

INTERNATIONAL
EXCHANGE
REPORT

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| 1 Visit Reference | 4488 |
| Aegis | JOWOG 39 |
| Project Contract/ Major Task Ref | EH |
| Doc Ref. No. | |
| Date | 23 November 2007 |

ATTENDEES

| | Facilities Visited | Dates | Hosts |
|------------------------|---------------------------|------------------|------------|
| 2 1. [REDACTED] | Y12, Oak Ridge, Tennessee | 08 - 10 Oct 2007 | [REDACTED] |
| 2. [REDACTED] | | | |
| 3. [REDACTED] | | | |
| 4. [REDACTED] | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |

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OBJECTIVES (from visit approval)

- 3** • To review progress on planned collaborative activities with Y12
- To further discussions on candidate collaboration projects to be progressed under the enhanced collaboration mandate for manufacturing. The output will provide an agreed position for presentation at the scheduled Government to Government meeting in October 2007.
- Introduction of AWE and Y12 operational/facility staff in order to establish the basis of exchange activities relating to the operation of existing and the transition to new facilities.
- For AWE to peer review and assist Y12 with [REDACTED] safety calculations

EXECUTIVE SUMMARY Information Exchanged / Achievements / Future Collaboration

4 Progress with Pegasus and the Y12 Uranium Processing Facility project was exchanged. The UPF project has been approved to proceed to CD2 with an estimate to complete between £1.5 and \$2.4Bn. Construction is scheduled to start in 2010 and the project will complete in 2020.

The exchange centred on operational issues, reviewing transition arrangements and issues impacting on future operating concepts such as skills, culture and organisation. The impacts of modern design, such as containment and processes were also considered. Y12 are interested in learning from AWE experience in advancing these issues.

[REDACTED] Machining and [REDACTED] processes were discussed in detail. Y12 are now involved in the AWE/LLNL/LANL machine tool exchange activity. Y12 reported on progress with their [REDACTED]. They have assembled data which they anticipate will justify this technology for component production.

A Memorandum of Agreement has been agreed between AWE and Y12, setting out a framework and the principles of future exchanges. The principles of enhanced collaboration was also discussed [REDACTED]

The exchange programme will be jointly reviewed in mid 2008.

| | | |
|----------------------|------------|--|
| 5 Prepared by | [REDACTED] | Visit Leader |
| Approved by | [REDACTED] | *JOWOG Leader <input type="checkbox"/> / PCM <input type="checkbox"/> / CCM <input type="checkbox"/> |

*select as appropriate

Project Status

Each team presented the status and a progress update of their project.

The Y12 UPF project has been approved and funded to proceed to CD2. The estimate to complete the work is \$1.5 - \$2.4Bn. \$1.2Bn contingency is being held by US Congress.

The Project is scheduled to commence construction in 2010 with inactive commissioning starting in 2012. Active commissioning and process qualification will commence in 2018 and the project will be completed in 2020.

The UPF is part of a Y12 programme to consolidate [redacted] operations into two 'Denial' facilities (Known as the Turtle 1 Turtle 2 concept) and substantially reduce the area of their protected security area (PIDAS). This forms the basis of their business justification as it is estimated the scheme will save \$200m p.a. in security and maintenance costs.

Operating Concepts

The Y12 appear to be planning for a flexible processing layout to mitigate mission uncertainty. The manufacturing process baseline is [redacted] and agile machining. Processes will be fully contained, although not fully integrated so that 'street clothing' can be worn without the need for further PPE.

This will move the Y12 facilities and operators from pre-Pochin to fully contained standards in a single step. AWE has taken around 30yrs to make the same changes [redacted]

Y12 have not yet developed their strategies regarding the skills, versatility and culture of their future workforce. They aim to have a road map in place mid 2008 to address this matter. The Y12 team expressed a great deal of interest in learning more about the AWE approach i.e. the Frontline Worker initiative and the current craft worker arrangements etc. [redacted]

This area is included in the future exchange programme.

The Y12 team are migrating from Extend 2D process modelling to a new package called Flexim, which allows 3D modelling of people, plant and parts. This area will be of potential benefit to Pegasus and other areas of AWE.

Further developments of [redacted] have been made. The design team seem to have overcome the problems they were experiencing in [redacted] components. Advances made in [redacted] and [redacted] between [redacted] and [redacted] have allowed them to successfully compile a data set which they are hoping will demonstrate service compatibility. This is due to be presented to design labs before the end of the year. Y12 has also made a commitment to share this data with AWE.

