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NNR: NO No.:	SIMULATOR MAINTENANCE, ACCESS/OPERATION AND INITIAL CONDITIONS AND THE TRAINING AND AUTHORISATION OF SIMULATOR OPERATORS			PAGE 1

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SIMULATOR SECTION HEAD	OPERATING TRAINING MANAGER	PLANT TRAINING MANAGER
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THIS GUIDE HAS BEEN SEEN AND ACCEPTED BY:

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1.0 PURPOSE

1.1 To describe the methods employed to ensure that the simulator environment is the same as Unit 1 control room, and is maintained and updated as required.

1.2 To provide the means for instituting training related changes in the simulator to ensure that it is reflective of Unit 1 control room, and to address non-conformances and defects.

1.3 To describe the process of creating, changing or modifying Initial Conditions (IC) for the simulator.

1.4 To describe the requirements for simulator operators and the training required for authorisation to operate the simulator.

1.5 To raise and maintain the level of confidence of the operating personnel that the simulators' fidelity corresponds to unit 1 control room.

1.6 To describe OTG responsibilities for simulator Testing.

2.0 SCOPE

2.1 Applicable to all aspects of the control room simulator with regard to its fidelity compared to Unit 1 control room, and its availability and effectiveness as an effective training tool.

2.2 Applicable to any situation requiring a new initial condition, or requiring changes to, or modifying of an existing initial condition on the control room simulators.

2.3 Applicable to all personnel whose job description includes the requirement to be able to operate the control room simulator.

2.4 Applicable to OTG personnel performing and reviewing control room simulator tests.

3.0 DEFINITIONS AND ABBREVIATIONS

3.1 Definitions

In terms of this guide, the following definitions are to be used:

3.1.1 **Reference Unit** – Koeberg Nuclear Power Plant Unit 1

3.1.2 **Simulator** – In context of this document "simulator" shall mean "full scope control room simulator".

3.1.3 **Simulator Defect** – A problem noted on the control room simulator(s) which affect the student and can induce negative training.

3.1.4 **Simulator Deviation** – A long term defect in the simulator that does not reflect Unit One, in a manner that is considered to have a possible impact on training.

3.1.5 **Simulator Issue** – A problem noted on the control room simulator(s). This may be a hardware issue (i.e. a switch, lamp, or controller not working, a defective chart recorder etc.), or a software issue (i.e. an unexpected response in the trend or value of a simulated variable, or an unusual behaviour inconsistent with expected behaviour under given circumstances).

3.1.6 **Simulator Operator** – An instructor who is authorised by the OTG Manager to operate the control room simulator(s).

3.1.7 **Simulator Section Head** – A person designated by the OTG Manager to be responsible for the control room simulator oversight.

3.2 Abbreviations

3.2.1 **IC** – Initial Condition of the control room simulator

3.2.2 **ILT** – Initial Licence Training

3.2.3 **IMS** – Instrumentation Maintenance Services

3.2.4 **IR** – Issue Report

3.2.5 **KPI** – Key Performance Indicator

3.2.6 **LORT** – Licenced Operator Requalification Training

3.2.7 **NNR** – National Nuclear Regulator

3.2.8 **OTG** – Operating Training Group

3.2.9 **OTS** – Operating Technical Specifications

3.2.10 **QRL** – Quality Records List

3.2.11 **SMC** – Simulator Management Committee

3.2.12 **TD&RM** – Technical Documentation and Records Management

4.0 REFERENCES

4.1 Referenced Documents

4.1.1 240-85520008, Rev 2: Modifications to Simulator

4.1.2 335-2, Rev 5: Koeberg Nuclear Power Station Management Manual

4.1.3 KAA-500, Rev 13: The Process for Controlled Documents

4.1.4 KSA-011, Rev 14: The Requirements for Controlled Documents

4.2 Applicable Documents

4.2.1 ANSI 3.5 (1998): American National Standard for Nuclear Power Plant Simulators for use in Operator Training and Examination

