July 19, 2012

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Chair, Department of Chemistry and Biochemistry
0358

Subject: ***Chemistry and Biochemistry NMR Recharge Facility***
Audit Project 2012-52

The final audit report for *Chemistry and Biochemistry NMR Recharge Facility*, Audit Report 2012-52, is attached. We would like to thank all members of the department for their cooperation and assistance during the audit.

The findings included in this report will be added to our follow-up system. We will contact you to schedule a review of the corrective actions.

UC wide policy requires that all draft audit reports, both printed (copied on tan paper for ease of identification) and electronic, be destroyed after the final report is issued. Because draft reports can contain sensitive information, please either return these documents to AMAS personnel or destroy them at this time.

Terri Buchanan
Interim Assistant Vice Chancellor
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Attachment

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AUDIT & MANAGEMENT ADVISORY SERVICES

Chemistry & Biochemistry NMR Recharge Facility
June 2012

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Project Number: 2012-52

Chemistry and Biochemistry NMR Recharge Facility
Audit & Management Advisory Services Project 2012-52

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ATTACHMENT A – NMR Facility 11 Year Financial Snapshot

I. Background

Audit & Management Advisory Services (AMAS) has completed a review of the Department of Chemistry and Biochemistry's Nuclear Magnetic Resonance Recharge Facility (NMR Recharge Facility) as a supplemental review for Fiscal Year 2011/2012. This report summarizes the results of our review.

The NMR Recharge Facility is comprised of eight different NMR spectrometers ranging from 300-800 MHz that cumulatively offer a wide array of NMR techniques used by scientists to determine the properties of certain molecules. Three of the spectrometers are located in the Natural Sciences Building (NSB), and are used primarily by biochemists. Five spectrometers are located in Pacific Hall, and are used primarily by organic chemists.

The NMR Recharge Facility is considered to be an academic support activity, which is defined as an activity within an academic department that provides, at approved rates, goods or services to campus extramural and university funded activities. In general, recharge activities are expected to operate on a break-even basis. Campus recharges and fees charged to external users should be sufficient in total to cover expenses, unless core funding is provided by the campus.

Customers of the NMR Recharge Facility are recharged for spectrometer use based on hourly recharge rates that vary based on the spectrometer used. The spectrometers located in NSB are larger, more sophisticated and incur higher annual maintenance costs. However, because the volume of usage of NSB spectrometers is generally higher, the recharge rates for use of these machines are comparable to those located at Pacific Hall. Spectrometers are available for use by individuals or entities external to the University at higher hourly rates.

The NMR Recharge Facility is staffed with two full-time Senior Development Engineers, one at each location. These individuals are responsible for spectrometers, assisting users, scheduling, monitoring usage and some facility administrative management. NMR staff members also provide support to NMR facilities located at the Scripps Institution of Oceanography (SIO), Moores Cancer Center, and the School of Pharmacy. Recharges assessed for the services provided to these locations vary based on agreements established with each location. For example, SIO is recharged $100 for each labor hour plus supplies and expenses, whereas the Cancer Center is recharged an hourly rate for use of the spectrometer.

From an overall financial perspective, the NMR Recharge Facility has been operating under a cumulative financial deficit since June 30, 2004. As of June 30, 2006 the cumulative deficit had grown to $146,866, and this prompted the Senior Vice Chancellor of Academic Affairs (VCAA) to request that the Department develop an action plan to address the cumulative deficit. As a result, the Department revised the NMR recharge rates to a level projected to fund the deficit over a five year period. However, the rate increase has not been sufficient to resolve the cumulative deficit, which was $104,517 as of June 30, 2011. An 11-year historical financial report that illustrates changes to the cumulative deficit is provided at **Attachment A**, which includes pre-close financial balances for 2011/2012.

The activities of the NMR Recharge Facility were monitored by the Department of Chemistry Facility Committee NMR Subcommittee (NMR Subcommittee), which currently consists of nine Chemistry/Biochemistry (Department) faculty members. In recent months, the Department Chair has received consistent concerns from faculty members regarding the current recharge rates, and responsibility for funding the cumulative deficit.

II. Audit Objective, Scope, and Procedures

The objective of our review was to evaluate the Department's financial reporting practices for the NMR Recharge Facility. In order to achieve our objectives we completed the following:

- Reviewed the *Overview of Self Supporting Activities* content available through blink.ucsd.edu;

- Interviewed the following individuals:

  - ✓ Department of Chemistry and Biochemistry Chair;
  - ✓ Former Chief Operating Officer (COO);
  - ✓ Recharge Administrative Analyst;
  - ✓ Department Financial Manager;
  - ✓ The Chair of the NMR Subcommittee;
  - ✓ The NSB NMR Facility Senior Development Engineer;
  - ✓ The Pacific Hall NMR Facility Senior Development Engineer; and
  - ✓ One additional member of the NMR Subcommittee.

