ALAM Newsletter

Autumn 2009

2009 Conference

The 2009 ALAM Annual Conference was held at University of Cumbria – Newton Rigg Campus, back in July 2009. Thanks to Jonty Rostron for pulling the whole thing together. There are the first reports from this conference in this newsletter.

2010 Conference

Plans are coming together to celebrate 50 years of ALAM with a tour of Ireland. See page 3 for the planned program and how to book.

One-Day events

We are always open to ideas and suggestions from members for future one-day updates, and names of useful contacts would be most welcome. Please contact the ALAM secretary.

Membership Form

The membership form has been updated slightly, so if you have any potential new members, please use this latest form.

A.L.A.M Conference 2009

Ill tell you what; that Mis Canthus has excellent reproductive qualities

Parts Offer

John Gough has a range of warranty return items sourced from JCB, which are available for colleges to use for teaching. For full info about what is available, contact John by email at gough.j@btinternet.com - note this is a new email address. Phone - 01630 685 942 - evenings 7 to 10pm, please.

Contents

ALAM Committee 2008-09

Updates are highlighted in **bold** text.

Position	Name	Work			Mobile	Home	
		Place	Tel	Email		Tel	Email
Chairman	David James	Coleg Meirion Dwyfor		d.james@meirion-dwyfor.ac.uk			
Secretary	Graham Higginson	Reaseheath College	01270 613230	grahamh@reaseheath.ac.uk	01948 667982	01948 667982	**gphigginson@sky.com**
Treasurer	David Heminsley	JCB Training	01889 594700	david.heminsley@jcb.com	07971 273725	01889 566882	
Chair Elect	**Phil Goddard**	**Walford College**	**01939 262100**				
Conference Organiser 2009	**Jonty Rostron**	**Appleby Heritage Centre**			**07919 458878**		**Jontyrostron@yahoo.co.uk**
Conference Organiser 2010	**Gwynfor Williams**					**01995 604538**	**Gwynfor@dorchester.entadsl.com**
Committee	John Gough	Walford College	01939 262100 ext 2158	j.gough@wnsc.ac.uk		01630 685942	gough.j@btinternet.com
	Neil Jewell	Reaseheath College	01270 613239	neilj@reaseheath.co.uk	07968 067298	01270 652554	neil.jewell@tiscali.co.uk
	Charles Szabo						**szabochil@aol.com**

ALAM CONFERENCE 2010

Ireland Tour

Celebrating 50 years of ALAM

Monday 5th to Saturday 10th April 2010

Proposed Outline Programme

Monday 5th	Meet North Wales near A55 Holyhead for 9am depart. Car parking to be arranged.
	Travel by Ferry to Dublin and coach to Limerick
	Limerick Hydro Power Station tbc
Tuesday 6th	Pallaskenry College
Wednesday 7th	McHale, Ballinrobe
	Major Farm Equipment, Ballyhaunis, tbc
Thursday 8th	Lough Ree peat fuelled Power Station, Lanesborough
Friday 9th	Dromone Engineering, Oldcastle
Saturday 10th	Return to Coleg Meirion Dwyfor, Caernarfon via Dublin Ferry
	Arrive back at Holyhead around 4pm

Other visits we hope to include are potato farming, specialist fork lift truck manufacture, and a famous beverage factory.

At this stage, the programme and plan are subject to change, but hopefully minor changes for the better!

Cost

£340 for members, £360 for non-members

This includes ferry, coach and accommodation, and most meals, but there may be some small extra costs to members during the trip, for example for some meals.

To book your place, contact Gwynfor Williams, on either:

Email - gwynfor@dorchester.entadsl.com

Phone - 01995 604538

Post - 32 Dorchester Road, Garstang, Lancashire, PR3 1HH

Booking form

Please reserve ____ places on the 2010 Ireland Tour.

Name .... Phone ....

Address .... Mobile ....

.... Email ....

....

....

Postcode ....

