SERVICES & FACILITIES ANNUAL REPORT - FY April 2008 to March 2009

SERVICE	FUNDING	AGREEMENT	ESTABLISHED as S&F	TERM
Life Sciences Mass Spectrometry Facility (LSMSF)	**Block**	**EK: R8/H10/09** **L: R8/H10/20** **B: R8/12/15**	**East Kilbride 1994** **Lancaster 1984** **Bristol 1992**	**5 years**

TYPE OF SERVICE PROVIDED:

Facility: Under the auspices of the LSMSF, NERC maintains three facility nodes for provision of organic and light element stable isotope mass spectrometry to the UK life sciences community, namely the East Kilbride node located at SUERC, the Lancaster node located within CEH-Lancaster and the Bristol node housed within the School of Chemistry at the University of Bristol. By adopting this more integrated approach accessibility to said Facility nodes has been increased as has been the organisation between Facilities. Whilst this move has not resulted in the physical amalgamation of the three Facilities, the 'one-stop-shop' exists as a single point of contact for users, with increased efficiency and synergistic operation thus making better use of the resources currently used in the maintenance of the mass spectrometry services offered. All three Facilities are contracted by NERC to provide 'free-at-point-of-delivery' support according to their respective service level agreements (SLAs) or contracts and the NERC LSMSF steering committee oversees their operation. Each of the three nodes offers a different portfolio of analytical techniques for which UK based researchers may apply to use through NERC Services and Facilities (S&F) by standard peer review procedure. East Kilbride has strong associations with migration, agro-ecology and conservation studies whilst the primary remit of Lancaster is terrestrial and fresh-water studies (including those deriving from NERC programmes). Bristol fields a wide range of projects to which a compound specific approach is essential, e.g. palaeoclimatic reconstruction (alkenone U^{K}_{37}), organic matter sourcing (biomarkers), faunal population and dietary studies (isotopic PLFA and FFA profiling) and palaeodietary reconstruction.

Analytical portfolio of the LSMSF:

- Isotopically enriched water ($D_2{}^{18}O$ to energy expenditure studies)
- Natural abundance e.g. $^{13}C/^{12}C$, $^{15}N/^{14}N$, $^{2}H/^{1}H$ and $^{34}S/^{32}S$ analyses of bulk animal organic matter to study food webs & element cycling
- Enriched & natural abundance analyses of organic and inorganic matter to study carbon and nitrogen fluxes within soil ecosystems e.g. $^{13}C/^{12}C$, $^{15}N/^{14}N$, $^{18}O/^{16}O$
- Enriched & natural abundance analyses of gases: e.g. $^{13}C/^{12}C$, $^{15}N/^{14}N$, $^{18}O/^{16}O$ of CO_2, CH_4, N_2O & N_2
- Natural & near natural abundance compound specific $^{13}C/^{12}C$, $^{15}N/^{14}N$, D/H analyses of biochemical extracts
- Organic mass spectrometric analyses of complex mixtures of compounds e.g. volatiles, functionalised molecules etc

NB. Nodes are designated as follows: L = Lancaster, EK= East Kilbride, B = Bristol

ANNUAL TARGETS AND PROGRESS TOWARDS THEM

EK Node to: solve the remaining reproducibility issues with oxygen isotope analysis of organic materials by CF-IRMS. A large in increase in applications in 2008 precluded developmental work in this area but we hope to continue this theme later on in 2009.
Lancaster node to: enhance its trace gas IRMS technology. Installations completed 08/09. Full validation of methods in progress.
Bristol node to: Install two new Delta V IRMS, one as part of a dedicated LC-IRMS system and the other as a GC-C-IRMS (principally for compound specific δD and $\delta^{13}C$; complete), train staff on the operation and maintenance of the two Delta V IRMS (complete), decrease backlog of analyses resulting from previous staffing changes and other issues (partially completed).

