September 1, 2005

Dear Oil and Gas Research Council Members,

Attached you will find a funding request for a project to be completed by BioRem Consultants, Amerada Hess Corporation and the North Dakota Industrial Commission, Department of Mineral Resources Oil and Gas Division.

Please accept this letter as a binding commitment on behalf of the above entities to complete the project as described in the application if the Commission approves the grant requested.

Sincerely,

Dr. Len Gawel
BioRem Environmental Consultants
Ponca City, OK

Gary Johnson
Environmental Coordinator
Amerada Hess Corporation
Williston, ND

Lynn D. Helms
NDIC Department of Mineral Resources Director
Bismarck, ND

Title Page

Oil and Gas Research Council

Project

“Remediation of Salt and Hydrocarbon Impacted North Dakota Soils”

9/1/2005

Table of Contents

Abstract

The goal of the proposed project is to develop a user-friendly, low-cost and environmentally appropriate soil remediation process.

The proposed project will organize, document and publish a practical soil remediation procedure. The technology has been developed and successfully used for the remediation of North Dakota soils impacted with brine and/or hydrocarbons. With proper organization and presentation, the technology can be applied by field personnel. The technology will be made available to all North Dakota oil and gas producers. Total project cost is estimated to be $40,000. The duration is expected to be six months.

The project work will be performed by Dr. Len J. Gawel, BioRem Environmental Consultants working with Amerada Hess Corporation (AHC) and the NDIC Oil & Gas Division (OGD).

Project Summary

The project will organize, document and publish a practical soil remediation procedure for salt and hydrocarbon contaminated soils. With the appropriate guidelines, the technology can be applied by field personnel. The technology will be available to all North Dakota oil and gas operators. In addition, the procedure guidelines will provide OGD personnel a standard technology with workable and successful guidelines for remediation. The duration of the project is expected to be six months.

Project Description

The project consists of the organization, documentation and publication of a unique and effective soil remediation process. The technology targets both salt water and hydrocarbon contamination in North Dakota soils associated with the petroleum industry.

The project will disseminate the salt and hydrocarbon soil remediation process developed over the past 14 years. The technology development includes research, field test applications and monitoring of results. The process is based on a practical, reproducible and effective procedure. The remediation philosophy relies on limited analytical work, a measurement of key indicators, prescribed treatment and a follow-up program.

With appropriate direction, all the tests, evaluations and treatment selections can be conducted by a field technologist.

This technology has now been used successfully for several years. The success of the process has been proven in many field applications conducted primarily for Amerada Hess Corporation.

We propose to organize and document the process in a field friendly format with supporting science and documentation of successful applications in appendices. The process will be made available to all North Dakota petroleum operators. A workshop will be conducted at the Williston Basin Petroleum Conference to be held in May 2006.

The technology uses all natural amendment materials except for a small amount of commercial fertilizer when appropriate.

A future proposal for a second phase of the project will be submitted at a later date. The second phase of the proposed project would conduct additional research to

optimize volume and reaction rates of the soil remediation amendment materials. The amendment materials are by far the most costly part of the remediation process. The research will evaluate the use of naturally occurring divalent cations in North Dakota soils to increase remediation efficiency and to reduce overall cost.

Standards of Success

To ensure user acceptability of the project soil remediation guide, selected members of the NDIC Oil and Gas Division and Amerada Hess Corporation will be asked to critique the field guide. Feedback will be evaluated and incorporated into the field guide technology. In addition, the peer review will be held before final publication.

To verify field results of the remediation technology, several examples of remediation projects and documentation supporting various aspects of the field guide will be illustrated in appropriate appendices.

Background

Accidental discharges of hydrocarbons and/or produced water occur in conjunction with oil and gas production in North Dakota impacting the soil environment. The soil is one of North Dakota's greatest resources and should be protected by all industries in the state. Existing soil remediation technologies documented in the literature have often been regarded by operators as impractical because of the cost and limited availability of personnel with the necessary technical training and experience to design and conduct soil remediation projects. The development and dissemination of guidelines presenting a user-friendly, cost effective technology with a demonstrated record of success will encourage remediation of salt/hydrocarbon impacts to the soil environment.