4.2.2 KAA-857: Management and Oversight of the Full Scope Operator Training Simulators at Koeberg Nuclear Power Station

4.2.3 KFT-072: Simulator Availability

4.2.10 KFT-111: Training Needs Assessment Process Control Room Simulator Deviations

4.2.4 KGT-004: Koeberg Curriculum Meetings Structure

4.2.5 KSA-038: Requirements for Quality Records

4.2.6 KSA-139: Initiating a Work Request

4.2.7 KSA-146: Simulator Testing Requirements

4.2.8 KWU-PC-SIM-001: Implementation of Simulator Software Modifications

4.2.9 LD-1093: Requirements for the Full Scope Operator Training Simulator at Koeberg Nuclear Power Station

5.0 INDIVIDUAL RESPONSIBILITIES

5.1 Simulator Users

5.1.1 Users of the simulator (any platform), shall report all simulator issues, fidelity concerns, requirements for new ICs, modification to existing ICs or other issues by raising an issue on the Simulator Database and include as much detail as possible, e.g. IC number, description of plant state, malfunctions active, overrides, etc.

5.1.2 In the event of experiencing a negative impact on training time on the simulator(s), users are expected to complete the Simulator Unavailability form (KFT-072) and submit this to the Simulator Section Head.

5.2 OTG Manager

5.2.1 Ensures that instructors are authorised as simulator instructors and operators.

5.2.2 Supports the resolution of defects and simulator upgrades.

5.2.3 Ensures that the yearly simulator fidelity work order to be done by the Shift Manager remains active as Work Order.

5.2.4 Attends or is represented at the SMC to ensure quorum is met.

5.3 Shift Manager

5.3.1 Calls out simulator standby maintenance personnel as required, after hours.

5.3.2 Schedules and ensures the execution of the yearly Simulator Fidelity check Work Order as allocated to a specific Shift Manager.

5.4 Simulator Section Head

5.4.1 Tracks and reports simulator KPIs to the SMC.

5.4.2 Reviews and reports timeously on the issues negatively impacting simulator training to the OTG Manager.

5.4.3 Assists with the processing and allocation of the simulator issues, together with the simulator maintenance personnel and other resources allocated, as required.

5.4.4 Assists in reviewing simulator issues/defects and determining priorities of issues/defects identified.

5.4.5 Provide/Assist with the necessary training for simulator instructors.

5.4.6 Schedules all training and other activities on the simulator platforms.

5.4.7 Performs the duties of the Secretary of the SMC and convenes the SMC at a frequency dictated by the status of the simulator.

5.4.8 Performs and reviews Simulator Core tests as per KSA-146.

5.4.9 Performs and reviews Steady State and Transient test results and generate the required reports.

5.4.10 Co-ordinates simulator Start-up and Shutdown Testing as per KSA-146.

5.4.11 Completes a needs assessment checklist for each identified simulator fidelity issues as per KFT-111.

5.5 Simulator Instructor

5.5.1 Logs noted issues on the Simulator Database with as much supporting information as possible.

5.5.2 Completes KFT-072 for training time lost due to simulator performance issues.

5.5.3 Ensures that he/she is suitably qualified before operating the simulator.

5.5.4 Ensures that good housekeeping practices are maintained in the simulator areas.

5.5.5 Ensures that he/she is familiar with all fidelity issues and mitigations for defects that may affect training prior to commencing a training session on the simulator.

5.5.6 Controls access to the simulator. Ensure that notices/barriers are placed indicating that examinations/assessments are taking place and ensure that these notices/barriers are removed once examinations/assessments are completed.

5.5.7 Ensures that the scenarios used in training has been authorised as a validated scenario as per KSA-146.

6.0 GUIDE REQUIREMENTS

6.1 Simulator Maintenance

6.1.1 Simulator Issues

6.1.1.1 When a simulator issue is identified, the person identifying the issue shall raise an issue report on the Simulator Database. The originator shall include as much detail as possible.

6.1.1.2 Where practical, apply a white rondel to the affected item, with issue number, the date and a brief description of the issue.