SCORES AT LAST REVIEW (each out of 5)			Date of Last Review:	March 2008
Need	**Uniqueness**	**Quality of Service**	**Quality of Science & Training**	**Average**
5.00	**4.50**	**5.00**	**5.00**	**4.88**

CAPACITY of HOST ENTITY FUNDED by S&F	Staff & Status	Next Review (March)	Contract Ends (31 March)
East Kilbride 100% **Lancaster 58%** **Bristol 30%**	**Dr AW Stott (SSO), Miss H. Grant (SO), Mr J. Surman (Casual 3 month)** **Dr. J Newton (RF) & Dr. R. McGill (RA)** **Dr. ID Bull (URF Grade K; 70% University of Bristol funded), Mrs. A Kuhl (Tech Grade H), Mr JM Williams (Tech Grade H)**	**2013**	**2014**

FINANCIAL DETAILS: CURRENT FY

Total Resource Allocation £k	Unit Cost £k			Capital Expend £k	Income £k	Full Cash Cost £k
	Unit 1 Half-Day Unit	Unit 2	Unit 3			
EK 171.49	**EK 0.39**			77.84*	0	164.10
L 97.7	**L 0.36**			30	0	192
B 114.27	**B 0.67**			355.15	0	153.1

FINANCIAL COMMITMENT (by year until end of current agreement) £k

2009-10	2010-11	2011-12	2012-2013	2013-2014
EK 217.65	**224.18**	**230.91**	**237.84**	**244.97**
L 220.10	**210.42**	**210.54**	**226.43**	**234.62**
B 192.5	**196.4**	**199.8**	**203.3**	**206.0**

*Represents 50% of equipment shared with the ICSF

STEERING COMMITTEE	Independent Members	Meetings per annum	Other S&F Overseen
LSMSFC-SC	5	**2**	**0**

APPLICATIONS: DISTRIBUTION OF GRADES (current FY — 2008/09)								
	α5	α4	α3	α2	α1	β	R*/Pilot	Reject
NERC Grant projects*	0	7	1	0	0	0	0	0
Other academic	0	9	1	2	0	0	2	1
Students	0	6	2	2	0	0	6	0
Pilot	0	0	0	0	0	0	0	0
TOTAL	0	22	4	4	0	0	8	1
APPLICATIONS: DISTRIBUTION OF GRADES (per annum average previous 3 financial years —2005/2006, 2006/2007 & 2007/2008)								
	α5	α4	α3	α2	α1	β	R*/Pilot	Reject
NERC Grant projects*	0.50	2.67	0.00	0.00	0.00	0.00	1.00	0.00
Other Academic	2.00	4.00	0.67	1.00	0.00	0.00	2.33	0.67
Students	1.33	5.33	3.33	0.00	0.00	0.00	2.00	0.50
Pilot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	3.83	12.00	4.00	1.00	0.00	0.00	5.33	1.17

PROJECTS COMPLETED (current FY – 2008/09)							
	α5	α4	α3	α2	α1	β	R*/Pilot
NERC Grant projects*	1	2	0	0	0	0	0
Other Academic	2	6	0	0	0	0	1
Students	2	3	4	0	0	0	0
Pilot	0	0	0	0	0	0	0

USER PROFILE - funding type (current FY – 2008/09)											
Grand Total	Infrastructure					PAYG					
	Supplement to NERC Grant *	Student		NERC C/S	Other	NERC Grant*	Student		NERC C/S	Other
		NERC	Other				NERC	Other		
53	9	8	14	2	20	0	0	0	0	0
USER PROFILE - funding type (per annum average previous 3 financial years - 2005/2006, 2006/2007 & 2007/2008)										
Grand Total	Infrastructure					PAYG				
	Supplement to NERC Grant *	Student		NERC C/S	Other	NERC Grant*	Student		NERC C/S	Other
		NERC	Other				NERC	Other		
63.33	4.50	40.00	17.00	6.00	19.50	0.00	0.00	0.00	0.00	0.00