- Reviewed the report on the 2008 program review of the Department and the Department's formal response to the report;

- Reviewed the NMR Facility recharge rate calculation that was submitted to the Recharge Rate Review Committee in July 2006;

- Reviewed financial results for the NMR Recharge Facility recorded in the UCSD Integrated Financial Information System (IFIS) fund 62029A and index CHEVCNM for Fiscal Years 2000/2001 through 2011/2012, and prepared a schedule summarizing the financial results based on this review **(Attachment A)**;

- Reviewed the June 2007 Chemistry and Biochemistry Debt Repayment Agreement between the Department and the Senior Vice Chancellor – Academic Affairs;

- Reviewed documentation supporting a credit memo processed during Fiscal Year 2004/2005 that reduced overall revenue by $81,279;

- Tested Biochemistry 2010/2011 NMR recharges by obtaining usage data and recalculating total recharges using published usage rates;

- Evaluated instrument usage during Fiscal Year 2010/2011 to evaluate potential for a tiered rate structure to lower overall recharge rates via increasing usage;

- Tested a judgmentally selected sample of 20 expense transactions that occurred in fund 62029A during Fiscal Year 2010/2011 to determine if they were reasonable, necessary and recorded in the appropriate IFIS fund; and

- Independently calculated instrument recharge rates that would ensure full cost recovery, based on estimated expenditures and input from the NMR Recharge Facility Senior Development Engineers.

III. Conclusion

We concluded that the NMR Recharge Facility recharge rate structure in effect since Fiscal Year 2006/2007 has been insufficient to recover annual expenditures incurred in the recharge center and resolve the cumulative deficit.

Financial reports provided by the Department of Chemistry/Biochemistry Business Office to NMR Subcommittee members appeared to be accurate and complete, and included funding from all sources. However, we noted that the Department of Chemistry/Biochemistry Business Office did not consistently account for depreciation and differential income between the Fiscal Years 2000/2001 and 2010/2011.

IV. Observations and Recommendations

A. Recharge Rates

The current NMR facility recharge rate structure has been insufficient to recover annual expenditures incurred in the recharge center and resolve the cumulative deficit.

Office of Management and Budget (OMB) Circular A-21 requires that specialized service facilities, such as the NMR Recharge Facility, adjust rates at least biennially, and shall take into consideration over/under applied costs of the previous period.[1]

Accordingly, campus guidelines for recharge activities require that they be operated on a break-even basis. Any surplus or deficit occurring in any one year is required to be corrected by adjustment of rates in the succeeding year to achieve a minimal balance at the succeeding year-end. The recharge activity should make every effort to ensure that year-end surpluses or deficits do not exceed one month of the recharging unit's expenses. If the recharge activity incurs an unacceptable deficit in any one year, the recharge activity must contact Business and Financial Services (BFS) – General Accounting (GA) and communicate an action plan to address the deficit. Further, campus overdraft policy requires that corrective action plans for overdrafts (negative financial balances) exceeding $10,000 or 60 days in duration be documented in writing, and be approved by the cognizant Vice Chancellor or Dean.

Since June 30, 2004, the NMR Recharge Facility has incurred a cumulative financial deficit (**Attachment A)**. As of June 30, 2005 the cumulative deficit was $63,954, and this appears to be largely attributable to a credit memo of approximately $81 thousand that was processed to reverse outside customer revenue that was originally recorded to NMR facility funds during Fiscal Year 2002/2003. That year, the NMR facility entered into a service agreement with an outside company (MicroGenomics) to analyze several samples between December 2002 and April 2003. Current Department Business Office and NMR personnel are not fully aware of the details of this agreement. It appears that UCSD erroneously invoiced the company for services, which in turn increased the NMR facilities external revenue by approximately $81 thousand during Fiscal Year 2002/2003. In Fiscal Year 2004/2005, the University recognized this error, and processed a credit memo that reduced overall revenue by that amount. Had the credit memo not been processed, the NMR facility would not have incurred a deficit during Fiscal Year 2004/2005. (Conversely, had the erroneous posting of revenue not occurred, the NMR facility would have incurred a deficit of approximately $30 thousand during Fiscal Year 2002/2003.)