6.1.1.3 The simulator issue process is illustrated in Appendix 2.

6.1.1.4 Priority descriptions for issues classified as defects are to be used as follows:

- High: Simulator training not possible.
- Medium: Potential impact on training.
- Low: Minor impact on training OR enhancement OR potential to impact on training but suitable mitigation is in place.

6.1.1.5 The simulator maintenance personnel on standby or other required resources are to be called out after normal work hours through the on-duty Shift Manager for emerging issues which affect continued simulator training/operation/safety/security.

6.1.1.6 The Simulator Section Head shall regularly review the simulator database to:

- Determine if a raised issue should be classified as a Defect.
- Reporting on defect numbers and status.
- Updating simulator Deviations.
- Highlighting the need for a training mitigation to be developed if required.
- Generating or modifying ICs.

6.1.1.7 In the event of lost training time on the simulator, the Simulator Unavailability form (KFT-072) must be completed. This will be used to calculate the availability for training (as needed) of the simulator.

6.1.2 Defects Affecting Training

6.1.2.1 Whenever a simulator defect which has been classified as a Medium has exceeded 90 days, it shall be evaluated to determine if a Simulator Deviation should be generated.

6.1.2.2 The OTG Manager should consult at least one member from each of the two licensed operator training sections to agree on mitigations required to compensate for any negative effect that a defect may have on training.

6.1.2.3 When a simulator defect is closed out, the section for Deviations is to be checked by the individual closing the defect, and if there were compensatory actions in place, they should be closed out, and that information distributed to the ILT and LORT section heads by the Simulator Section Head.

6.1.3 Simulator Outages

6.1.3.1 Outages, required by simulator maintenance personnel, shall be negotiated with the OTG Manager and the Simulator Section Head in order to maintain optimal availability of the simulator for training purposes.

6.1.3.2 Unplanned outages, necessitated by unanticipated problems not covered by 6.1.3.1, shall be dealt with by the simulator maintenance personnel on a priority basis to ensure continuity of training.

6.1.4 Simulator Testing

6.1.4.1 Simulator testing shall be performed in accordance with 240-85520008 and KSA-146. The test data shall be reviewed against available data as per ANSI 3.5 (1998) and test results submitted to TD & RM by the Simulator Section Head via the OTG records Senior Clerk. Successful test results shall be considered proof of fidelity with Koeberg Unit 1 with respect to function and modelling.

6.1.4.2 Simulator update and project testing should be performed after each major update, or as needed. The test results must be submitted to TD&RM as required by LD-1093 and for NNR inspection.

6.1.5 Simulator Recorder Maintenance

6.1.5.1 IMS personnel are responsible for routine maintenance of chart recorders and related equipment. Other maintenance or repair of simulator chart recorders shall be done in accordance with a notification entered into the SAP system.

6.1.5.2 If, for any reason, IMS personnel are not allowed access to the simulator, they or their supervisor are to report this to the OTG Manager for resolution.

6.1.6 Simulator Hardware Fidelity Issues

6.1.6.1 The hardware fidelity with Koeberg Unit 1 will be assessed by the Operating staff via a Work Order, to ensure correct configuration control and fidelity with the reference unit. The frequency of the Work Order will be yearly.

6.1.6.2 A needs assessment checklist for identified simulator fidelity issues shall be completed for each fidelity as per KFT-111.

6.1.6.3 Fidelity Issues arising during the simulator fidelity Work Order or during normal training will be entered in the Simulator Database as an issue. The issue may either be resolved or dispositioned. In the event that the issue is dispositioned, the issue will be cleared and a deviation with the reason for dispositioning which must be entered in the Simulator Database.

6.2 Simulator Access, Operation and Initial Conditions

6.2.1 Access to the Simulator

6.2.1.1 Access to the simulator are to be restricted to authorised instructors, operating personnel, maintenance personnel (required to work on equipment in the simulator) and to observers or witnesses to training sessions or evaluations. Students will be allowed access under the supervision of an instructor for training purposes. Visitors will be allowed if accompanied by the Operating Manager, a Shift Manager, a training manager or ILT/LORT section head.

