August 30, 2004

Dear Oil and Gas Research Council Members,

Attached you will find a funding request for a project to be completed by the North Dakota Geological Survey.

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

Sincerely,

Edward Murphy
ND Geological Survey
Acting State Geologist
600 E Blvd Ave.
Bismarck, ND 58505-0840
Office (701-328-8000)
Fax (701-328-8010)
http://www.state.nd.us/ndgs/

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Title Page

Oil and Gas Research Council

Project

“Digital Thin Section and Core Photo Project”

North Dakota Industrial Commission Oil and Gas Division
North Dakota Geological Survey

8/30/04

$10,000 Request

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Abstract

The proposed project entitled “Digital Thin Section - Core Photo Project” is designed to produce high quality digital photomicrographs of representative thin sections and photographs of the corresponding core section to be posted on the North Dakota Geological Survey (NDGS) website. Links to the “scout card” currently available on the NDIC Oil & Gas Division (NDOGD) website will be created.

The duration of the project is expected to be two years. The project will be conducted in phases approximately three months in length. Each phase will deal with a producing pool or horizon. The current Middle Bakken, Birdbear, and Ratcliffe plays will be given top priority.

Total project cost is expected to be $35,000.

The project work will be performed by a multi disciplinary team consisting of the NDGS core library geologist and lab technician along with the NDOGD Information Technology Group.

Project Summary

The proposed project entitled “Digital Thin Section - Core Photo Project” is designed to produce high quality digital photomicrographs of thin sections and photographs of the corresponding core section to be posted on the North Dakota Geological Survey (NDGS) website. Links to the “scout card” currently available on the NDIC Oil & Gas Division (NDOGD) website will be created. Subscription users of the NDOGD web site will be able to use the “scout card” to quickly and easily move between well files, well logs, drill stem tests, and rock photographs.

The duration of the project is expected to be two years. The project will be conducted in phases of approximately three months in length. Each phase will deal with a producing pool or horizon. The current Middle Bakken, Birdbear, and Ratcliffe plays will be given top priority.

Project Description

The proposed project entitled “Digital Thin Section - Core Photo Project” is designed to produce high quality digital photographs of thin sections and their corresponding core section then post them on the North Dakota Geological Survey (NDGS) website.

The duration of the project is expected to be two years. The project will be conducted in phases of approximately three months in length. Each phase will deal with a producing pool or horizon. The current Middle Bakken, Birdbear, and Ratcliffe plays will be given top priority.

Links to the “scout card” currently available on the NDIC Oil & Gas Division (NDOGD) website will be created. Subscription users of the NDOGD web site will be able to use the “scout card” on the site to quickly and easily move between well files, well logs, drill stem tests, and rock photographs.

A custom search utility will be developed to filter available digital photomicrographs and core photographs by pool, county, township, etc.

Appendix 1 contains the technical information on the proposed microscope and digital camera.

Appendix 2 contains the technical information on the proposed digital camera.

Appendix 3 contains a sample thin section photomicrograph.

Appendix 4 contains a sample core section photograph.

Standards of Success

Intelligently conceived, intuitive search tools, and effectively organized links will be beta tested by a group of industry, and government users.

Based on feedback from the test group, decisions concerning modifications to improve site design will be made resulting in a user-friendly site.

A Frequently Ask Questions (FAQ) section and effective written instructions will be established for user assistance.

The final version will be made public only after evaluation by the test group.

Success will be assessed through the following measures:

1. Monitoring access and usage logs
2. Feedback from users who access the site
3. Monitoring search engine referrals

Background

A recently completed inventory of the Wilson M. Laird core library in Grand Forks reveals we have 15,000 mounted thin sections and more than 425,000 feet of oil field core in inventory.

The current process requires that petroleum geologists who desire to learn about North Dakota geology travel to Grand Forks or have core shipped to them at significant expense for even the earliest stages of developing a play concept.

The proposed project will make enough information available to petroleum geologists around the world for them to relate North Dakota geology to analogs they have worked on and develop play concepts remotely. This is expected to lead to increased core library visits as those concepts develop into prospects and ultimately increased drilling for oil and gas on the prospects.

Qualifications

The project work will be performed by a multi disciplinary team of NDGS geologists and the core library technician along with the NDOGD Information Technology Group.

The NDGS core library geologist and technician have 40 years experience in working with core inventory, thin sections, photomicrographs, core photographs and digital photography equipment.