ALAM CONFERENCE 2009

Biomass farming

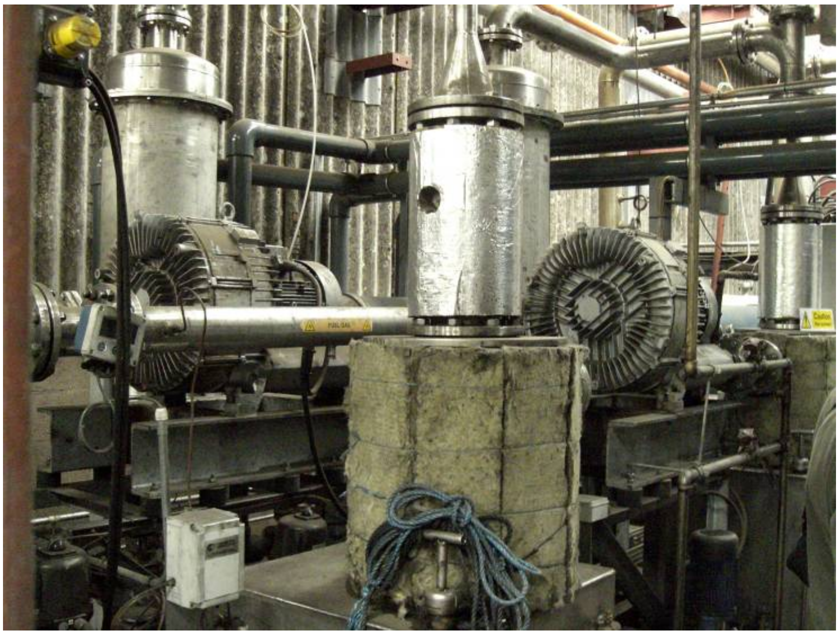
Thursday 16th July 2009.

Biomass Farming and Gasification Plant.

Having boarded the minibuses for the final visit of the conference, we set off north travelling about 6 miles along the old A6, before turning right onto a long farm drive which went through a sand and gravel quarry before arriving at our destination. There we were greeted by our host and guide, Mr Mark Jones, who took us on a tour of the installation which he had set up in one of the farm buildings. He explained that the initial reason for embarking upon this venture was to provide heat and light for the broiler-chicken-rearing enterprise which he has. It appears that in the meantime the emphasis has moved to electricity production to feed back into the grid!

Following experimentation with old pallets and waste timber from other sources as fuel, clean-felled timber up to 16 inches in diameter is now bought in as the most suitable fuel source. One of the advantages of this is that the material is of a known quality, and supply can be predicted. The timber is first fed through a large top-fed wood-shredding and chipping machine which has a magnet fitted on its outlet to remove ferrous scrap. The ideal chip size is between 20 and 130 mm, anything larger is reprocessed, anything smaller is used for bedding, mulching or power-station mixed fuel. The large chip could be used to provide heat at 80° to 90° C to dry damp chip from 25% down to the optimum 15 to 18% moisture content.

The chip is stored in a hydraulically powered ladder-floored holding area which feeds batch quantities of material at a rate of 1 ton per hour onto a conveyor. This moves it up to the top of 4 down-draught gasifiers, the chip is then fed into the top-batch charge unit which controls / minimises the entry of air into the furnace. This part of the operation is essentially the same as charcoal making but with the added advantage that the gas produced is drawn off. The furnaces operate at 600° - 650° C and are fitted with heat guns and blowers around the sides to start the burning process. Grate riddles are used to move the charge down and eject the charcoal ash from the bottom of the furnace where it goes to palletised storage boxes. This ash is spread onto the land in place of lime, whereby two parts of ash are required to replace one part of lime. The ash also has a high potash content so is a valuable fertilizer.



The gas is drawn out from the bottom of the burning chamber throughout the process; it then passes through 70- to 80-micron bag filters and cools to 35° /30° C, it then goes through a condensation vessel and into a buffer tank. The filter bags are cleaned by using nitrogen, extracted from the atmosphere on site, and back flushed through the filter system. As the gas buffer tank is only of a limited capacity, it is usual that the generator engines consume the gas as it is being produced. The end-product, which is termed "wood or producer gas", is then piped into the engine room at a pressure of 115 millibars and then goes through an electrostatic precipitator operating at 50 to 60,000 volts to remove any tars still in the gas. Apparently, bio-diesel can also be used for this tar-removal process, a fact not lost on our conference convenor, who has been beavering away at Newton Rigg over the last 18 months perfecting the production of this liquid gold, and is always seeking new potential markets!