6.2.2 Simulator Performance Indicators

6.2.2.1 The KPIs to be tracked and trended shall be determined by the SMC on a periodic basis.

6.2.3 Authorisation to Operate the Simulator

6.2.3.1 Simulator operators shall be deemed to be authorised to operate the simulator, if they have completed the Simulator Authorisation Checklist Appendix 1 and have been authorised by the OTG Manager.

6.2.4 Simulator Initial Conditions

6.2.4.1 Initial Conditions

(1) This is a list of all currently available initial conditions that have been loaded onto the instructor station for the simulator (All Platforms). As a minimum, there should be initial conditions (ICs) to cover all the plant domains, as defined in the OTS. This list is kept on the simulator Instructor Station.

(2) The first 50 slots are write-protected and can only be changed by the Simulator Section Head responsible for the simulator, these are reserved for the standard initial conditions.

(3) The complete list of ICs is available on any instructor station linked to the relevant platform.

6.2.4.2 Request for a New Initial Condition.

6.2.4.2.1 When new ICs are required, the initiator shall enter the request by generating a simulator issue on the Simulator Database. Reasons for the request should be given, as well as all the specifics of the new initial conditions, such as plant state, malfunctions, abnormalities, overrides, etc. This request will then be verified by the senior instructor responsible for the simulator.

6.2.4.3 Generation of a New Initial Condition

(1) Planning

The most appropriate IC must be selected as a starting point. The procedural path must be outlined from the IC to the desired end-state.

(2) Validation

Changes to plant status to generate new ICs shall be made by performing actions in accordance with the controlled copies of the correct revision of the appropriate procedures.

6.2.4.4 Modification of an Existing IC

(1) Modification of existing initial conditions (ICs) is the responsibility of the Simulator Section Head and should be linked to changes in procedures affecting the IC in question, or referenced from a Simulator issue/defect.

(2) When a modification to an IC is required, the initiator shall complete the relevant section in the Simulator Database. Reasons for the request should be given, as well as any other relevant information. This data shall be reviewed by the Simulator Section Head and actioned as appropriate.

6.2.4.5 Existing ICs are to be reviewed or maintained at least twice per year or more often as the issues/defects or training requirements warrant.

6.3 Training and Authorisation of Simulator Operators

6.3.1 Task List for Simulator Operators

6.3.1.1 The Simulator Authorisation Checklist (Appendix 1) lists the tasks that an authorised simulator operator is required to be able to perform competently prior to authorisation. The trainee Simulator Operator should refer to the Orchid IS User on line Manual, which addresses the specific method and functionality for each task. In addition to this, the simulator operator or trainee operator shall make themselves fully conversant with the simulator reload process from the instructor station interface.

6.3.2 Authorisation Training

6.3.2.1 Trainee simulator operators shall shadow an authorised simulator operator as required for the development of the required competencies.

6.3.2.2 The Simulator Section Head shall be responsible for ensuring adequate instruction of the trainee regarding all applicable aspects of simulator operation.

6.3.2.3 During the running of simulator sessions, the trainee simulator operator should initially observe the authorised operator operate the simulator, and then operate the simulator under the supervision of an authorised operator. The authorised simulator operator shall provide feedback to the OTG Manager with respect to the trainee's competence.

6.3.2.4 The trainee simulator operator must complete the training checklist Appendix 1, in order to ensure that all the specified areas of competence have been covered, and that he/she is able to perform all the required tasks specified therein.

6.3.2.5 When the trainee's checklist Appendix 1 has been completed and signed off, and the Simulator Section Head is satisfied that the trainee has attained the required degree of competence. The Simulator Section Head must sign the trainee's checklist Appendix 1. The trainee must be authorised by the OTG Manager as an authorised simulator operator by signing the trainee's checklist Appendix 1.

7.0 RESOURCE REQUIREMENTS

7.1 There are no special or unusual resource requirements needed to meet the purpose of this guide.

8.0 RECORDS

8.1 All records generated during this programme are to maintained, disposed of or transferred to TD & RM in accordance with KSA-038.