During Fiscal Year 2005/2006, the NMR Recharge Facility did not adjust recharge rates to address the prior year deficit. In addition, the facility incurred a significant increase in payroll and benefit costs because the two NMR facility Senior Development Engineers became fully funded by the NMR Recharge Facility. Prior to Fiscal Year 2005/2006, the NSB Engineer was partially (50%) funded with general funds. And prior to September 2005, only 12% of the Pacific

[1] OMB Circular A-21, revised May 10, 2004, Section J.47.B(2).

Hall Engineer's payroll expenses were funded by the NMR Recharge Facility, with the balance of expenses charged to fellowship and research funding. As a result, the cumulative deficit increased to $146,866 as of June 30, 2006.

During Fiscal Year 2006/2007, the NMR Recharge Facility submitted a recharge rate proposal to increase rates to a level designed to eliminate the cumulative deficit over a five year period in accordance with the deficit reduction plan approved by the Vice Chancellor Academic Affairs. The recharge rate calculation projected that annual expenditures would equal approximately $297 thousand, and that total revenues would approximate $335 thousand. While actual expenditures were very close to the projection stated in the recharge rate proposal, actual revenues were only $236,220. NMR business office staff estimated that approximately $12,500 in revenues were lost during the Fiscal Year 2006/2007 due to unexpected instrument down-time for repairs. The estimate appears reasonable. As a result, the cumulative deficit increased to $214,941.

During Fiscal Year 2007/2008, the NMR Recharge Facility did not adjust the recharge rates to address the increased cumulative deficit. Again, revenues failed to meet the projection stated in the Fiscal Year 2006/2007 recharge rate proposal. However, a significant decrease in expenditures resulted in a slight decrease to the cumulative deficit. During the year, the NMR Recharge Facility was able to reduce payroll and benefit expenditures by funding some of the salary with general funds (**Attachment A**). In addition, one NMR Senior Development Engineer taught a class during three months of the year, which was funded with alternative funding sources. As of June 30, 2008, the cumulative balance was $214,009.

During Fiscal Years 2008/2009 and 2009/2010, the NMR Recharge Facility received $75,000 per year from the Office of Research Affairs (ORA) to establish a campus-wide Nuclear Magnetic Resonance Umbrella Core Facility (NMR-UCF). As stated in the Memorandum of Understanding, dated November 12, 2008, the goal of the funding was to enhance the capabilities and operation of the nuclear magnetic resonance facilities throughout UCSD by coordinating their management via the NMR-CLC under the oversight of the Associate Vice Chancellor for Research Facilities (AVC-RF) in ORA. During the two years that the NMR Recharge Facility received this funding, facility expenditures charged to the recharge center were lower as some expenses were accounted for in the fund number associated with the ORA subsidy. As a result of the decreased expenses and increased revenues, the facility experienced operating surpluses during these two years. As of June 30, 2010, the cumulative deficit had been reduced to $83,032.

During Fiscal Year 2010/2011, the NMR Recharge Facility continued to utilize the same recharge rate structure that was approved in FY 2006/2007, pending negotiations for continued support from ORA. During this Fiscal Year the facility installed a new and technologically advanced NMR instrument in Pacific Hall, the VX500. Based on preliminary studies, the NMR Subcommittee projected that this instrument would generate an annual surplus to the facility, which would in turn be used to reduce the cumulative deficit. Unfortunately the VX500 was fully operational for only the first four months in service. As of the date of this report, the facility has been unable to restore the machine to its full functionality. As a result of not increasing recharge rates and the VX500 downtime, revenues did not meet projections. In addition, payroll expenditures increased. Consequentially, the cumulative deficit increased to $104,517.

It is our understanding that some faculty members who use the NMR facilities perceive that the current recharge rates are too high, especially compared to rates at other research institutions. However, a direct comparison of recharge rates across institutions is not fully informative without knowledge of the institutions' financial models, salary and non-salary expenses, and whether the recharge centers receive institutional subsidies to maintain low rates.

It has also been suggested by one committee member that the NMR facility would benefit from a tiered rate structure, with a lower rate offered during off-peak (night) hours. In theory, offering a lower off-peak rate could potentially influence behavior so that users opt to use instruments during off-peak hours, and promote greater facility usage and higher overall revenue. However, in periods where a facility appears to be operating well below capacity, such as now, the migration of users from peak-time to off-peak time could result in an overall reduction of revenue.

Management Corrective Actions:

The Department Chair will consult with the Office of the VC Research and the Dean of Physical Sciences in determining whether funding is available to subsidize the facility and maintain low recharge rates.