The two engines which consume the wood gas are housed in a separate generating room. They are of Spanish manufacture and are 48 litre V16 twin turbocharged units which run at 1500 rpm. They are each coupled to a 500KW generator and are estimated to produce 1200 to 1400 HP. Each unit weighs 8 tons and the engines stand about 8 ft high with walkways around them to enable maintenance and servicing. The engines have very clean exhaust emissions and the cooling system releases heat through roof-mounted radiators. Consideration is now being given to using this heat for the chicken sheds mentioned earlier! The engine service intervals are 1500 hrs and servicing is carried out by the farm staff. One engine has been trouble-free but the other has required some attention and currently needs the oil pump to be replaced; not an easy task at first glance as it may require the sump to be removed. Between the 1500 hr service intervals they use a laboratory oil-monitoring system which traces, identifies and quantifies the different metal particles in the oil, highlights any abnormalities and gives an early warning of potential problems developing. The engines have a design life of 100,000 hrs during which they are likely to undergo 3 rebuilds involving piston and liner replacement. The plant has a 20 yr. design life and when it was installed 4 years ago it cost £1.5 million: an equivalent installation today would cost an estimated £2.5 to £3 million.

In the recent past the plant and engines have been run to produce electricity for the grid at times of peak demand when higher payment for generation is available. Payment for the electricity is split into 50%"cash" and 50% "ROCS", which are certificates that are tradable with organisations which need to offset their carbon dioxide emissions. This trading has been handed over to a specialist Green Energy broker in London who hopefully secures the best value for his customer. Payback on investment was originally estimated to be 4 years but has been revised to 6 years. Mark explained that there was a similar generating plant near Merthyr Tydfil with which he has maintained contact throughout the planning and development of his enterprise with a view to a mutual exchange of experience and ideas. Mark's installation appears to be well planned, laid out and thoroughly installed; inevitably there were refinements which could be incorporated with the benefit of hindsight but the owner seemed well able to cope with whatever engineering eventuality may crop up! Once the oil pump issue is resolved on the second engine, I am sure that the plant will be restored to full power.

Moving on from this 'electrifying' exhibit, we went to learn about the miracle of Myschanthus, or 'very tall grass' to we non-agronomists. Mark had planted 35 acres of this crop in 2007 and, from the look of it, his Myschanthus seems to be well established and adapted to the local climate. Myscanthus is a rhizome which can be planted from April to late June; during its first year it does not put on much growth but in subsequent years matures and will crop for up to 20 years before replanting is required. Each year the plant starts growing in March/April reaching a height of about 8ft with a stem very similar to bamboo. When the first frost comes the leaves go brown and the stem dies back. It is harvested the following March / April and can be cut with a conventional agricultural grass mower (if a conditioner is fitted, it needs to be a steel-flail type) or a forage harvester with a maize header. If mown, the crop can be baled. The harvested crop can be burnt in a wood-chip burner and is another means of heating the chicken sheds. Some of the crop has been made into compressed briquettes, again for burning in a burner, while the remainder has been used as power-station mixed fuel. The crop has a very low input once established and is tolerant to poorer quality land so has considerable potential as a biomass fuel if a market or local user can be found.

This visit demonstrated that integrated energy production represents a viable entrepreneurial diversification available to the agricultural community in the face of the current economic, energy and climate-change challenges. Mark certainly seems better placed than most to cope with any future shortfall in electricity supplies. We thanked him for giving us an insight into ways of dealing with future eventualities: at least he will always be able to see the light. We, too, were greatly enlightened.

John Gough
Walford College

ALAM CONFERENCE 2009

Sellafield

Visit to Sellafield Ltd, Whitehaven, West Cumbria.

Wednesday 15 July 2007

We travelled in two mini buses to the Sellafield site, on a bright sunny morning, arriving in good time for our 10.30 a.m. visit.

Introduction

The group was warmly welcomed by the receptionist and after a short wait our guides for the day greeted us and lead the way to an area set aside for us; and provided the traditional morning coffee and biscuits.

Chris Keeble acted as Chairman for the visit and the formal introductions took place; our three guides were Neil Stagg, Steven Stagg and Laura Steel.

During coffee we watched a video, A Safety Introduction to the Site, and the actions to be taken in the unlikely event of a fire or accident.

Neil then with aid of a series of photographs gave us some detailed information about the site, why it is in West Cumbria and the changes that have taken place over the years.

The Sellafield site is spread across 6 square miles (750 acres: not gone metric yet!) and is home to more than 1,000 facilities, employing approximately 11.000 employees, all performing a wide range of tasks. These include decommissioning the UK’s nuclear legacy as well fuel recycling, manufacturing and the management of low, high and intermediate level nuclear waste.

To help fund the nuclear clean-up/reprocessing, revenue from the commercial fuel recycling and manufacturing operations is managed by: International Nuclear Services. INS is the customer interface for spent fuel reprocessing and mixed oxide (Mox) fuel supply contracts with over 20 utility customers. They are also responsible for the transport of nuclear fuel products to both UK and overseas customers.