8.2 The following table is a listing of all documents generated from the performance of the programme that have been identified as records in terms of KSA-038 and listed in the OTG QRL. The area where a record is stored and the duration of storage is given.

8.3 All electronic records will be stored in the Simulator Database.

		Record Type		Storage and Duration			
Record	**Orig Doc**	**Perm**	**Non-Perm**	**OTG**	**Yrs**	**TD & RM**	**Yrs**
Simulator Operability Tests	KSA-146	X				X	40
KFT-072 Simulator Unavailability	KGT-025		X	X	2		
KFT-111 Training Needs Assessment Process Control Room Simulator Deviations	KGT-025	X		X	40		
Simulator Authorisation Checklist	KGT-025		X	X	6		
KFI-RE-005 Authorisation for Destruction of Records	KSA-038	X		X	40		

8.4 Any records pertaining to simulator operator qualifications and authorisations are to be stored as above. In addition to this, a copy of the record is to be placed on the individual's personal training file.

9.0 ATTACHMENTS

Appendix 1 – Simulator Authorisation Checklist

Appendix 2 – Simulator Issues Process

Appendix 3 – Justification

APPENDIX 1

SIMULATOR AUTHORISATION CHECKLIST

The trainee simulator operator must be able to perform all the tasks included in this checklist. He is expected to be able to fulfil all the duties incumbent upon a simulator operator, competently and independently, upon completion of the checklist

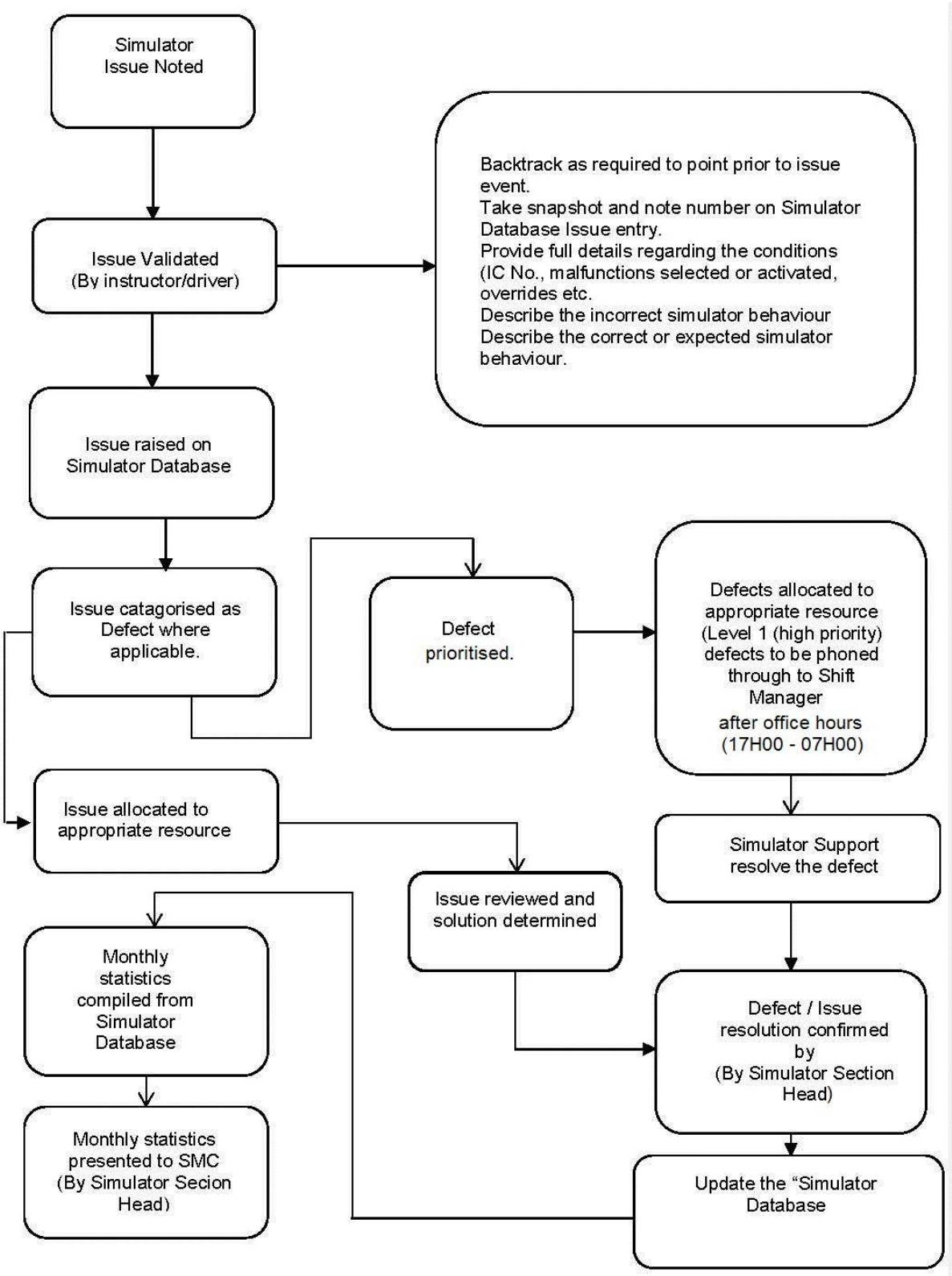
	#	TASK	CHECK
INSTRUCTOR STATION	1	Initialise the simulator using an existing IC	☐
	2	Create a snapshot and add a comment to it	☐
	3	Access and use all features of Malfunctions	☐
	4	Access and use all features of Remote Functions	☐
	5	Access and use all features of Overrides	☐
	6	Be able to access all mimics and utilise all available functions of any given mimic	☐
	7	Utilise the backtrack function	☐
	8	Utilise the Simulation Speed function	☐
	9	Be familiar with Parameter Display	☐
	10	Be familiar with External Parameter	☐
	11	Be familiar with all audio-visual equipment in the simulator	☐
	12	Be able to insert a Simulator Issue into the simulator database	☐
SIMULATOR	13	Check that KIT is working and is linked to the simulator	☐
	14	Check bulbs and LEDs in TPLs, BVs, TOs and AAs. Raise Simulator Issue where necessary	☐
COMPUTERS	15	Reload the simulator computers from the Instructor Station	☐
	16	Correctly handle computer error messages	☐

