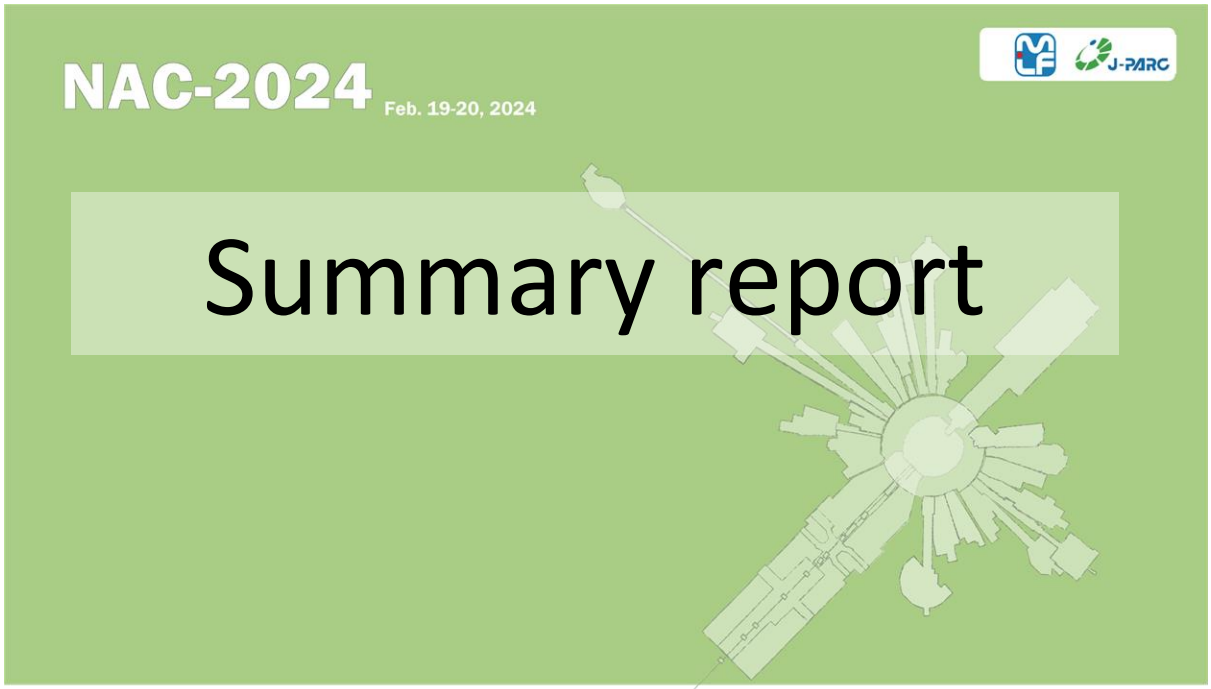

Jamie Schulz (Chair), Yoshie Otake, Philip King, Bertrand Blau, Michael Dayton, Jon Taylor, Christiane Alba-Simionesco, Sungil Park, Taka-hisa Arima, Toyohiko Kinoshita