During the coffee break we had to produce some means of identification before we were given the required passes to proceed to the reprocessing building; i) a Visitors Badge, ii) a Security Pass – to pass through doors into the reprocessing building, iii) a Radiation Monitor.

We were informed that our identity had been recorded and our visit to the plant was now on a central Data Base – ‘so if we start to glow in the dark you know why’! and were it all started.

Overview of the history of the Sellafield site

The Sellafield site was originally occupied by ROF Sellafield, a Second World War ‘Royal Ordnance Factory’, which, with its sister factory, ROF Drigg, at Drigg, produced TNT. After the war, the Ministry of Supply adapted the site to produce materials for nuclear weapons, principally plutonium, and construction of the nuclear facilities commenced in 1947. The site was renamed Windscale to avoid confusion with the Springfields uranium processing factory near Preston. The two air-cooled, graphite-moderated Windscale reactors constituted the first British weapons grade plutonium-239 production facility, built for the British nuclear weapons programme of the late 1940s and the 1950s. Windscale was also the site of the prototype British Advanced gas-cooled reactor.

With the creation of the United Kingdom Atomic Energy Authority (UKAEA) in 1954, ownership of Windscale Works passed to the Authority. The first of four Magnox reactors became operational in 1956 at Calder Hall, adjacent to Windscale, and the site became Windscale and Calder Works. Following the breakup of the UKAEA into a research division (UKAEA) and a production division, British Nuclear Fuels Ltd (BNFL) in 1971, the major part of the site was transferred to BNFL. In 1981 BNFL's Windscale and Calder Works was renamed Sellafield as part of a major reorganisation of the site. The remainder of the site remained in the hands of the UKAEA and is still called Windscale.

Since its inception as a nuclear facility Sellafield has also been host to a number of reprocessing operations, which separate the uranium, plutonium and fission products from spent nuclear fuel. The uranium can then be used in the manufacture of new nuclear fuel, or in applications where its density is an asset. The plutonium can be used in the manufacture of mixed oxide fuel (Mox) for thermal reactors, or as fuel for fast breeder reactors, such as the Prototype Fast Reactor at Dounreay. These processes, including the associated cooling ponds, require considerable amounts of water and the license to extract up to 18,184.4 m^3 a day (over 4 million gallons) and 6,637,306 m^3 a year from Wast Water, formerly held by BNFL, is now held by the Nuclear Decommissioning Authority.

The Reprocessing Building

We gathered in front of the visitors centre and waited for the coach to transport us to the reprocessing building.

Firstly we had to get into the site, the coach was stopped at the security gate our guide had the required documentation that was a good start. Then a security person got on the coach with her sniffer dog who wagged his tail and went on his way quite happy – but the Policeman who then gave us the once-over looked a bit grumpy, but we got onto the site.

We proceeded into the building and into the changing rooms using our passes as instructed by our guides, and then the safety procedures started. Firstly we had to leave our coats, mobile phones, etc, in a locker room, then through more security doors into the changing area.

Our guide Neil gave us and instructions on the following:

1. Off with jackets, shoes, etc, and but on blue coats of the correct size and fasten all buttons, fix personnel radiation monitor to tab on blue coat

2. Then long socks and tuck in the trousers bottoms

3. Proceed to the next room and select the correct size of safety shoes.

4. Site on a bench and move you feet over the bench, without touching the floor on the other side of the bench, (this the guide informed us was to prevent cross contamination)

Now we could enter the reprocessing area and an impressive sight it was. A large area of plant and equipment and containing a pool of water 8 metres deep. The spent fuel was in approximately 3.5 tonne flasks in packaging weighing approximately 110 tonnes.

This material comes from; 1 third UK, 1 third Japan and 1 third Europe. The pond stores 55 tonnes inside and another 2 tonnes outside, the storage temperature is between 20ºC and 25ºC. The spent fuel is stored for about 5 years before processing starts.

Our guide informed us that the building cost approximately £1.8 billion in 1985 and to-days replacement cost is estimated at £5 to £6 billion.

Our tour of the building followed to process of the spent material from the storage pool, to the cut-off machine that chops the radioactive rods into the appropriate size before they enter the nitric acid baths.

What is reprocessing?

Fuel for nuclear power stations comes from concentrated uranium which is made into fuel rods.

The average life of a nuclear fuel rod is four years, after which time waste products have built up making it less efficient.

Reprocessing is the chemical operation which separates the useful fuel for recycling from the waste.