INSTRUCTOR NAME	UNIQUE NUMBER

AUTHORISATION		
AUTHORISER	**SIGNATURE**	**DATE**
SIMULATOR SECTION HEAD		
OPERATING TRAINING MANAGER		

APPENDIX 2

SIMULATOR ISSUES PROCESS



APPENDIX 3

JUSTIFICATION

Revision 6

1. Full Review.
2. Minor changes to Appendix 1 and detail in Appendix 2 updated.
3. Responsibilities clarified where needed.
4. Simulator Defect priority descriptions revised.
5. Simulator Issues separated from Defects.

Revision 7

1. Simulator Defect definition changed.in section 3.1.1.
2. QRL added to abbreviations in section 3.2.11.
3. All document revisions removed from section 4.1.
4. KGT 027 removed from section 4.2 due to procedure withdrawn.
5. KSA 038 added to section 4.2.5.
6. Section 4.2 numbering changed.
7. 4.2.10 Added.
8. Issues/defects added to section 5.4.4.
9. 5.4.11 Paragraph added.
10. 5.5 Numbering corrected.
11. 6.1.6.2 Paragraph Added.
12. Spelling error corrected in section 6.1.3.1.
13. Section 6.2.4.1 Simulator platforms changed to all platforms.
14. Section 6.3.2.5 The Simulator Section Head and the OTG Manager to sign the trainee's checklist.
15. KSA-146 added to table in section 8.3.
16. KFT- added to table in section 8.3.
17. Simulator authorisation checklist changed from 2 years to 6 years to table in section 8.3.
18. Appendix 1 signature section changed from Responsible Instructor to Simulator Section Head.