The Department Business Office will work with the NMR Recharge Facility personnel to develop revised recharge rates that will be adequate to recover projected annual expenses, less any core funding, and to fully eliminate the cumulative financial deficit over a reasonable time period. The corresponding deficit reduction plan will be documented in writing, and submitted to the Senior Vice Chancellor, Academic Affairs and Dean.

Annually, the NMR facility will evaluate the financial results of operations, and adjust recharge rates as required by policy. Consideration will be given to include a salary escalation provision so that rates can be revised to adjust for annual increases to salary and benefits.

Further, the Department Business Office will seek financial restitution in the event that the VX500 cannot be restored to its full functionality. This would also result in the Business Office reallocating salary and benefit expenses from the VX500 to other Pacific Hall instruments for the purpose of revising instrument recharge rates.

B. Inconsistent Accounting Practices

We noted inconsistent accounting practices for two financial items, depreciation and differential income.

Depreciation Expense **–** Depreciation expense for the NMR Spectrometer AVR600, purchased in September 2004 was recorded in the amount of $23,901 in Fiscal Year 2006/2007 and Fiscal Year 2007/08, but was not depreciated in prior or subsequent years. The equipment was purchased in June 2003 using a variety of funding sources including state funds, federal funds, and NMR Recharge Facility equipment reserves/replacement funds.

UCSD campus guidelines require that Academic Support Activities depreciate equipment using a straight line method over the useful life of the equipment, and that the depreciation expense be recovered via user recharges. In general, the primary purpose of the depreciation and corresponding entry to the equipment reserves/replacement fund is to set aside funds to replace the asset after its useful life.

An exception to the depreciation requirement is made for equipment purchased with federal funds. OMB Circular A-21 provides that the portion of the cost of buildings and equipment borne by or donated by the Federal Government are not to be depreciated but are included as direct charges to federally sponsored projects.[2]

Subsequent to the Department's recharge rate proposal for the NMR Recharge Facility dated July 5, 2006, the Department requested to exempt a majority of the NMR equipment from the recording of depreciation expense on the basis that federal funds (and a small percentage of state matching funds) would be used for equipment replacement. The request was dated November 17, 2006. Based on the depreciation schedule that was attached to the proposal, it appears that the

[2] OMB Circular A-21, Section J.14.c(2)

Department intended to exempt all equipment except for the DRX600[3], which carried a depreciation expense of $23,901 beginning Fiscal Year 2004-05 through Fiscal Year 2024/2025 (useful life of 22 years).

The Campus Recharge Rate Review Committee formally approved the revised recharge rates and the depreciation waiver via email on July 9, 2008, over two years after the original submittal. The Department advised that they did not record equipment deprecation in years after FY 2007/08 based on the approved depreciation waiver. The Department also advised that it is their intent to pursue federal awards to the maximum extent possible to replace equipment as needed. For example, the latest equipment acquisition was federally funded. However, major research equipment awards are competitive so there is no guarantee that the Department will succeed in obtaining federal funding to replace equipment when needed. The balance of the Department's NMR Facility equipment reserve/replacement fund (76857A) was $31,633 as of January 31, 2012.

Differential Income –Differential income was not consistently recorded in Fiscal Year 2001/2002 through Fiscal Year 2005/2006.

UCSD guidelines for Academic Support Activities require that recharge activities assess differential income, a form of overhead cost recovery, on all sales made to non-UC customers. The rates are based on the current negotiated research rate for the campus, less four components: Equipment Depreciation, Sponsored Project Administration, Library, and Student Administration & Services. While 65% of the funds representing differential income are retained by the Vice Chancellor responsible for generating the differential income, 25% is directed to the Vice Chancellor - External and Business Affairs, and 10% is directed to the Vice Chancellor - Resource Management and Planning.

Prior to Fiscal Year 2005/2006, the NMR Recharge Facility had not assessed differential income on sales to non-UCSD customers. It appears that in Fiscal Year 2005/2006 the facility assessed differential income for non-UC customer income received between Fiscal Year 1996/1997 and Fiscal Year 2005/2006. Since that time, the facility appears to have been consistently recording differential income as required by policy.

Management Corrective Actions:

The Department Business Office will evaluate the adequacy of NMR equipment reserves/replacement fund, and determine if a depreciation exemption on all NMR equipment is appropriate. If it is deemed appropriate, the Business Office will communicate to the Recharge Rate

[3] The company subsequently changed the model number to AVA 600.

Committee that it is the intent of the Department to seek a depreciation exemption on all NMR equipment in conjunction with the proposed revised recharge rates (item A).

