116	129	130
Iron, Total (mg/L)		1.86	3.04	1.12	0.44	0.402
Manganese, Total (mg/L)		0.1	0.268	0.3	0.2	0.688
pH		8.60	8.10	8.50	8.80	8.30
Sulfate, Total (mg/L)		8	26	24	14	10
Total Dissolved Solids (mg/L)		100	120	175	170	176
Total Suspended Solids (mg/L)		13	65	16	7	44
Flow Rate, gpm	0	0	0	0	0	0
Discharge Location #	D-2	D-2	D-2	D-2	D-2	D-2
Date	9-Jan	28-Feb	29-Mar	25-Apr	31-May	26-Jun
Water Quality						
Acidity, Total (mg/L $CaCO_3$)	-102	-88	-176	-207	-230	-50
Alkalinity, Total (mg/L $CaCO_3$)	136	111	244	284	292	62
Chloride (mg/L)	25	16	26.3	24	21	5.7
Hardness (mg/L $CaCO_3$)	164	131	269	280	273	71
Iron, Total (mg/L)	1.92	2.09	0.951	0.803	0.57	1.18
Manganese, Total (mg/L)	0.1	0.1	0.36	0.2	1.2	0.157
pH	7.80	7.40	7.70	7.90	7.80	7.80
Sulfate, Total (mg/L)	43	36	35	66	43	16
Total Dissolved Solids (mg/L)	290	205	360	405	365	125
Total Suspended Solids (mg/L)	4	12	13	8	6	13
Flow Rate, gpm	60	65	50	10	5	10
Discharge Location #	D-3	D-3	D-3	D-3	D-3	D-3
Date	9-Jan	28-Feb	29-Mar	26-Apr	31-May	26-Jun
Water Quality						
Acidity, Total (mg/L $CaCO_3$)	-124	-106	-165	-146	-168	-33
Alkalinity, Total (mg/L $CaCO_3$)	141	119	206	216	248	52
Chloride (mg/L)	36	24	40.1	28	16	8.2
Hardness (mg/L $CaCO_3$)	169	166	246	214	211	66
Iron, Total (mg/L)	0.46	0.21	0.26	1.62	5.05	0.903
Manganese, Total (mg/L)	0.0	0.0	0.065	0.4	2.6	0.034
pH	8.00	7.60	7.80	7.80	7.90	7.70
Sulfate, Total (mg/L)	34	36	34	37	20	21
Total Dissolved Solids (mg/L)	260	210	340	330	325	140
Total Suspended Solids (mg/L)	3	1	1	11	51	14
Flow Rate, gpm	0	5	5	2	0	0

Note: Samples for July & August were not obtained due to no flow and no pooled water at sampling points.

Exhibit F:
Hydrology of Mine Pit Lakes

Southwest HYDROLOGY
The Complete Hydrologic Resource

Volume 1/Number 3 September/October 2002

Hydrology of Mine Pit Lakes

Southwest Hydrology
P.O. Box 15600
Tucson, AZ
85728-5590

Address Service Requested

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536 P1
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Water Treatment as a Mitigati

James R. Kuipers, P.E. – Center for Science in Public Participation

When pit lakes exceed applicable state or federal surface water quality standards, or may cause exceedances of groundwater standards, various forms of mitigation may be employed. Three primary options are:

- Neutralize the pit lake in place through treatment.
- Prevent the formation of a pit lake by pumping groundwater.
- Regulate the pit lake level at a certain height.

This last option is done either to maintain a pit lake as a hydraulic sink or to prevent it from commingling with other aquifers. Both of the latter options require treatment of the pit lake water prior to discharge.

Treatment Options

Pit lake water can be treated by a variety of physical, chemical, and biological processes that are capable of economically and effectively removing sulfate, metals, and other elements. Recent technological innovations continue to make these processes more effective and more economical.

Physical treatment processes primarily address suspended solids and consist of screening and filtration techniques to remove particulate matter down to around 10 micrometers (µm). For example, nanofiltration and reverse osmosis employ engineered membranes to separate different sized dissolved matter of less than 1µm. Physical processes also include solids/liquid separation such as thickening of sludge products.