USER PROFILE – user type (current FY – 2008/09)				
Academic	Centre/Survey	NERC Fellows	PhD	Commercial
31	2	0	20	0
USER PROFILE - user type (per annum average previous 3 financial years - 2005/2006, 2006/2007 & 2007/2008)				
Academic	Centre/Survey	NERC Fellows	PhD	Commercial
22.33	6.00	0.67	36.33	2.00

OUTPUT & PERFORMANCE MEASURES (current year)										
Publications (by science area & type) (calendar year 2008)										
SBA	ES	MS	AS	TFS	EO	Polar	Grand Total	Refereed	Non-Ref/ Conf Proc	PhD Theses
1	3	15	1	17	0	1	38	16	13	9
Distribution of Projects (by science areas) (FY 2008/09)										
SBA		ES		MS		AS		TFS	EO	Polar
3		0.5		21		3		23.5	0	2
OUTPUT & PERFORMANCE MEASURES (per annum average previous 3 years)										
Publications (by science area & type) (Calendar years 2005, 2006 &2007)										
SBA	ES	MS	AS	TFS	EO	Polar	Grand Total	Refereed	Non-Ref/ Conf Proc	PhD Theses
3.67	6.67	16.33	0.00	31.00	0.00	0.00	59.00	34.00	16.67	6.67
Distribution of Projects (by science areas) (FY 2005/2006, 2006/2007 & 2007/2008)										
SBA		ES		MS		AS		TFS	EO	Polar
1.89		2.29		8.96		2.66		10.54	0.00	1.17

Distribution of Projects by NERC strategic priority (current FY 2008/09)						
Climate System	Biodiversity	Earth System Science	Sustainable Use of Natural Resources	Natural Hazards	Environment, Pollution & Human Health	Technologies
7	34.5	4.5	3	0	4	0

**Combined Responsive Mode and Directed Programme grants*

NOTE: All metrics should be presented as whole or part of whole number NOT as a %

OVERVIEW & ACTIVITIES IN FINANCIAL YEAR (2008/09):

Node Overview

East Kilbride

This has been an exceptionally busy year. An unprecedented number (thirteen) of applications (ten of which were successful) in the April round caused a backlog of analyses by the end of the year, such that two alpha 4 projects were shelved for 5 months. Fortunately these were accommodated, but developmental work on oxygen isotope analysis was shelved instead, so this is not yet a part of our analytical portfolio. The increased interest in the node is welcome, but if the applications continue to rise this is unsustainable in terms of analytical capacity; so far though, the increase in 2008 looks like an anomaly, and only eight applications have been submitted for steering committee consideration in the April 2009 round.

It was also a busy year in terms of conference participation. Node staff participated in the 1st Isoscapes Meeting in Santa Barbara (two posters from Facility applications), the 6th International Conference on Applications of Stable Isotope Techniques to Ecological Studies in Honolulu in August (2 talks and 4 posters from Facility applications), the British Ecological Society meeting (Ecology of Industrial pollution: Remediation, Restoration and Preservation) and also the meeting of the Stable Isotope Mass Spectrometry Users Group (SIMSUG) in Glasgow in January 2009 (1 poster). In November 2008, Dr. Newton was invited by the TRACE forensics group to talk about how stable isotopes may be used in wildlife crime at Edinburgh Zoo, and as a result was invited by the PAW Forensics Working Group for a more formal presentation at Kew in March 2009. This may not result in many direct applications to the Facility but the publicity was very valuable.