There are only two commercial reprocessing plants in the world - Sellafield in the UK and Cogema in France. But Japan is developing its own plant at Rokkashomura.

Sellafield exports reprocessed fuel around the world

Sellafield's Thorp reprocessing centre receives waste nuclear fuel from 34 plants around the world. The metallic outer casing is first stripped away and the spent fuel is then dissolved in hot nitric acid.

This produces three things - uranium (96%) and plutonium (1%) and highly radioactive waste (3%).

The reusable uranium is turned into a powdered form, processed into fuel pellets and sent back for use in nuclear reactors.

What about the plutonium?

Plutonium can be combined with uranium and turned into a mixed oxide fuel called Mox.

Each six-gramme pellet holds the equivalent energy of one tonne of coal. British Nuclear Fuel (BNFL) says three pellets can provide a family's needs for an entire year.

Mox is a way of using up the otherwise unusable plutonium. But there are fears that if it fell into the wrong hands it would be easy for someone to extract the plutonium for nuclear weapons.

What happens to the left over radioactive waste?

The waste is turned into a powder and mixed with glass to produce a pellet and goes into storage for eventual return to the customer.

All customers with BNFL have a clause in their contract to accept back their own waste, but no return date is specified.

Our tour guides were most informative and I believe our entire questions were answered, including one involving the lifespan of some of the equipment and the actions necessary if the failure is in a Radio Active area.

Through the glass inspection windows (approx 1 metre thick) we could see some of the processes taking place.

One aspect of our tour was the absence of employees considering the number employed on the site.

After our tour we returned to the changing rooms, the reverse process to when we entered but;

1. After removing our safety shoes in the reverse of entering the building and our blue coats, but retain our radiation monitors
2. We next had to thoroughly wash and dry our hands
3. Next place our hands in a scanner until our fingers touched a plate in the back of the scanner to check for any radiation
4. Now a complete body scan with a hand held scanner
5. Next part of the process was to enter a small booth just a bit smaller the a GPO telephone box – face to the back of the booth as close as possible with your hands in a scanner and wait for a buzzer and flashing lights to indicate the next part of the process. Turn through 180 degrees and press 2 buttons. If the if all was clear the doors opened and you could get out.
6. Back to the lockers, off with the long blue socks and life is almost back to normal, but you still have to collect the rest of you personnel belongings on your way out.

We returned by coach to the visitors centre, much easier to get out of the site than to get in.

After lunch and another Q&A session the Chairman called upon a member of the group to propose a vote of thanks, and the traditional wise ALAM owl was presented to the guides. Our appreciation was shown in the traditional manner, we left the site glowing and much better informed about the one aspect of the nuclear industry

For those of you who feel the need for more detailed information, have a look at the Sellafield website - www.sellafieldsites.com

David Stephenson
ALAM Member

Brief History of Sellafield

1947

Windscale in Cumbria announced as the new atomic energy site. Work begins on the construction of the Windscale Piles

1950's

Ministry of Supply (MOS) site – ordnance. In 1950 the government issued a notice to local farmers and occupiers of the 150 acres of land surrounding the ROF site that the land was to be requisitioned for the new gaseous diffusion plant .The site was officially taken over by the MOS in April 1950.

Experimental loading of fuel into first Windscale Pile Experimental loading of fuel into first Windscale Pile

First active operation of the plant to separate uranium and plutonium from used fuel

Uranium Enrichment commences

First uranium product bottle filled March of that year

Calder Hall reactor 1 generates first electricity and HM Queen Elizabeth II officially opens the power station in the October of that year

Fire in Windscale Pile leads to closure of both original Piles

Plant ran at full Uranium Enrichment

1960's

Military Support ceased as supply outweighed demand.

1962/82 - Civil enrichment for nuclear power stations

Windscale Advanced Gas Cooled Reactor starts operation

Magnox reprocessing plant comes on line to reprocess fuel from the first generation of British reactors

1970's

BNFL formed

First gas centrifuge plant – construction commenced on the first commercial centrifuge plant.

Windscale enquiry into plans to build a Thermal Oxide Reprocessing Plant (Thorp)

More efficient centrifuge process put in place by Urenco, collaboration between BNFL and Dutch and German organisations.

Thorp receives go ahead for construction

1980's

Windscale AGR closes

Diffusion operations ceased and decommissioning work began. A long term decommissioning program was established. Part of the outer structure to be retained to house uranic storage containers

Decommissioning of the Windscale Piles begins

1990's

Windscale Vitrification Plant starts turning high-level radioactive waste into glass.