The annual review of preliminary (comprehensive) year-end financial statements will include a comparison to prior years to ensure consistent accounting treatment for all items including depreciation and differential income.

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Ten Year Historical Financial Report

	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008 (A)
Fund 62029A							
Revenues							
Outside Customer Receipts	6,371.19	81,633.64		-79,817.10	509.81	3,598.82	158.63
Internal Recharges	117,117.04	144,680.14	110,927.21	137,890.60	157,080.61	233,391.32	247,518.28
Total Revenues	123,488.23	226,313.78	110,927.21	58,073.50	157,590.42	236,990.14	247,676.91
Expenditures							
Payroll	-4,969.80	-105,669.07	-62,302.62	-54,354.27	-137,077.52	-139,773.26	-106,148.36
Employee Benefits	-666.81	-9,961.89	-11,340.20	-14,243.75	-40,795.28	-48,267.85	-36,996.69
Supplies	-117,473.48	-48,673.45	-68,012.97	-53,631.26	-57,226.83	-91,343.86	-78,601.71
Equipment	-3,209.55		-8,566.12	8,566.12			
Travel	-1,125.77		-19,397.11	-1,703.16	-2,690.67		-991.30
Depreciation	-15,000.00	-15,000.00				-23,901.00	-23,901.00
Total Expenditures	-142,445.41	-179,304.41	-169,619.02	-115,366.32	-237,790.30	-303,285.97	-246,639.06
Net Income	-18,957.18	47,009.37	-58,691.81	-57,292.82	-80,199.88	-66,295.83	1,037.85
Differential Income					-2,711.71	-1,779.21	-105.75
Beginning Balance (Deficit)	23,978.35	5,021.17	52,030.54	-6,661.27	-63,954.09	-146,865.68	-214,940.72
Cumulative Balance (Deficit)	5,021.17	52,030.54	-6,661.27	-63,954.09	-146,865.68	-214,940.72	-214,008.62
Fund 19933A, Index CHEVCNM							
Revenues							
Research Affairs Funding							
Total Revenues	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Expenditures							
Payroll							
Employee Benefits							
Supplies							
Equipment							
Travel							
Depreciation							
Total Expenditures	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Income	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Differential Income							
Beginning Balance (Deficit)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cumulative Balance (Deficit)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

(A) Expenses were temporarily reduced in Fiscal year 2007-2008 by transferring some salary expense to general funds.

Chem/Biochemistry NMR Recharge Facility
Audit Management Advisory Services Project #2012-52
Ten Year Historical Financial Report

	2008-2009	2009-2010	2010-2011	2011-2012 (B)
Fund 62029A				
Revenues				
Outside Customer Receipts	2,094.48	1,673.00	158.33	
Internal Recharges	269,872.42	298,121.88	282,370.86	178,663.71
Total Revenues	271,966.90	299,794.88	282,529.19	178,663.71
Expenditures				
Payroll	-72,210.44	-108,708.85	-153,510.20	-166,092.29
Employee Benefits	-27,888.63	-44,752.00	-69,595.21	-76,152.13
Supplies	-123,730.71	-61,615.04	-77,785.58	-108,092.94
Equipment				
Travel	-710.95		-3,073.81	-5.00
Depreciation				
Total Expenditures	-224,540.73	-215,075.89	-303,964.80	-350,342.36
Net Income	47,426.17	84,718.99	-21,435.61	-171,678.65
Differential Income	-650.01	-519.00	-49.14	0.00
Beginning Balance (Deficit)	-214,008.62	-167,232.46	-83,032.47	-104,517.22
Cumulative Balance (Deficit)	-167,232.46	-83,032.47	-104,517.22	-276,195.87
Fund 19933A, Index CHEVCNM				
Revenues				
Research Affairs Funding	75,000.00	75,000.00		
Total Revenues	75,000.00	75,000.00	0.00	0.00
Expenditures				
Payroll	-49,125.53	-26,978.91		
Employee Benefits	-19,320.87	-9,643.80		
Supplies	-6,553.77	-35,964.38		
Equipment				
Travel		-2,412.74		
Depreciation				
Total Expenditures	-75,000.17	-74,999.83		
Net Income	-0.17	0.17	0.00	0.00
Differential Income				
Beginning Balance (Deficit)	0.00	-0.17	0.00	0.00
Cumulative Balance (Deficit)	-0.17	0.00	0.00	0.00

(B) The Fiscal Year 2011-2012 financial results were compiled from the operating ledger prior to the year-end closing process.