The Oil & Gas Division Information Technology Group has over 20 years experience in using databases and websites to store and deliver oil and gas information. This group will post the photographs on the website, create the necessary links to the NDOGD “scout cards”, and develop the required search utilities.

Value to North Dakota

It is anticipated that petroleum geologists, oil and gas operators, working interest owners, and royalty owners world wide will make use of the project results.

Petroleum geologists, operators and venture capitalists will have access 24-hours per day to information they can utilize for in-house presentations, to develop play concepts, and to market prospects. Providing this access will facilitate use of other data on file with the NDIC, lead to increased core library visits as those concepts develop into prospects, and ultimately increased drilling for oil and gas on those prospects.

Since North Dakota competes with many other oil and gas producing states in attracting company investment in the state, providing oil companies with more information will hopefully encourage them to invest here rather than in other states.

Management

The NDGS core library geologist and lab technician are currently under the direct supervision of the applicant. Work schedules and priorities are reviewed weekly.

The NDOGD Information Technology group is currently under the supervision of the co-applicant. Work schedules and priorities are reviewed every 2 weeks in regular staff meetings.

Timetable

Leeds Instruments - deliver and set up equipment
September and October 2004

NDGS geologist - identify Middle Bakken thin sections and core
October 2004

NDGS lab tech - photograph Middle Bakken thin sections and core
November 2004

NDOGD IT Group - post Middle Bakken photographs to website, create links to "scout cards", and design search utility December 2004 and January 2005

NDGS geologist - identify Birdbear thin sections and core
December 2004

NDGS lab tech - photograph Birdbear thin sections and core
January 2005

NDOGD IT Group - post Birdbear photographs to website and create links to "scout cards" February 2005

NDGS geologist - identify Ratcliffe thin sections and core
January 2005

NDGS lab tech - photograph Ratcliffe thin sections and core
February 2005

NDOGD IT Group - post Ratcliffe photographs to website and create links to "scout cards" March 2005

Repeat cycle through December 2006

Budget

Grant Support

Leed Instruments for microscope and camera - $15,000

Cost Share

NDGS Petroleum Geologist to identify thin sections and core - $5,000

NDGS Lab Technician to photograph thin sections and core - $10,000

NDOGD IT Group to post photographs, links, and search utility - $5,000

The funding requested is necessary to achieve the project's objectives within the proposed timetable. If no funding or less funding is available than that requested the project's objectives are ultimately be attainable but will have to be delayed significantly.

Matching funds

North Dakota Geological Survey - $15,000

NDIC Oil & Gas Division - $5,000

Confidential Information

None of the information in this application is of a confidential nature.

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 Geological Survey does not have outstanding tax liabilities 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 the North Dakota Industrial Commission Oil & Gas Division does not have outstanding tax liabilities 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 _____

Appendix 1

Project Description:
BX41 Polarizing Microscope w/ Plan Fluorite Objectives & 2 Mega Pixel Digital Camera

Leeds Precision Instruments, Inc.
800 Boone Avenue North, Minneapolis, MN 55427

FAX (763) 546-4369
(763) 546-8575
800-444-LEEDS

QUOTATION

Qty	Unit	Catalog #	Description	Unit Price	Price
1	EA	BX41TF	BX41TF; Microscope Frame with Nosepiece Mount for Transmitted Light. Rigid cast aluminum frame includes: front mounted intensity control dial, coaxial coarse and fine focus controls graduated to 1 micron, one fine focus extension knob-exchangeable left to right side, DC power supply for 6V/30W tungsten halogen lamphouse, user-adjustable photo-preset switch, LED power indicator. NiChrome plated steel rack and pinion focus gears, 1 micron sensitivity, 25mm focus tension adjustment and adjustable focus stop. Accepts U-LS30-4 (catalog # 5-UL1034) lamphouse for 6V/30W tungsten bulb (catalog # 8-C410), 100 volt - 240 volt input voltage selectable by frame switch. With dovetail stage holder and condenser mount with centering screws. Requires UYCP power cord. Includes user manual, immersion oil, and warranty card.		$1,234.00
1	EA	5-UL1034	U-LS30-4; Lamp Socket for 6V/30W Halogen Bulb. Precentered, plugs into back of Olympus BX41TF microscope stand. Built-in louvers for convection cooling. Removable for bulb replacement.		$26.00
1	EA	UYCP-11	UYCP-11 Power Cord; three prong U.S. style.		$12.00
1	EA	9-U115	LBD filter; Light Balancing Daylight filter, for daylight color film, 45mm		$57.00
2	EA	8-C410	6V/30W Tungsten Halogen Bulb (also L410)	$15.00	$30.00
1	EA	3-U134	U-TR30-2; Trinocular Observation Tube. 30 degree eyepiece adjustment 50mm-76mm; left eyepiece tube with +/- 5 diopter control. Right eyepiece tube with rotation stop maintains orientation of eyepiece reticle with interpupillary distance adjustment. Requires use of Video Adapter (Cat# U-V105, U-V111), Photo tubes U-SPT (Cat# 3-U801) or U-DPTS Dual Photo Tube (Cat# 3-U806), plus appropriate video/photo mount adapters.		$1,588.00