Lancaster

Provision of funds by NERC Scientific Facilities & Technologies enabled the recruitment of a Band 8 casual member of staff (Mr Jacob Surman) from January 2009 to June 2009. This has certainly mitigated the workload from several of the more analytically demanding LSMSFSC approved projects. Mr Surman, a 1st class Honours student, was recruited from the Lancaster University graduates of 2008 and has proven to be a proficient member of the stable isotope team. He received full training to allow him to run both bulk IRMS's methods and the trace gas IRMS CO_2 method. His training and competency to ISO17025 standards was tested as primary auditee during the UKAS re-assessment visit in February 2009. Both EA-IRMS ^{13}C and ^{15}N methods on the Eurovector EA-Isoprime and Carlo Erba NA1500 EA-DLT were audited as part of the re-assessment visit. Both methods and the laboratory quality management mechanisms were operating to the highest standards and in full compliance with the ISO17025 standard. 2008/2009 has been an intensive reporting year for the LSMSF Lancaster node. Analyses have been carried out for eleven different NERC LSMSFSC approved projects (all α 4 grade). Of these, 38.9 % were bulk ^{15}N's, 30.7 % trace gas analyses, 28.7% bulk ^{13}C's and 1.7% compound specific measurements. The number of external enquires to the Lancaster node manager was 16 this year, resulting in 9 formal applications to the LSMSFSC (including joint nodal applications). Publications from node supported research amounted to **X** this year, with two co-authorships and a further two recently accepted. Two PhD students were trained in stable isotope methodologies, namely trace gas CO_2 and the principles of GC/MS and compound specific isotope ratio mass spectrometry. Dr Stott has given 5 promotional oral presentations this year on Stable Isotope ratio mass spectrometry. Four at the CEH sites of Lancaster, Wallingford, Bangor and Edinburgh, and one as an invited speaker at the Lancaster Environment Centres Isotope Users day. The node manager also gave tours to Dr Steve Wilson (NERC Director, Strategy & Partnerships) and to Lord Hunt (Chair of CEH Advisory Panel)

Bristol

The 2008-2009 period saw the Bristol node concentrate heavily on service provision and training. Both Facility technicians, Mrs Alison Kuhl and Mr James Williams, have experienced a steep learning curve over the last year and it is to their credit that they have managed to continue to provide continued preparative and analytical support to users of NERC LSMSF (Bristol) whilst undergoing a thorough and challenging programme of training in the methodologies and analytical techniques routinely used by the Facility. This resulted in a service provision of 137% for the current contractual commitment (30% capacity; 230 HDU) of the Facility to NERC which may be offset against a fulfilment of 76% for the 2007-2008 period resulting from the increase in staffing only coming into effect from December 2007 onwards, significant understaffing during the October/November 2007 period and staffing issues with successful applicants. Much of the outstanding backlog of analyses has now been cleared and whilst remaining capacity for the ensuing period has been assigned to projects the Facility is confident that, based on performance this year, that the expectations of the end-users shall be met. An increasing number of measures have been introduced over the last 12 months in order the rationalise Facility operation, increase efficiency and improve overall service, these include (but are not limited to): design of a computerised sample database (utilising bar-coding technology), increased office space to provide dedicated workstations for Facility users, implementation of a new chromatography data management system, additional brand-new laboratory space, and new laboratory equipment for Facility users wishing to undertake chemical extraction and isolation procedures of their samples. This period also saw a significant augmentation of Facility capabilities with the installation of two new Delta V IRMS. In December 2008 all Facility staff attended an extensive 5-day training course in Bremen, Germany along with an additional two members of UoB postdoctoral staff (Dr Tim Knowles and Dr Pete Maxfield) both of whom will be available to provide additional instrument support should it be required. The node received 8 successful applications (1 reject) for analytical support over the 08-09 period. Peer reviewed publications arising from node users and staff (and ascribable to only support from the node) for the same period amounted to 6.

OVERVIEW & ACTIVITIES IN FINANCIAL YEAR (2008/09), continued:

Generic LSMSF training protocol

Students have had little if any previous experience of 'wet chemical' preparative methodologies, high precision quantitative stable isotope analyses or mass spectrometry and often this is their first introduction to vacuum-line cryogenic chemistry and/or isotope-ratio mass spectrometry or related mass spectrometric techniques. The often intensive training they receive within the LSMSF therefore develops skills different and complementary to those required in the field or later in their career development. The combination of laboratory analysis and data interpretation skills is considered an attractive attribute of our 'alumni' and fulfills NERC's responsibilities to students and fellows as part of their skill development portfolio.