BNFL Split and Urenco Capenhurst Limited (UCL) was formed to form a separate company to progress, promote and sell centrifuge separation technology to domestic and overseas customers.

Thorp operations start

BNFL Capenhurst Site was confirmed as uranic storage facility. Approval was later given for a programme to modernise and upgrade the uranium storage facilities, housed in the former diffusion plant. Today, the site safely stores uranic materials prior to their long-term re-use within the nuclear fuel cycle in line with UK policy.

Construction of the Sellafield Mox plant complete

2000's

Government announces the intention to form a Liabilities Management Authority (LMA) to manage the historic wastes and facilities at Sellafield and other nuclear sites

New Vitrification plant to solidify high-level waste starts active commissioning.

Calder Hall power station closes in March after 46 years of electricity generation

Ownership of the sites transfers to the Nuclear Decommissioning Authority (NDA) who will oversee the operations and decommissioning work, carried out by Sellafield Ltd

50 years erased in seconds - Calder Hall`s cooling towers are demolished.

Integration of Windscale site.

November - Share transfer to new Parent Body, Nuclear Management Partners Ltd

Extracted from Sellafield web site

ALAM CONFERENCE 2009

Coniston Hydro Electric Power Co Ltd

History

There was a turbine and generator at this site installed in1932 a second turbine in1937 and these worked into the1950s

In June26th 2003 the present company was incorporated with Sue Hext as Director of this private limited company.

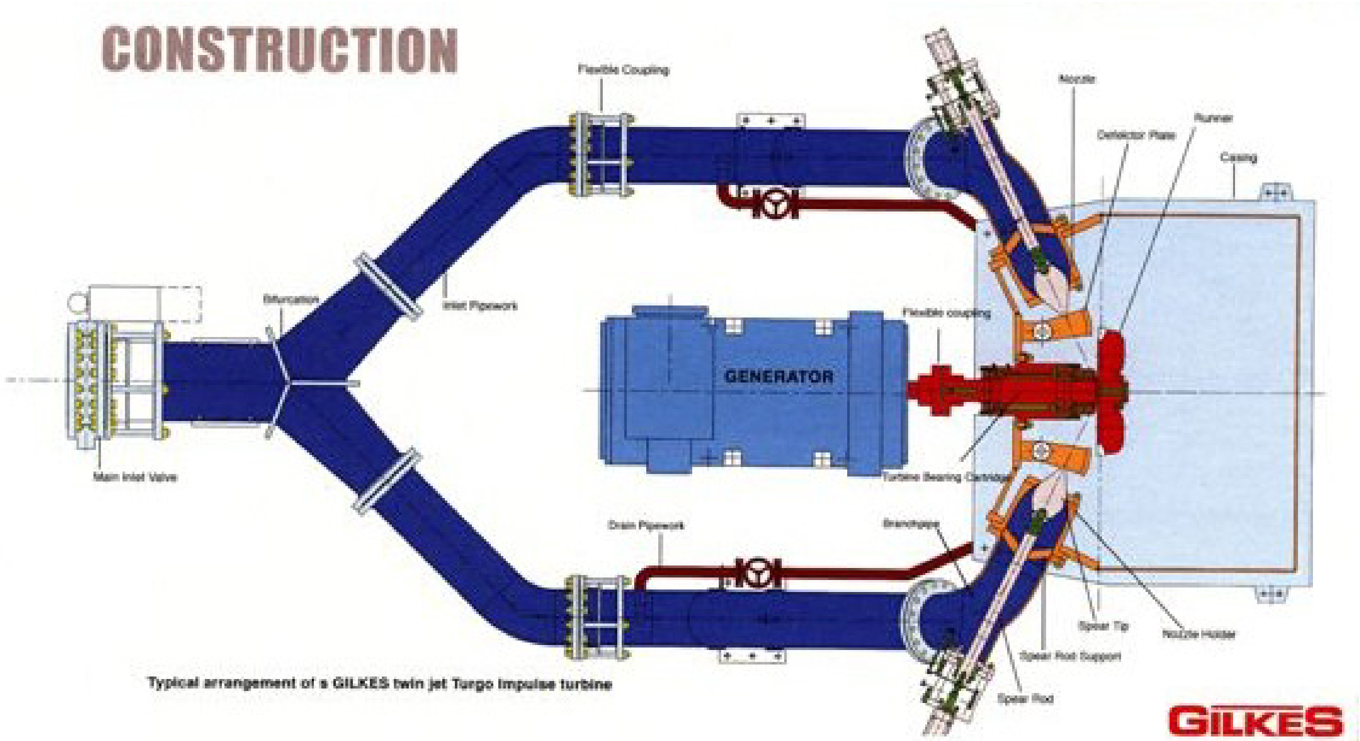
February 2007 Commissioning

ALAM were met by Mathew Crosher (UK sales Gilkes Hydropower Kendal) assisted by Sarah James (Marketing)

Gilkes have been making turbines for over 150 years!! and are the "Rolls Royce".