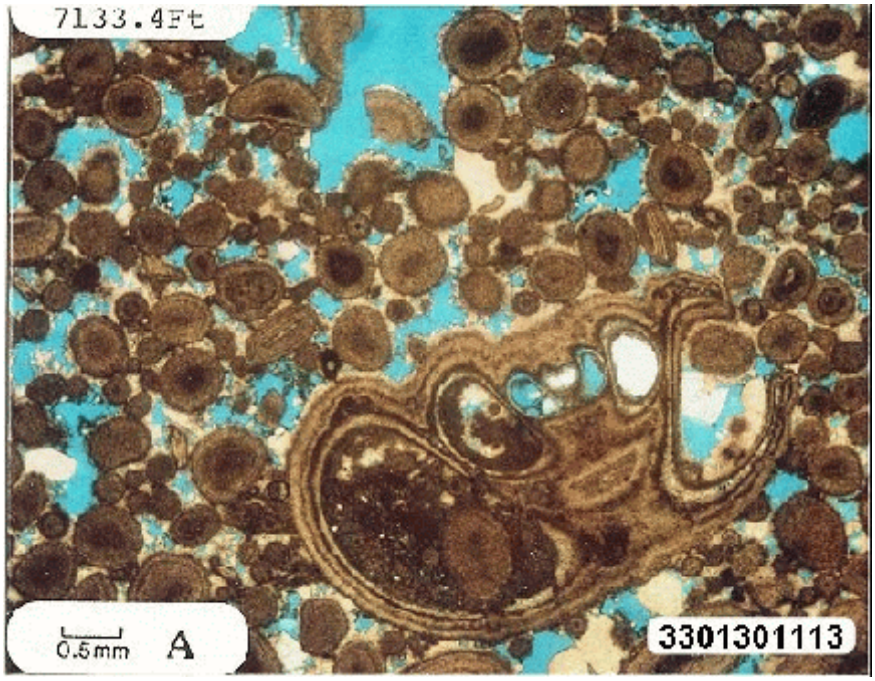
1	EA	U-P510	U-OPA; Orthoscope Polarizing Intermediate Attachment. Includes 10mm x 40mm slot for U-AN360P analyzer (catalog # U-P520) and quartz depolarizer.	$423.00
1	EA	U-P520	U-AN360P; Rotatable Analyzer for Quantitative Polarized Light Applications. Vernier scale graduated to 0.1 degrees for fine measurements. One rotation of control wheel translates to 180 degrees rotation of analyzer. For use only with U-OPA (catalog # U-P510) and U-CPA (catalog # U-P515) polarizing intermediate attachments.	$1,152.00
1	EA	2-U1003	WH10X-3; Widefield 10X Eyepiece, high eyepoint, FN 22, 30mm diameter, with shelf for F=24mm t=1.5mm reticle.	$174.00
1	EA	2-U1022	CROSSWH10X-2; Widefield 10X Crosshair Eyepiece. High eyepoint, FN 22; 30mm diameter, focusable top lens with crosshair reticle and alignment pin.	$275.00
1	EA	U-R164	U_P4RE; Quadruple Revolving Centerable Nosepiece with Slider Slot. Inward-facing, ball bearing rotation, RMS standard objective mount thread. With 45 degree accessory slot for compensator adapter U-TAD (catalog # U-P530) or U-DIC series of DIC sliders. Includes blank slider with mount for simple analyzer U-ANT (catalog # U-P115). Each objective mount is individually centerable via 1.5mm centering screws, one pair included.	$756.00
1	EA	1-UD222	PL4XP: Plan Achromat 4X Polarized Light Strain-Free Objective, infinity corrected, RMS thread., FN 22, NA 0.10, WD 24.60mm.	$181.00
1	EA	1-UD523	UPLFL10XP: Universal Plan Fluorite 10X Polarized Light Strain free Objective, infinity corrected, RMS thread, FN 26.5, NA 0.30, WD 10.10mm.	$842.00
1	EA	1-UD525	UPLFL20XP: Universal Plan Fluorite 20X Polarized Light Strain Free Objective, infinity corrected, RMS thread, FN 26.5, NA 0.50, WD 1.60mm, spring loaded.	$941.00
1	EA	1-UD527	UPLFL40XP: Universal Plan Fluorite 40X Polarized Light Strain Free Objective, infinity corrected, RMS thread, FN 26.5, NA 0.75, WD 0.51mm, spring loaded.	$1,388.00
1	EA	6-U310	U-POC; Polarizing Condenser. N.A. 0.90, strain-free lens design for polarized light observation. Swing-out top lens allows illumination for 2X - 100X objectives. Includes rotatable polarizer, graduated 360 degrees, locking, with fine adjustment of "0"	$1,086.00
1	EA	4-U352	U-SRG2; Circular Rotating Stage. Rotating on a mechanical track, 142mm diameter, with vernier reading to 1 degree and stage lock. Built-in centering screws. Accepts mechanical stages U-FMP (cat# 4-U390) and CH-FMP1(cat# 4-P104). Includes two specimen clips.	$802.00
1	EA	U-V111	U-TV1X-2; 1X CCD Camera Adapter. No lens elements for direct image projection. Accepts camera mounts U-CMAD, U-BMAD, U-SMAD, or U-TMAD. For all CCD camera chip sizes.	$63.00