Capital Investment

East Kilbride

Capital investment of £155,680 in a new ThermoFisher Scientific Delta V isotope ratio mass spectrometer and Gas Bench peripheral from NERC provided the East Kilbride node and the Isotope Community Support Facility with a fast method of running both hydrogen and oxygen isotope measurements in water samples. Testing of this device has resulted in the ability to analyse waters of around 70 µl, well under the manufacturer's specifications.

Lancaster

A total of £30k was requested for a Trace gas Pre-concentrator. This has been coupled to the refurbished JA016 Isoprime and has been validated for CO_2 and CH_4. N_2O is to be tested in Summer 2009. The new Gilson 271 auto-sampler is also coupled to this instrument and is currently awaiting full validation in 2009. This great improvement to our trace gas IRMS instrumentation now allows us to process twice the quantity of CO_2 analyses than previous years, in addition to allowing the simultaneous analyses of mixed gas species.

Bristol: Under the announced exceptional capital equipment round a combined total of £355,150 was awarded. The majority of this money was used for the purchase of two ThermoFisher Delta V IRMS. One of these instruments was interfaced to a pre-existing LC-IsoLink interface to provide a dedicated LC-IRMS system. The second IRMS was configured as a GC-C-IRMS incorporating the new GC-IsoLink interface; this instrument shall be primarily used for compound specific δD and $\delta^{13}C$ value determinations. In particular, the Facility aims to exploit the enhanced level of automation associated with this new interface thereby increasing sample throughput by a more efficient use of the instrument. £30,000 of the above award was used to install a new chromatography data management system in the laboratory thereby enhancing ancillary facilities available to users visiting the Facility.

SCIENCE HIGHLIGHTS:

East Kilbride

Five publications this year have come from the Furness Group at the University of Glasgow, including three peer-reviewed publications and two PhD theses. One of the publications has been investigating the seabird foodweb at New Island, Falkland Islands, where the largest colony of Thin-Billed Prions resides. The researchers have been looking at the interactions between the seabird colony and introduced mammals: rats, mice and feral cats. Stable isotope analyses and faecal examinations showed that whereas feral cats consume mainly terrestrial rodents, marine prey may account for up to 60% of the diet in rats during the prions' chick-rearing period. On an individual level, some rodents (12% of rats and 7% of mice) were highly specialised in marine derived food.
Quillfeldt P., Schenk I., McGill R.A.R., Strange I.J., Masello J.F., Gladbach A., Roesch V. and Furness R.W. (2008a). Introduced mammals coexist with seabirds at New Island, Falkland Islands: abundance, habitat preferences, and stable isotope analysis of diet. ***Polar Biology*** **31, 333-349.**

Other studies by the same group have highlighted technical issues in foodweb studies, for instance Quillfeldt *et al.* 2008b present correlations of feather and blood $\delta^{13}C/\delta^{15}N$ signatures and suggest that the assumption that different tissues are equivalent indicators of trophic ecology should be viewed with caution, especially where feathers are synthesised from endogenous reserves rather than recent diet. Bugoni *et al.* 2008 also advice caution when making comparisons of isotopic analyses of avian blood samples arising from different preservation methods.
Quillfeldt P., Bugoni L., McGill R.A.R., Masello J.F. and Furness R.W. (2008b). Differences in stable isotopes in blood and feathers of seabirds are consistent across species, age and latitude: implications for food web studies. ***Marine Biology*** **155, 593-598 .**
Bugoni L., McGill R.A.R. and Furness R.W. (2008). Effects of preservation methods on stable isotope signatures in bird tissues. ***Rapid Communications in Mass Spectrometry*** **22, 2457-2462.**