The results showed that the system reduces the level of [redacted] impurities in [redacted] product. (This was thought to remain in the [redacted])

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This will be a growing collaborative area as Pegasus intends to procure a [REDACTED]

The concept of new a modular [REDACTED] design was presented. This consisted of a number of self contained [REDACTED] and [REDACTED] assemblies, which can be moved to a [REDACTED], where the appropriate services (e.g. wave guides) can be applied. The philosophy is that many assemblies can use a single [REDACTED] station in quick succession, with assembly and breakdown activities carried out elsewhere.

Machining

Y12 have purchased a conventional five axis machine tool as part of their Agile Machining development programme. This is a standard off-the-shelf model, equipped with Capto tooling and on-machine gauging. The machine needs to be engineered for a radiological environment which is a significant challenge given the Y12 objective of achieving a 'street clothes' environment within the process areas. There are indications that this may not be feasible.

Swarf (chip) breaking and removal also remains under development. Y12 are hoping to achieve a method of removing swarf without operator intervention as an efficiency measure. Fissile material mass limits are significantly higher than those in AWE.

Y12 are interested in improving their swarf accountancy method. AWE will provide information on the Total displacement swarf container design.

Y12 are now represented on the existing AWE/LLNL/LANL exchange which is working with the manufacturer Hardinge to design a machine tool suitable for Pegasus and also US Pit manufacture.

[REDACTED]

The AWE was requested to peer review the design proposal for a new [REDACTED] in particular the effect of [REDACTED] on [REDACTED]. AWE made several recommendations to optimise their design by undertaking further work to model [REDACTED]. These were accepted and AWE will continue to peer review this activity.

The Y12 [REDACTED] team also outlined their technology development programme. It appears that Y12 is facing the same issues as AWE, namely, [REDACTED]. The current [REDACTED] of [REDACTED] Vs. [REDACTED]. There is an opportunity here to bring the AWE and Y12 teams together to share data and align their development programmes.

Storage

The new Y12 storage facility, HEUMF, is due to become operational in 2010. The facility is 300 ft x 475 ft and is designed to house the Y12 inventory.

Construction of the store is well advanced. Container criticality limits higher for HEUMF [REDACTED]

The store has two processing areas for loading and unloading material into rackable storage boxes. There do not appear to be engineered criticality safety controls. Y12 operate on a single hard containment philosophy [REDACTED]

Y12 also have clearance to extend their PIV period to 4 yrs 9 months (security basis)

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Tours

Over the course of the last two years Y12 have made some significant improvements to their reception and administrative infrastructure with the construction of the New Hope and Jack Case facilities. Badging arrangements have also been upgraded to include biometrics. This element of the security system was in transition.

The following plant areas were toured:

- Chemical recovery
- HEU [REDACTED] machining
- Rolling, pressing and hydroforming
- Quality evaluation (stockpile surveillance)
- Assembly and disassembly

[REDACTED] the rolling and forming process areas were non operational at the time of the visit, However, Y12 has recently completed a major restart programme to re-establish these capabilities. Space was also being made in preparation for the installation of a production [REDACTED] unit.

The HEU machining area was fully operational. Machines are ventilated using hood extraction.

There was a very high tolerance of airborne and surface contamination that is not acceptable in the UK. There was no evidence of interstage checking from the radiological standpoint and no independent monitoring.

There were also very high criticality safety limits, [REDACTED] much higher than those operated in AWE facilities.

AWE / Y12 Exchange Programme

Previous exchange activities were reviewed and the forward programme was revised. The following areas are included:

- Fissile Material Control and Accountancy
- Design of Plant
- Machining Capability
- [REDACTED]
- Material Processing
- Modelling
- Inspection Capability
- Concept of Operations
- Transition Philosophy

Progress will be reviewed on an annual basis.

A Memorandum of Agreement setting out the principles of future exchanges under the JOWOG framework was accepted.

[REDACTED]

The following enhanced collaborations were discussed:

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- A framework to provide effective project support and to manage exchange activities through 2008.
- Development of a modern operational model addressing cultural/organisational and productivity issues
- Specification and procurement of a new machine tool
- Specification development and testing of a [REDACTED]
- Specification development and procurement of a [REDACTED]

These were accepted in principle and were all the subject of on-going work. The Y12 team, including the DOE representative felt that they needed to discuss internally the management arrangements and familiarise themselves with these arrangements from a US standpoint.

The collaborative programme will be jointly reviewed mid 2008.

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