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Introductory Remarks

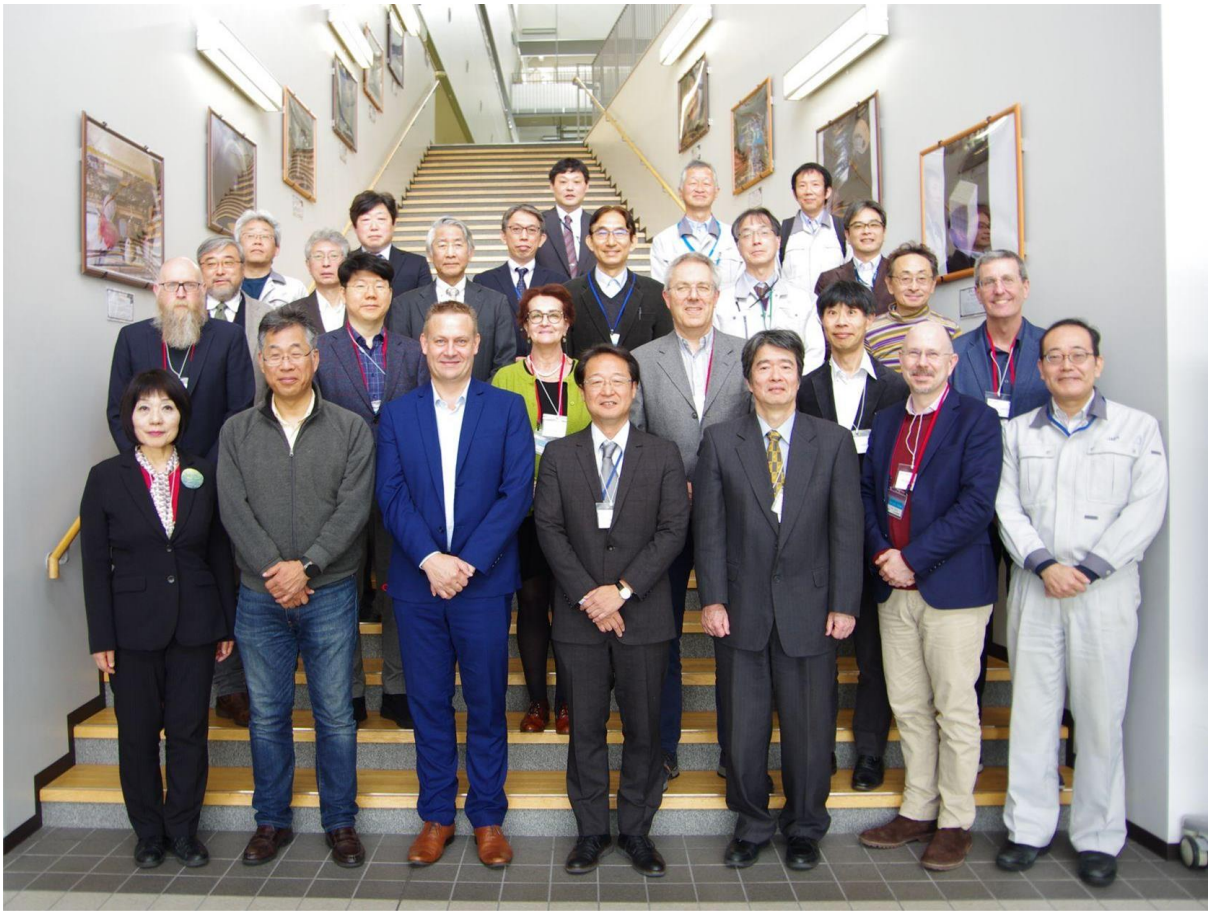
The Neutron Advisory Committee (NAC) thanks the participants for the clear presentations and fruitful conversations & explanations.

The NAC thanks Mr Mori & Mr Sugio for their support with the logistics and kind hospitality.

The NAC thanks the staff for the tour and the interesting discussions.

The chair thanks the NAC for their enthusiastic participation.

NAC-2024 Committee



Jamie Schulz - ANSTO (Chair)
Yoshie Otake - RIKEN
Philip King - ISIS
Bertrand Blau - PSI
Michael Dayton - ORNL
Jonathan Taylor - ESS
Christiane Alba-Simionesco - LLB (CEA/CNRS)
Sungil Park - KAERI
Taka-hisa Arima - University of Tokyo
Toyohiko Kinoshita - SPring-8

NAC-2024 Agenda

19-Feb				
9:30		Closed Session	0:40	J. Schulz
10:10	NAC2024-0	Overview of J-PARC	0:30	T. Kobayashi
10:40		Group photographing	0:10	
10:50		Break	0:15	
11:05	NAC2024-1	Overview of MLF & Charge to NAC	1:00	T. Otomo
12:05		Lunch	1:20	
13:25	NAC2024-2	Neutron Source	1:00	K. Haga
14:25	NAC2024-3	Neutron Instruments & Outcomes	0:45	M. Nakamura
15:10	NAC2024-4	Industrial Use	0:30	K. Mita
15:40	NAC2024-5	Analysis of Publication Status	0:30	K. Funakoshi
16:10		Break	0:30	
16:40	NAC2024-6	Polarization Devices	0:20	T. Oku
17:00	NAC2024-7	Deuteration Lab	0:20	H. Aoki
17:20		Closed Session	0:40	J. Schulz
18:00		Move to Katsuta	0:40	
18:40		dinner		

20-Feb				
9:00		Closed Session	0:20	J. Schulz
9:20		Break	0:10	
9:30	NAC2024-8	MLF roadmap update	0:20	T. Otomo
9:50		Content of roadmaps for overseas facilities and process of establishment	1:00	ANSTO, SNS, ISIS
10:50		Break	0:10	
11:00		Closed Session	1:00	J. Schulz
12:00		Lunch	1:30	
13:30		Closed Session	1:00	J. Schulz
14:30		Summary session	0:30	J. Schulz
		Adjourn		
		MLF tour		
		dinner		

General Comments

MLF Source Performance

- **Comment:** NAC congratulates the MLF for achieving stable operations at 830 KW. The J-PARC staff must be congratulated for achieving this significant milestone.