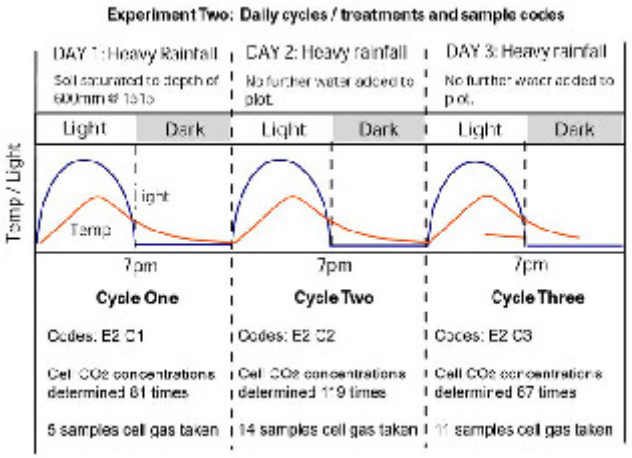
We now have several collaborating groups investigating the trophic and migratory ecology of seabirds in the Southern Ocean, which is contributing to significant output in this area and will allow comparative investigations to be published.

Thin-billed Prion chick, New Island

Lancaster

An alpha 4 approved application from Manchester Metropolitan University (Thomas and Hoon) has been yielding some exciting information about carbon cycling in arid regions. The surface of dryland soils is frequently characterised by a biological crust comprising of various combinations of cyanobacteria, algae, moss and lichens. In the Kalahari of Botswana, soil crusts are predominantly made up of cyanobacteria, which when moist, are capable of fixing N and C. Many cyanobacteria also produce extracellular polymeric substances (EPS) which bind soil particles together and decrease erodibility. The physical integrity and metabolic activity of soil crusts is thus critical to ecological productivity, erodibility and CO_2 fluxes in dryland regions. There are few studies of the magnitude and controlling factors of soil CO_2 flux within these systems. The aim of the study was to quantify 'in situ' soil CO_2 flux during contrasting antecedent moisture conditions in the south west Kalahari of Botswana. Their approach has enabled CO_2 fluxes to be monitored in situ with a high degree of precision for extended periods. When the surface and sub-soils are dry, the ambient CO_2 efflux was negative and low during the daytime. When 8 mm rainfall equivalent of water was added to the surface there was an immediate uptake of CO_2 during the daytime, demonstrating that rates of net photosynthesis are greatly enhanced by available moisture. In contrast, following a prolonged wet period when the subsoil was moist, there was a net positive efflux of CO_2 from the soil, irrespective of whether the surface soil was moist or not. This is consistent with subsoil heterotrophic bacterial respiration becoming an important contributor to soil efflux.

Gas sampling from a Kalahari 'soil' profile



Experimental protocol for CO2 flux sampling

Bristol

An application to the Facility entitled 'Isotopic signatures of Arctic sea-ice biomarkers' and led by Professor Simon Belt of the University of Plymouth has enabled the continuation of work to develop and validate the use of a new biogeochemical proxy for sea-ice to be used in palaeoenvironmental reconstructions of the marine environment from sediment cores. Briefly, a C_{25} highly branched isoprenoid (HBI) monoene hydrocarbon, designated IP25, has been proposed previously to originate from diatoms living in Arctic sea ice, while the presence of IP25 in sediments, as mentioned above, has been suggested to be a proxy for the occurrence of former Arctic sea ice. Here, we show that the ^{13}C isotopic composition of IP25 in sea ice, in sediment trap material collected under sea ice, and in high latitude northern sediments, is distinctive (isotopically 'heavy') and distinguishable from that of organic matter of

planktonic or terrigenous origin. Mean $\delta^{13}C$ values for IP25 were -22.3 +/- 0.4 parts per thousand. (sea ice), -19.6 +/- 1.1 parts per thousand. (sediment traps) and -19.3 +/- 2.3 parts per thousand. (sediments). These measurements, therefore. support further the proposed use of IP25 as an Arctic sea ice proxy. The Facility was responsible for the provision of GC/C/IRMS for the determination of IP25 $\delta^{13}C$ values. **Belt, S.T., Massé, G., Vare, L.L., Rowland, S.J., Poulin, M., Sicre, M-A., Sampei, M., Fortier, L. (2008) Distinctive ^{13}C isotopic signature distinguishes a novel sea ice biomarker in Arctic sediments and sediment traps.** ***Marine Chemistry*** **112(3-4), 158-167**.