Chemical treatment processes are the most common. They are typically used to treat acid drainage-affected pit lake water or to treat specific contaminants such as arsenic. Chemical treatment processes include lime precipitation for sulfates and other methods that remove contaminants by precipitation, adsorption, and cementation, or by other means such as ion exchange. The processes are typically designed to treat specific contaminants or characteristics of the influent stream.

There are proven, practical and cost effective means to achieve stringent water quality standards if the treatment of pit lake water is necessary.

Biological processes have yet to be extensively used in pit lake treatment except in limited circumstances involving small lakes or restricted flows. Biological treatments include sulfate reduction processes to treat acid drainage and remove sulfate and metals. Biological processes can also be used to treat metals under other conditions and to reduce nutrients such as nitrogen.

Treatment Applications

In most applications, a combination of physical and chemical processes has been proposed. The lake located in the Berkeley Pit adjacent to Butte, Montana is one of th largest and most toxic pit lakes in existenc with a volume of more than 30 billion gallons and a pH less than 2. The lake contains high levels of sulfate, and metals such as aluminum, cadmium, copper, iron, lead, zinc, and arsenic.

ARCO, the primary responsible party for the Berkeley Pit Superfund site, has received the EPA's approval for an eventu 5,000-gallon per minute capacity lime precipitation high-density sludge (HDS) treatment process to reduce sulfate. The process will produce an effluent of approximately 1,500 milligrams per liter (mg/l) sulfate that will be discharged to surface water (Montana does not have numeric surface water standards for sulfate The plant is expected to cost $25 million and be operational by 2004. The plant will be operated in perpetuity in order to keep the pit lake at a certain level so as not to contaminate shallow alluvial aquifers and

Method for Pit Lakes

surface waters in the headwaters of the Upper Clark Fork River basin.

In New Mexico, Phelps Dodge Corporation recently announced that they will continue to pump groundwater in perpetuity at their Chino and Tyrone copper mines near Silver City to prevent the formation of surface water in the existing mine pits. The Tyrone pit water contains approximately 2200 mg/l sulfate at a pH of approximately 3.5. The company has also proposed an innovative approach to future pit lake water treatment at their Tyrone mine using the same lime precipitation and HDS method as will be used at the Berkeley Pit in Montana, combined with nanofiltration technology.

Historically, engineered membrane separation processes such as nanofiltration and reverse osmosis have only been used as a polishing step to remove trace amounts of metals or other elements. However, with recent improvements in membrane manufacturing processes and new materials, greater durability and flexibility have been achieved, allowing for the application of the nanofiltration process as an up-front treatment method that produces both a high-purity effluent and a concentrate that can then be treated by conventional processes.

The advantage of the process, which is licensed by HW Process Technologies, is that it can be used to produce an effluent that meets stringent water quality standards more efficiently than lime precipitation and chemical treatment alone, which also requires additional dilution with clean water to meet standards. In addition, the new process reduces capital and operating costs. The flowsheet below shows the nanofiltration lime precipitation HDS process.

In conclusion, there are proven, practical and cost effective means to achieve stringent water quality standards if the treatment of pit lake water is necessary. This avoids the need for other means of pit lake water disposal that are less acceptable environmentally and socially, such as using clean water for dilution, or relying on faulty land application disposal systems.

Contact James Kuipers at jkc@montana.com.

Tyrone Mine Pit Water Treatment Process Flowsheet

Nanofiltration treats the full volume of pit water and produces a low dissolved-solids effluent and a high dissolved-solids concentrate (or reject stream). The nanofiltration concentrate is then neutralized with lime to precipitate metals and salts such as sulfate. The neutralized solution from the lime precipitation process is then combined with the permeate prior to discharge to achieve regulatory compliance.

As shown on the flowsheet, the process can be used to remove approximately 95 percent of the sulfate from the Tyrone pit lake water, resulting in a final effluent of 506 mg/l sulfate, below New Mexico's groundwater standard of 600 mg/l. The estimated cost of a 1,600 gallon per minute capacity plant is expected to be approximately $23 million with an annual operating cost of $1.4 million ($1.50/1,000 gallons). This design was developed by Van Riper Consulting and Hazen Research.