Their Engineering does not come cheap but is regarded as the very best.

Visit www.gilkes.com – it is very interesting.



Intake

80 metres (250 feet) above power house on Church Beck consists of-

a) Intake Screen – self cleaning.

b) Header Tank – level sensor. Tank flush sediment to compensation water.

c) Pipeline – High density 500mm diameter.

d) Adjustable Weir – compensation water (environmental)

The Power House

It has been built to look like a Lakeland barn and houses two generating sets.

Main Set

Turbine

Gilkes Turgo Impulse max output 300Kw (400 h.p.)

Twin nozzle with spear control(to adjust flow – to maximize water availability)

Working Head 82 Meteres (Approx 250 feet) Pressure at nozzle120lbs sq in.

RPM = 1000. Diameter approx 600mm

Max Flow(0.45cu metres/second or 450 litres/second)

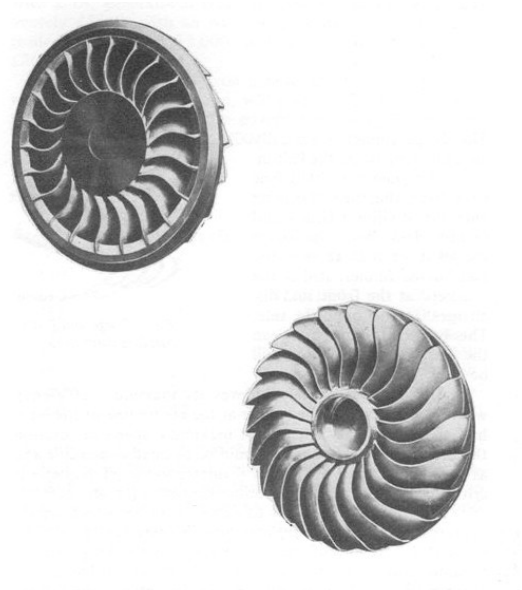


Fig. 8. Inlet and discharge sides of the runner of a Turgo impulse turbine.

Generator.

Of Italian manufacture induction type.

Max output 300Kw, 3 phase, 415 volts, at 50 Hz. Inverted to 11Kva to D59 compliant for Grid connection. Generator can withstand 200% over speed. Over speed is highly unlikely, but if the load came off the generator it's speed would almost double.

Two devices come into operation to bring unit to a controlled halt. The hydraulic controls:

a) bring in the deflector plates which deflect the flow from the turbine.

b) slowly move the spear rods (avoiding water hammer) to stop flow.

Control of Power Output

Power output is related to the flow of water. In Britain the flow of rivers and streams can vary from day to day or even hour to hour. The environmental agency dictate the flow or compensation water. In other words you cannot take every drop of water from the stream and put it through your turbine, those fish animals and plants have to be protected.

The intake to the pipeline consists of a concrete tank with a level sensor. If it rains then the flow/ level in the tank rises. A signal via a computer is sent to the hydraulic controls which withdraws the spear rods increasing flow to the turbine.

In dry weather the Main Set stops say at 20% say 60Kw and a small 50 Kw set starts up. If drought continues then this set via the action of the spear rods will decrease output to a minimum of about 10kw.

So Coniston Hydro can optimise the potential of Church Beck and safely meet it's environmental responsibilities.

How much does it cost?

Main Set £300.000. Small Set £50.000

The whole Project £1000.000

Pay Back

Produces £125.000+ annually.

Can cost £100.000 in survey fees etc to bring project to green light!!!

ROC Renewable Obligation Certificates.

A Government subsidy to green energy 1ROC = 0.5 Mw (500Kw/Hrs)

If 1ROC = £30.00 then it is 6p per kw.

So a set producing 250 Kw would earn £15.00 per hour of subsidy.

I think in the case of Coniston 4.5p was mentioned.

Gwynfor's Doodling...