1	EA	U-V311	U-CMAD3; C-Mount Adapter - Narrow Design. Attaches C-mount camera to adapters U-TV0.5X, U-TV1X, U-PMTV, U-TVZ, U-PMTV1X.		$130.00
1	EA	IN1120	Insight Firewire Digital Camera System		$4,395.00
				TOTAL	$15,555.00

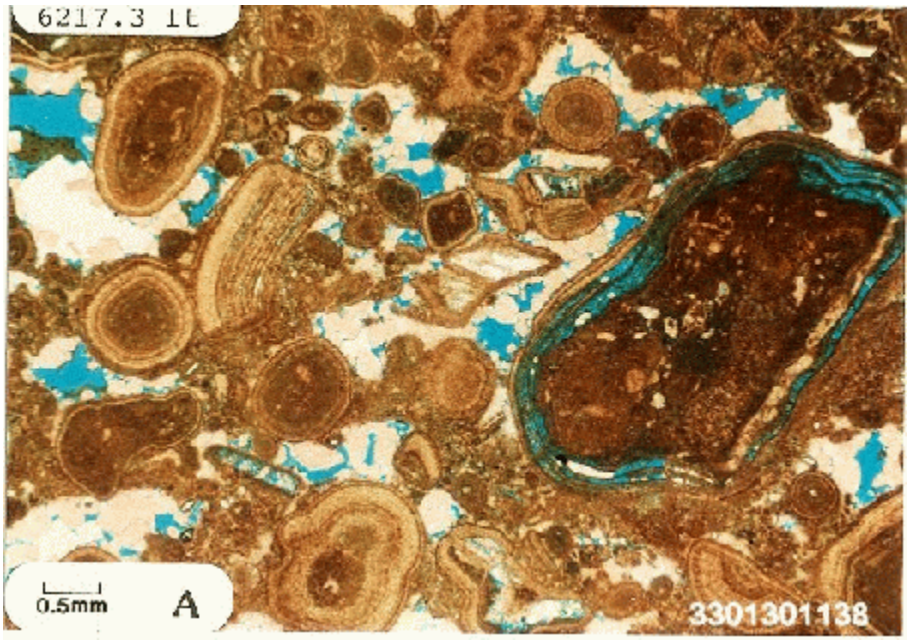
May Also Need

1	EA	FWDT	FireWire Card for Desktop		$67.00
				TOTAL	$67.00

Olympus BX41 Laboratory Microscope



Oolitic carbonate thin section. Porosity in blue, cement in white. Photograph of an oil well core of the Mission Canyon Formation in Burke County.



Oolitic carbonate thin section. Porosity in blue, cement in white. Photograph of an oil well core of the Mission Canyon Formation in Burke County.

Note how the cement has reduced the porosity in this thin section.

This core is from the Bakken Formation in McKenzie County.

This core is from the Winnipeg Group in Stark County.