Exhibit G:
Sulfate Removal from Injected Water in Oilfield Operations

Sulfate Removal from Injected Water in Oilfield Operations

The FILMTEC™ SR90 nanofiltration membrane (and the resultant sulfate removal technology) has been developed in a cooperative effort between The Dow Chemical Company and the Marathon Oil Company to selectively remove sulfate from seawater that is used for waterflood injection operations.

There are two major advantages in the removal of sulfate from injected seawater.

- Prevention of barium and strontium sulfate scale precipitation. When normal high sulfate seawater is injected into reservoirs which have formation water containing barium and strontium, mixing occurs forming a supersaturated barium and / or strontium sulfate solution. Upon pressure decreases in and around the production wells, the supersaturated barium and / or strontium sulfate solution is no longer stable and precipitation occurs. The result is scale formation in the production tubing and / or plugging of reservoir rock around the production well. Petroleum reserves are often lost. By removing sulfate from injected seawater, the potential for scaling is prevented. This is contrasted with traditional scale remediation treatments and procedures addressing scale problems after they occur. In deep water and other complex oil developments, sulfate removal, and the subsequent prevention of scale, provides significant cost advantages.

- Souring Control / Mitigation in reservoirs containing barium and strontium. By removing the sulfate in the injected seawater, there simply is a reduced source of sulfur that can be converted to hydrogen sulfide by thermophilic sulfate reducing bacteria. Consequently, well souring does not occur. Examples of sweet oilfields that became sour upon waterflood breakthrough following the injection of high sulfate seawater, include Prudhoe Bay, Kuparuk, and Gulfaks in the North Sea. By removing the sulfate from the injection water providing subsequent souring control, there is a reduced need for sour safe metallurgy, costly hydrogen sulfide removal equipment, and health and safety concerns. Along with sulfate removal in normal scale prone reservoirs, the Reservoir Souring Mitigation (RSM) Technology is being developed by Dow and Marathon to ensure no hydrogen sulfide generation for reservoirs - regardless of barium or strontium content.

The nanofiltration membrane also removes all particles greater than one one-thousands of a micron resulting in high quality injection water free of silica and bacterial materials thereby insuring continued injection rates reflective of initial reservoir conditions.

Sulfate removal provides maximum benefits in oil developments exhibiting the following characteristics.

a) Deep water operations with subsea vs. dry well heads. Chemical squeeze inhibitor treatments generally cannot be applied when access to a dry well head is not available.

b) Horizontal or multilateral reservoir developments where there is difficulty / risk in the placement of chemical squeeze inhibitors.

c) Costly production wells where the loss of one well due to scaling could approximate the cost of a sulfate removal unit.

d) Mild / Moderate scaling potential in combination with costly and / or complex reservoir developments.

It has been observed that sulfate removal is being accepted as the "default" scale control technique in most West African and Brazilian operations. Seven additional sulfate removal facilities are either in operation or under construction in the North Sea. Total sulfate removal capacity is approximately 4MM BWPD for existing systems and systems under construction.

Products

FILMTEC SR90-400***i*** and SR90-440***i*** nanofiltration membranes are used exclusively in offshore oilfield applications. In addition to the membrane elements, the product includes end use know-how, proprietary operation procedures, risk assessments, detailed system designs, and a sublicense of the Marathon Oil Company patent, which allows an end user to practice the technology. Extensive field experience, product technical manuals (under confidentiality and sublicensing agreements) and research has resulted in a one-third reduction in weight, space, and cost requirements since the inception of the technology. Systems are designed specifically to ensure the elimination of scale and for particular platform requirements and reservoir characteristics.

Features

Eliminating Scale

Removal of sulfate eliminates the sulfate component from injection water that causes scale formation. Reducing or eliminating scale:

1. Eliminates the existing scale inhibitor squeeze treatments.
   a. Cost of such treatments.
   b. Deferred oil production during squeeze treatments.
   c. Necessary monitoring of residual scale inhibitors.
   d. Potential reservoir damage from these treatments.
   e. Discharge of scale inhibitors and resultant environmental concerns.
2. Eliminates potential coprecipitation of radium 226 which results in radioactive barium sulfate scale and resultant handling and disposal costs.
3. Potential loss of a well (reservoir reserves) due to scaling and resultant unsuccessful well workovers.
4. The cost of a well workover. In some areas, two or three well workovers often equal the cost of a sulfate removal facility.