Qualifications

Dr. Len J. Gawel, BioRem Environmental Consultants, will be the primary investigator for the proposed projects with assistance and counsel from Amerada Hess Corporation, Williston and NDIC Oil & Gas Division, Bismarck. Dr. Gawel holds a Ph.D. degree in Microbiology Biochemistry and Natural Science from Oregon State University. Following graduation, he joined Conoco Production Research Division in 1965.

While employed with Conoco Inc. (28 years) he held several research and managerial positions until his retirement in 1993. Although he was involved in many aspects of petroleum production, his major emphasis was in environmental science. During his tenure he published, presented papers and originated patents associated with environmental technology.

In 1993 Dr. Gawel started BioRem Environmental Consultants. Working as a consultant he realized a need for a practical, low cost, but effective soil remediation process. Over the next 12 years he developed the technology that met these requirements. By using a limited amount of analytical data, important key indicators, prescribed treatments and a follow-up program, a remediation procedure for soil contaminated with salt and hydrocarbons was developed. Dr. Gawel's consulting employment is mainly associated with Amerada Hess Corporation and ConocoPhillips Company.

Dr. Gawel is a past member of the American Society of Microbiology, Society of Petroleum Engineers, American Society of Chemistry and National Association of Corrosion Engineers. He is presently a member of the International Ozone Association.

Gary Johnson, Environmental Coordinator for Amerada Hess Corporation, has been employed with Amerada Hess for 29 years. As Environmental Coordinator, he manages numerous air, water, and soil issues related to oil and gas drilling and production. He serves as an industry representative on the USFS Well Permitting Group, the Prairie Grasslands Stewardship Council, and is a board member of the ND Petroleum Tank Release Compensation Fund. For 11 years prior to his appointment to Environmental Coordinator, he served as area foreman for Newburg Operations, overseeing 90 producing wells and 45 injector wells with total production of 1500 BOPD/3500 BWPD. Prior to his job as foreman, he was an Operations Technician responsible for analyzing design of pumping units and production strings. Mr. Johnson has participated in training for Hazwoper Incident Commander, Accident Investigation and Root Cause Analysis, 40 Hr Freshwater Oil Spill Control, Excavation Safety, Industrial Fire Protection, and Confined Space Entry.

Laura Erickson, Amerada Hess Corporation, holds a Bachelor of Science degree in Zoology from ND State University where she participated in undergraduate research as a McNair Scholar, received honors as Outstanding Zoology Major and as a recipient of a scholarship from the North Dakota Chapter of the Wildlife Society. She attended Utah State University for post-graduate research in the field of animal damage control. From 1995 – 1998, she taught life science lab and lecture courses at Williston State College. Since 1999, she has worked in regulatory and environmental compliance for Amerada Hess Corporation, participating in several ecological assessments, and authoring and presenting numerous reports for AHC personnel and regulatory agencies. Ms. Erickson completed the API's Remediation of Salt-Affected Soils at Oil and Gas Production Facilities short course in 2001, and attended a Rapid Assessment of Wetlands course at the BLM Reclamation Conference in June of 2003.

Glenn Wollan, NDIC Oil and Gas Division, holds a Bachelor of Science degree in Earth Science from ND State University and has more than twenty six years of oil and gas regulatory experience with the Division. Since 1987, he has been directly involved with development and implementation of land reclamation and environmental regulatory requirements. Mr. Wollan has attended numerous conferences and seminars addressing reclamation and environmental issues, including several sessions of the Rocky Mountain Symposium on Environmental Issues in Oil and Gas Operations and the International Environmental Petroleum Conference. Short courses specific to remediation issues include: Fundamentals of Bioremediation of Hydrocarbon Contaminated Soils presented through the University of Tulsa, and Remediation of Salt-Affected Soils at Oil and Gas Production Facilities presented through the American Petroleum Institute.

Mark Bohrer, NDIC Oil and Gas Division has eighteen years of oil and gas regulatory experience with the Division. Mark holds a Bachelor of Science Degree in Geological Engineering and a Bachelor of Science Degree in Geology from the University of North Dakota. Since 1999, Mark has been involved with coordination of spill reporting, reclamation of impacted spill sites, and coordination with other government agencies.