Recent Fires

- **Comment:** NAC appreciates the transparent discussion on the 2 recent fires within the J-PARC facility. The NAC would like to provide feedback that incidents such as fires will occur. However, measures can be implemented to reduce likelihood including preventative maintenance, inspections, thermal imaging etc. Other actions to reduce the impact can also be implemented such as fire detection systems, automatic extinguishers and rapid response. Implementing learnings from past incidents is also important to prevent future recurrence. It is important to communicate to stakeholders that J-PARC has the systems and process in place to minimize risk (likelihood & impact).

MLF Access Road

- **Comment:** The NAC is pleased to see progress on the MLF access road and fully supports the implementation to streamline access to the facility which is planned to be completed in FY2026.

SOKENDAI Joint Research Center/J-PARC Experimental Equipment Development Building

- **Comment:** The NAC is pleased to see that the construction of the assembly building has commenced. This new building will be important to enable existing activities and facilitate future growth of MLF activities.

User transport

- **Comment:** The NAC supports the recent actions implemented to improve user transport with the shared car at the Dormitories, increased service for the shuttle bus and trial operation of a taxi van.

Budget

- **Comment:** The NAC is pleased to see that the budget allocation is planned not to be reduced in FY2024. However, the NAC has concerns that this budget has remained relatively flat for the past 3 years despite increasing costs of operations. With increasing electricity prices, a special additional budget allocation will need to be requested to ensure the MLF can operate the full 7.2 cycles.

- **Recommendation**: The NAC strongly urges the MLF to secure additional special budget to fund the incremental electricity costs to ensure full use of the facility and delivery of neutrons for users.

MEXT Review

- **Comment:** The NAC was pleased to hear the recommendations of the MEXT 5-year review and the NAC fully supports the implementation of the recommendations. NAC were particularly pleased to see the potential for MLF to retain funding achieved through proprietary industrial (and priority) use(s) of the facility. NAC expects this will work well for a long time.

Charge & Role of the NAC

- **Comment:** The NAC would like to encourage to J-PARC to review the NAC charge each meeting in order for the NAC to best assist the MLF with performance, current challenges and plans for the future.

“MLF Double” Plan

- **Comment:** The NAC understands the rationale why the MLF has named the future plan as “MLF Double”. NAC believes that the name may cause some confusion regarding the expectation of “Double”. NAC suggestion is to label with a more appropriate descriptive name eg “MLF Boost”

Transfer of the management of the Ibaraki Beamlines to CROSS

- **Comment:** The NAC would like to thank to Ibaraki University for their great management of the Ibaraki beamlines and encourages the continued critical support of the Ibaraki Beamlines by Ibaraki Prefecture.

Deuteration:

- **Comment:** The NAC is pleased to see links to DeuNet and BINDS and recommends that the J-PARC Deuteration Laboratory maintains a good relationship with these networks.

- **Comment:** It is expected that open use of Deuteration Laboratory is a positive step toward greater utilisation of deuteration techniques and will promote neutron scattering on biomolecules and organic materials.
- **Recommendation:** To overcome the current shortcomings of having to rely on collaborative network and to provide deuteration in a fair and effective manner, the NAC advises the deuteration group to develop a long-term strategic plan which includes business model to reach sustainability.

Charge: Neutron Target Development & Maintenance

Are the lifetime of target vessel expectancies appropriate?

- **Yes.** Iterative improvements in the target vessel design and operation have resulted in reductions in the primary limiting factor for target lifetime - cavitation erosion. The damage prediction model has proven to be a useful tool in quantifying target lifetime based on the progression of erosion.

- **Comment:** Efforts should be focused on better correlating the damage prediction model using actual pitting damage measurements. At the moment, the model predictions seem to overestimate the actual measured damage. Timely Post-Irradiation Examination activities should be pursued to continually update and adjust the model as beam powers and operational hours increase. Understanding the variability in the rate of erosion over longer run times should also be an objective.

Is the maintenance plan appropriate?

- **Yes.** The target maintenance plan incorporates a strategy that manages target design, fabrication, and operation in a manner that supports operational objectives. Fabrication plans support installation and operation and ensure sufficient spare targets are available for unexpected failures.

- **Recommendation:** Taking advantage of the delay in fabrication of Target #17, consider incorporating modifications to configure this vessel according to the lessons learned from operation of target #15 with respect to bubbler design.

Are the considerations currently envisaged appropriate in realizing a two-year replacement?