Eliminating Hydrogen Sulfide

An auxiliary benefit is that by reducing sulfate injected into barium and / or strontium rich reservoirs, one eliminates the source of sulfur that is converted to hydrogen sulfide by sulfate reducing bacteria. This applies only to wells such as those in the North Sea that were sweet until waterflood breakthrough when they turned sour. Eliminating hydrogen sulfide generation:

1. Reduces safety, health, and environmental concerns by eliminating the production of deadly hydrogen sulfide.
2. Reduces the cost related to sour gas and oil treatment or dedicated "sour safe" pipelines.
3. Allows use of less costly metallurgy for the operation due to reduced stress cracking and corrosion.
4. Reduces sulfide scale problems (ferric sulfide is exceptionally troublesome).
5. Reduces the potential for necessary addition equipment on a platform or FPSO with limited space and weight capacities.
6. Improves the economics of a discovery to "tip the scales" in pursuing v. abandoning a new prospect via risk analysis.

Competitive Offerings

The Dow / Marathon Sulfate Removal Technology is a patented process offered by four worldwide non-exclusive licensees. The licensees / system suppliers include: Aker Kværner Process Systems of Lysaker, Norway; NATCO Group of Houston, TX, USA and Farnborough, UK; Siemens - US Filter of Houston, TX, USA and Oslo, Norway; and VWS Westgarth Ltd. of East Kilbride, Scotland and Gloucester, UK as well as Houston TX, USA.

Case Histories

Low Sulfate Seawater Mitigates Barite Scale - Jim Hardy and Ian Sims, Marathon Oil UK Ltd. *Oil and Gas Journal*, 02 Decemeber 1996.

Barite Scale Prevention for Elf Angola's Girassol Field Using Sulphate Removal Technology, Van Khoi Vu, Elf Exploration Angola, Paris France, Deep Offshore Technology Conference, October 1999.

Eliminating the Need for Scale Inhibition Treatments for Elf Exploration Angola's Girassol Field, Van Khoi Vu, Elf Exploration Angola, Paris France, SPE 60229, January 2000.

Low Sulfate Water Injection Knocks Off Production Hit-List, *Offshore* Magazine, Pennwell, April 1998

Seawater Membrane Filtration Used to Control Scale in Syd Arne Reservoir, *Offshore* Magazine, Pennwell, August 2001, English

New System at Heidrun removes sulfate from seawater, *Offshore* Magazine, Pennwell, May 2004.

Deepwater project economics demand sulfate removal to ensure scale-fee operation, *Offshore* Magazine, Pennwell, May 2003.

The Advancement of Sulfate Removal from Seawater in Offshore Waterflood Operations (972KB PDF) presented at CORROSION/2002

NACE International Web Site

Presentations / Reference List

For in-depth discussions and review of how Sulfate Removal may provide field operation cost reductions for each particular reservoir development, please contact either:

The Dow Chemical Company (Scott Beardsleyat (952) 897-4290 ssbeardsley@dow.com) or Marathon Oil (George Southwell at (303) 692-0139 george@prattllc.net)

Exhibit H:
Sulphate removal demonstration plant

- 21 January 2008 -

Sulphate removal demonstration plant

BioteQ Environmental Technologies Inc, which specialises in the treatment of industrial contaminated water, has created a development agreement with Freeport McMoRan Copper and Gold to jointly engineer, construct and operate a demonstration plant for the removal of sulphate and other dissolved solids at the Sierrita copper mine site in southern Arizona, USA, using BioteQ's proprietary Sulf-IX ion-exchange technology. The plant, to be constructed in 2008, is anticipated to have a total capacity of 125 gallons per minute.