In another study, in-house development has resulted in the interfacing of an automated thermal desorber (ATD) with a GC-C-IRMS to provide compound specific $\delta^{13}C$ value determinations of halocarbons in the atmosphere. Briefly, the $\delta^{13}C$ values of a suite of halocarbons were determined in an urban background site in Bristol, UK. A novel mobile preconcentration system, based on the use of multi-adsorbent sample tubes, was developed for trapping relatively large-volume air samples in potentially remote areas. An Adsorption Desorption System-Gas Chromatography Electron Capture Detector was used to measure the mixing ratios of the selected halocarbon species, while a Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometer was used to determine $\delta^{13}C$ values. For the species with strong local sources, the variation of isotope ratios has been observed over the experimental period. Some of the results reported in the present study differ from previously reported values and reasons for this are discussed. The reporting of different $\delta^{13}C$ values for selected halocarbons from different areas in the present study suggests that $\delta^{13}C$ values may be used to determine the relative magnitudes of anthropogenic and biogenic sources. **Mead, M.I., Khan, M.A.H., Bull, I.D., White, I.R., Nickless, G. and Shallcross, D.E. (2008) Stable carbon isotope analysis of selected halocarbons at parts per trillion concentration in an urban location.** ***Environmental Chemistry*** **5, 340-346**. This study is yet another example of the Bristol node's continued commitment to the development of new analytical methodologies to enable UK life scientists to tackle new and increasingly complex questions concerning the natural environment.

FUTURE DEVELOPMENTS/STRATEGIC FORWARD LOOK

East Kilbride

We intend to streamline the current data redaction process for all techniques, by adopting a Laboratory Information System for stable isotopes, developed at the USGS; thus staff will be attending the LIMS workshop in Vienna in April 2009. More development work is needed, in order to offer $\delta^{18}O$ in organic materials, however currently we have a large analytical workload which is eating into development time. $\delta^{2}H$ is becoming more popular as an analytical request, and some effort should be made to increase the sample throughput. No large capital bid is expected for 2010.

Lancaster

We predict heavy use of the nodes trace gas and bulk $^{13}C/^{15}N$ technologies in 2009-2011 from substantial EHFI and NERC responsive mode grants that have been recently approved. The validation of the automated CO_2 method is scheduled for 2009 to a comparable reliability of measurement with our current manual methods. Automation should thus increase throughput of routine natural abundance CO_2 samples and free up resources for development. Given the recent rise in the number of large capacity applications, requesting a large proportion of node capacity per annum, we will be seeking to request temporary staff from NERC SFT when the need arises. We believe that the benefits of having a casual staff member, even for 6 months during busy periods, have already outweighed the disadvantages inherent with short term staff members. With the increasing and varied amount of analyses being undertaken by the node we have requested capital from NERC SFT to upgrade our electronic data storage via upgrading to networked instrumentation.

Bristol

Given the increasing requirement for the provision of GC/C/IRMS and the prerequisite need for GC/MS results. We are currently awaiting delivery and installation of a second ThermoQuest TraceMS GC-MS system; the instrument, now discontinued, was available as a reconditioned unit for a very low price (£18,000). This will enable the Facility to double throughput of GC/MS analyses and enable more than one chromatographic column to be available at any one time thereby removing one of the major obstacles associated with this heavily used hyphenated technique. Since the instrument replicates an existing system the effects of downtime shall be minimised as will costs associated with maintenance and consumables. The Facility will continue to give high priority to the development of new analytical methodologies that have a demonstrable benefit to UK life scientists and to this end Dr Bull shall be attending the 18th International Mass Spectrometry Conference (Bremen, Germany, 30/08/09-04/09/09). Provision of a dedicated LC-IRMS has greatly enhanced development of further analytical methodologies which are still currently ongoing and shall be brought on-stream when fully tested. Reconfiguration of existing instrumentation shall result in HT-GC-MS becoming a continuously available technique. In July the Bristol node shall also host the annual meeting of the British Organic Geochemistry Society (BOGS), an ideal forum for further dissemination of the services provided by NERC LSMSF.