- **Yes.** The maintenance plan ensures the availability of suitable target designs that support MLF operation. The strategy of adjusting beam power in response to cavitation erosion measured depth provides additional margin in lifetime and mitigates the risk of unexpected failure.

- **Comment:** Consideration of possible target vessel fatigue failure mechanisms should be evaluated given the increased target operational times envisioned in a two-year replacement strategy.

Other feedback:

- **Recommendation:** Tritium release continues to present an operation challenge. Consideration should be given to strategies that quantify total tritium produced per year and develop methodologies to capture, store, and then release this tritium over sufficiently extended time to ensure offsite measurements remain below acceptable limits.
- **Recommendation:** Following discovery of the operational issue with the moderator & reflector/proton beam window cask gripper drive mechanism, actions should be taken to ensure the mechanism is fully restored to operational status as soon as possible to enable replacement of the moderator assembly prior to its end-of-life.
- **Recommendation:** Operational issues with the cryogenic hydrogen control system have incurred significant downtime. Efforts should be focused on determining the root cause of these issues and ensure measures are put in place to prevent reoccurrence.
- **Recommendation:** Testing results on the tooling to perform cuts on the 'disassemblable' target tubing are promising. Future activities should ensure that all aspects of this operation from tooling development to procedures fully support the objectives.
- **Recommendation:** As the MLF moves into its adolescent years, consideration should be given to vulnerabilities associated with obsolescence and conventional facility upkeep. A risk assessment activity should be pursued to identify vulnerabilities in single-point failures, high-value spares, and asset management of the existing facility.

Charge: Neutron Instruments & Outcomes

Are the results of the MLF hardware's performance being <u>fully</u> utilized?

- **Yes** – reported average demand for instruments of 1.7 remains high ensuring quality science is undertaken with the MLF beamlines. International demand continues to increase clearly indicating the word leading status of the MLF.
- **Recommendation**: The NAC notes the continuing trend of low demand from Japanese researchers. The MLF should undertake actions to increase the demand from Japan.
- **Yes** - Proposal to publication rate greater than 50% demonstrates good utilisation of beamtime for user peer reviewed proposals
- **Yes** - a number of scientific case studies demonstrate impactful research across many areas of science are being undertaken
- **Yes** - Industry usage continues be high and world leading

- **Unclear:** It's unclear to the NAC whether the benefits of increased beam power are being realised (eg higher throughput, more challenging experiments).
- **Recommendation:** In future meetings the NAC would like to see clear examples of how the benefits of increased beam power are being realised.
- **Unclear:** The NAC is not able to advise on whether the full 156 beam-on-target days are being used optimally based upon the data presented. The NAC was provided with the plan for proposal round beamtime allocation but not the actual beamline utilisation information.
- **Recommendation:** In future meetings the NAC would like to see a breakdown of utilisation across the beamlines to enable review and discussion during the meeting.
- **No** – the current MLF staffing levels supporting user operations remains low (approx. 4 staff per beamline) when compared to other facilities (SNS @ORNL approx. 7 staff per beamline).
- **Recommendation:** J-PARC should continue efforts to increase the staffing levels supporting user operations.
- **Yes** – the establishment of the deuteration activities and increased staffing will ensure that the experiments undertaken using the MLF beamlines are of high quality.

Is the plan for upgrading adequate?

- **Yes** - Implemented & in-progress beamline upgrades are delivering performance increases and benefits
- **Yes** - future upgrade plans on individual beamlines appear to be justifiable and will deliver clear benefits.
- **Recommendation:** The NAC recommends developing a process to collect and prioritise upgrades to ensure maximum benefit to the MLF. The plan would also need to consider available budget and staffing required to deliver the upgrades.

Charge: Roadmap

What are the advantages and shortcomings compared to roadmaps of other facilities

- The MLF high level roadmap is adequate for communicating the scope of the upgrades & new capabilities
- The purpose and benefits of the roadmap need to be clearly articulated including the science and industry cases.
- Stakeholder engagement will be a critical component to support the roadmap.

- Significant effort will be required to convert the MLF high level roadmap into a fully scoped, budgeted and human resourced plan. The staffing effort and additional costs to enable the delivery of this activity should not be underestimated.
- **Recommendation:** The plan should include the strategies to obtain funds to deliver the roadmap.
- **Recommendation:** The plan should also consider the additional staffing & budget required to operate the new capabilities and TS2 in order to raise awareness of the long-term commitment that is required.
- **Recommendation:** The NAC recommends that a steering committee is established to enable, provide direction, support and monitor progress of the MLF roadmap planning activities & implementation.