Value to North Dakota

The soil environment is one of North Dakota's greatest resources and should be protected by all industries in the state. The proposed technology will make remediation of accidental discharges a doable exercise for all members of the petroleum industry.

Many of the oil and gas operators do not have, at their disposal, a workable method to remediate salt and/or hydrocarbon spills. Many of the operators do not have the technology to conduct a successful remediation. In addition, the operators consider the remediation process to be a very costly undertaking and therefore hesitate to conduct any remediation. The proposed remediation technology will provide a workable, step by step and cost effective remediation procedure.

Many operators in the oil and gas industry are concerned with environmental needs. Most operators would be more willing to conduct remediation work if a user-friendly, cost effective and comprehensive technology demonstrated to have a high degree of success is available.

In addition, the procedure guidelines will provide NDIC personnel a standardized technology and workable guidelines for remediation.

Management

BioRem Environmental Consultants will be subject to a contract with a completion deadline for the project and intermediate progress review steps.

NDIC Oil and Gas Division technical staff are under the supervision of the Director of the Department of Mineral Resources and work progress will be reviewed at regular staff meetings.

Amerada Hess Corporation environmental staff is under the direction of the Environmental Coordinator for AHC.

Timetable and Budget

Total project cost: $40,000

Total project duration: six months with an anticipated start date of October 2005

Task #1. Organization and development of a field remediation guide	$14,000
Task duration - 4 months	
Task #2. Literature support and documentation of field results	$16,000
Task duration - 4 months, concurrent with task #1	
Task #3. Peer review	$4,000
Task duration – 1 month	
Task #4. Printing and distribution	$4,000
Task duration – 1 month	
Task #5. Workshop	$2,000
Task duration – 1 day	

Grant Support

Task #1. Organization and development of a field remediation guide	$12,000
Task #2. Literature support and documentation of field results	$6,000
Task #3. Peer review	$2,000
Task #4. Printing and distribution	$0
Task #5. Workshop	$0

Cost Share

Task #1. Organization and development of a field remediation guide	$2,000	AHC
Task #2. Literature support and documentation of field results	$10,000	AHC
Task #3. Peer review	$1,000	AHC
	$1,000	OGD
Task #4. Printing and distribution	$4,000	OGD
Task #5. Workshop	$1,000	OGD
	$1,000	AHC

Note: Oil & Gas Division funds are general fund dollars

Confidential Information

On publication of the project document the information in the project will be considered non-confidential.

Patents and Rights to Technical Data

There are no patents or rights that the applicant wishes to reserve.

Tax Liability

I, _____, do hereby confirm that the North Dakota Oil & Gas Division does not have an outstanding tax liability owed to the State of North Dakota or any of its political subdivisions.

_____
(Affiant's Signature)
STATE OF _____)
)ss
COUNTY OF _____)

On _____, _____,
known to me to be the person described in and who executed the foregoing instrument, personally appeared before me and acknowledged that (s)he executed the same as a free act and deed.

_____
Notary Public
Seal State of _____, County of _____
My Commission expires _____

Tax Liability

I, _____, do hereby confirm that BioRem Environmental Consultants does not have an outstanding tax liability owed to the State of North Dakota or any of its political subdivisions.

_____
(Affiant's Signature)
STATE OF _____)
)ss
COUNTY OF _____)

On _____, _____,
known to me to be the person described in and who executed the foregoing instrument, personally appeared before me and acknowledged that (s)he executed the same as a free act and deed.

_____
Notary Public
Seal State of _____, County of _____
My Commission expires _____

Tax Liability

I, _____, do hereby confirm that Amerada Hess Corporation does not have an outstanding tax liability owed to the State of North Dakota or any of its political subdivisions.

_____
(Affiant's Signature)
STATE OF _____)
)ss
COUNTY OF _____)

On _____, _____,
known to me to be the person described in and who executed the foregoing instrument, personally appeared before me and acknowledged that (s)he executed the same as a free act and deed.

_____
Notary Public
Seal State of _____, County of _____
My Commission expires _____