Turbine speed $\frac{\text{1000r.p.m x 24 blades(bucket)}}{60}$ = 400 blades/sec (flow 400 lit /sec) = 1litre/blade

Head 82 m (approx 250 feet) Velocity at nozzle = square root of 2 x 32 x 250/sec

= 200ft/sec

= 12 000ft/min

Turbine speed under load = 0.5 x velocity = 6000ft /min

Turbine diameter = $\frac{\text{3.142 x 24inch}}{12}$ = approx 6ft

TurbineSpeed = $\frac{6000}{6}$ = 1000 rpm (Coniston)

Food for thought

Only 30% of small Hydro sites have been developed!!

No bleepers or special suits needed they just borrowed the water!!

I did not mention efficiency Turgo 80 - 85% Generator say 80% so 80 x 80 = 64% overall. Say 60% pretty good.

Gwynfor Williams
ALAM member

ALAM Accounts 2008-09

THE ASSOCIATION OF LECTURERS IN AGRICULTURAL MACHINERY

Income and Expenditure - Year Ending 31st March 2009

		2007-08 Income	2007-08 Expenditure		2008-09 Income	2008-09 Expenditure
Subscriptions		957.00			887.00	
Committee Expenses			284.85			446.90
Newsletter			90.08			36.76
Courses	MF Oct07	370.00		Road Regs	600.00	4.44
	Legals Feb08	415.00	787.50	Hayter	480.00	0.00
				IsoBus	0.00	0.00
Conference	B Burton	3500.00	3901.29	B Burton	0.00	0.00
				C M D	2065.00	1771.62
Interest		29.30			20.94	
Miscellaneous		175.00	1471.31		180.00	288.77
Surplus/Deficit	Deficit	1088.73		Surplus		1684.45
TOTAL		**6535.03**	**6535.03**		**4232.94**	**4232.94**

Statement of Affairs as of 31st March 2009

Bank Account as on 1 April 2008		4644.03	Bank Account as on 31 March 2009	5580.04
Building Society as on 1 April 2008		1399.49	Building Society as on 31 March 2009	1420.43
Plus uncleared incoming cheques	1/4/08		Plus uncleared incoming cheques	0.00
Less uncashed outgoing cheques	1/4/08	787.50	Less uncashed outgoing cheques	60.00
Plus Surplus		1684.45		
		6940.47		**6940.47**

In my opinion the above is a true and fair view of the financial state of the Association of Lecturers in Agricultural Machinery for the year ending 31st March 2009

Signed Treasurer

Signed First Audit

Signed Second Audit

Notes

Miscellaneous income includes a late £155 payment for the Massey Ferguson hosted by Warwickshire College.

Miscellaneous expenditure includes £110 for certificates which are now issued after each ALAM event, to provide evidence of CPD.

ASSOCIATION OF LECTURERS IN AGRICULTURAL MACHINERY

Membership Application Form

Title	Initials	Forename	Surname

Home Address	College Name
	Address
Postcode	Postcode
Phone	Email
My connection with education in agricultural/horticultural engineering is:	
Signed	Date
Proposer (Member of ALAM) If you don't know any members, just return the form and we'll arrange contact with one in your area.	

HOW TO PAY- The current rate is £10 per annum, payable on April 1st each year.

By cheque: Cheques should be crossed and made payable to "The Association of Lecturers in Agricultural Machinery", and sent with this form to the treasurer.	
By standing order: It will help us provide an efficient service to members if you pay subscriptions by Standing Order, by completing the following, and returning the whole form to the treasurer.	
Bank Name	Name of Account
Branch	Account No.
Address	Sort Code
	Payment Reference
	Please write your Initial and Surname as a Payment Reference in the space above, to ensure ALAM can clearly identify your payments.
Postcode	
Please pay to Lloyds Bank, 12 Lendal, York, YO1 2AF, (Sort Code 30-99-99) in favour of The Association of Lecturers in Agricultural Machinery (Account Number 1373714), the sum of £10 immediately, and then annually on the first of April each year, until cancellation by me of this standing order, debiting the account specified above. This order cancels and replaces all previous orders in favour of The Association of Lecturers in Agricultural Machinery.	
Signed	Date
Standing Orders are for a fixed amount, which can only be altered by you. It is not a Direct Debit, which allows the payee to vary the amount drawn.	

Return completed forms to David Heminsley, ALAM Treasurer,
The Old Byre, Lower Street, Doveridge, Ashbourne, DE6 5NS.

For use by the treasurer							
Details recorded		Payment received		Bank Order processed		Member number	

Form revised June 2009