"We are optimistic about the market opportunities for our sulphate reduction technology, as regulations for sulphate discharge are tightening in many jurisdictions around the world, driving the need for environmental compliance in industries like mining, metal processing, pulp and paper, and chemical manufacturing," said Brad Marchant, BioteQ's President & CEO. "The Sierrita project will be the first large-scale application of BioteQ's Sulf-IX process."www.bioteq.caThis update is brought to you by *Filtration Industry Analyst*, the business information newsletter. To receive a sample copy of *Filtration Industry Analyst*, click here.

BioteQ Signs Agreement with Molymet for Sulphate Removal Plant; -To Replace Existing Reverse Osmosis Plant-.

Canadian Corporate News, February, 2008

VANCOUVER, BRITISH COLUMBIA, Feb 20, 2008 (Marketwire via COMTEX) -- BioteQ Environmental Technologies Inc. (TSX:BQE), a leader in the treatment of metal and sulphate contaminated water, reports that it has signed a construction and operating agreement with Molibdenos y Metales S.A. (Molymet) to build and operate a Sulf-IX(TM) water treatment plant to remove sulphate, replacing an existing reverse osmosis process at Molymet's Nos refinery near Santiago, Chile.

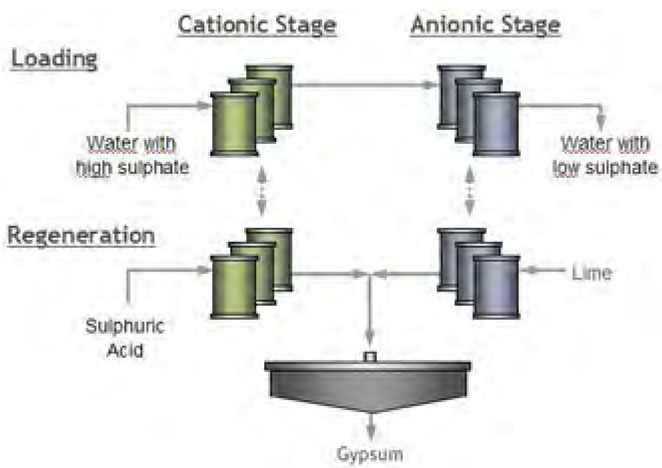
The plant, to be built in three stages to allow gradual replacement of existing technology, is expected to have a capital

From www.bioteq.ca:

The Sulf-IX™ Process

The Sulf-IX™ Process

The Sulf-IX™ ion exchange process is a two stage process employing two different resins to remove calcium and sulphate ions (Ca^{2+} and SO_4^{2-}) from water. The resins are regenerated using the low-cost reagents, sulphuric acid and lime, so that the only products of the process are clean water that can be discharged or re-used, and a solid gypsum product that can be used in building products and fertilizer production. A simple schematic of the process is shown below.



The Sulf-IX™ process is particularly suited for the removal of sulphate from lime plant effluent but is applicable for the treatment of any process stream or wastewater high in Total Dissolved Solids (TDS) and Ca/Mg hardness. The complete process cycle includes resin loading, regeneration and rinsing. Feed water is first passed through a series of contactors containing cation exchange resin to remove primarily calcium and magnesium by loading the cations onto the resin, and then through contactors containing anion exchange resin to remove sulphate.

The technology was initially based on the GYP-CIX technology developed in South Africa, which also uses sulphuric acid and lime for resin regeneration. The Sulf-IX™ process, however, overcomes difficulties of the GYP-CIX process associated with limited process flexibility for varying feed chemistry, mechanical entrainment of gypsum in the regeneration stage, and limitations on sulphate removal when magnesium is present in significant concentration in the feed water.

BioteQ is working with Freeport McMoRan to build a demonstration plant at the Sierrita mine site in southern Arizona. Click here to find out about more BioteQ's developing projects.

Benefits of the Sulf-IX™ ion exchange technology

- Uses simple and low-cost reagents to remove sulphate from water to levels that meet or exceed tightening sulphate regulations.
- Produces only clean water and a clean gypsum product than can provide added-value due to its potential use as a construction material.
- High recovery of water
- Ideally suited for sulphate removal form lime plant effluent
- Costs less compared to alternative processes.