SAFETY JUSTIFICATION **ISSUE: 1**

PART 1 - DOCUMENT INFORMATION

Document Title:	**Persons Working On or Near to AC Electrified Lines**		
Document No:	GE/RT8024	**Issue:** One	
Primary Subject Committee:	Electrification		
Other Subject Committee input/ involvement:	Operations and Safety		
Proposed Date of Submission to Subject Committee:	13/01/99		
Submitted by: **Standards Project Manager**	R P Smith		Date:17/11/99
Reviewed by: **Deputy Director, Safety & Standards Directorate**	A Nelson		Date:08/11/99
Approved by: **Controller, Railway Group Standards**			Date:

PART 2 - EXECUTIVE SUMMARY

This is a new document, which amends and supersedes GM/RT1087. The amendments were initiated by a review of the current Standard to ensure it captures the requirements necessary to control the change in risk caused by the introduction of higher speed and tilting trains.

The changes to GM/RT 1087 which have been incorporated into GE/RT8024 address the change in risk brought about by the introduction of more complex AC electrification arrangements being introduced onto Railtrack controlled infrastructure; e.g. the auto-transformer electrification system. The primary objective of the redraft of the document was to make it generic and therefore applicable to any type of AC electrification system or arrangement.

This safety justification describes the measures necessary to control the risk of injury by electrical causes when working on or near to different forms of AC overhead line systems.

PART 3 - BACKGROUND

Need for change

GM/RT1087 was reviewed against the background of higher speed (in excess of 125mile/h); tilting operations and the introduction of more complex electrification systems. This review identified shortcomings and inadequacies in the present control measures, namely:

- as written implied safe working on or near to 'classic' AC electrification systems;
- unintentionally prevented the use of approved testing devices and live line appliances;
- contained the 'classic' definition of 'overhead line equipment';
- contained precautions outside the scope of 'working on or near to', i.e. relating to electric train operations issues;
- mandated the industry standard 'classic' isolation process.

Proposed changes

- Withdrawal of GM/RT1087 Issue One – Persons Working On or Near to A.C. Electrified Lines.
- Introduction of GE/RT8024 Issue One - Persons Working On or Near to AC Electrified Lines.

The Standard has been categorised to reflect its application to multi-disciplinary infrastructure activities affecting all Railway Group Members. The key changes introduced by this standard are:

- written generically, therefore applicable for differing types of AC electrification systems, i.e. the existing 'classic' system and future auto-transformer systems;
- addition of an exception clause to allow, where persons are authorised, the use of approved voltage testing devices live line tools and live line measuring devices;
- a revised, more generic, definition of 'overhead line equipment';
- requirement to demonstrate (in a method statement) that safety is not prejudiced when working on or near to live parts of pantographs and other roof mounted electrical equipment on trains;
- include, when taking an isolation, the consideration of interfaces with differing types of AC electrification systems, AC and DC electrification systems and electrification systems controlled by others;
- to define the precautions when working on or close to earth wires and auto-transformer feeders;
- to define the procedure for switching off the electricity in an emergency when employing different electrification systems and equipment.

Controls and their function

Having different AC Electrification systems, possibly along the same route, causes the change in risk. Application of safe systems of working is a current requirement. However the standard is written around the "classic" system of electrification. This new document does not change the requirement or enhance the need for safe systems of work but maintains the status quo by writing the requirements in such a way as to capture all forms of electrification arrangements.

Initially it was proposed that GE/RT8024 included a requirement that controlled the risk that isolation documentation is accurate and can be described precisely; this is primarily because GE/RT8024 mandates a high-level isolation process (itself a safe system of work). This requirement has however, been omitted from GE/RT8024 and has been included in GL/RT1252 (Production and Management of Electrification Isolation Diagrams).

During drafting the expansion of the scope of GE/RT8024, to include all parts of electrification fixed equipment that are live, including trackside-switching stations and associated electrical equipment, was considered. However it was concluded that work on or near this equipment was a subject that should be addressed by the Railway Group member concerned.

The remaining new requirements have all been judged to be within the scope of Railway Group Standards by the criteria defined in GA/RT6001.

Part 4 - COSTS AND BENEFITS

The Benefits

The primary benefit is that it is a mandated requirement to define the electrification system, definitions and terms, define the general precautions to be taken to prevent injury and to highlight the danger from live parts of all AC electrification systems. This will result in specific precautions to be defined for future electrification systems where the disposition or configurations of overhead line conductors, the isolation process, the earthing design and rating, etc. may differ from that of the present 'classic' electrification system.

Top Hazards

- Injury by electrical causes to persons working on or near to AC electrified lines;

- Lack of robustness of the isolation process;
- Lack of robustness of the emergency isolation process;
- Lack of clear roles and responsibilities for persons involved in isolation processes.

The Costs

The costs associated with GE/RT8024 are capital costs in connection with the implementation of new high-speed AC electrification infrastructure and the introduction of, or changes to, the suite of instructions for AC electrified lines. Therefore these costs apply only to new electrification infrastructure and are not applied retrospectively.

Part 5 – CONCLUSION

Safe systems of work on AC electrified lines is a current requirement. GE/RT8024 does not change this requirement but presents the issues that need to be considered as part of the implementation of the safe system of work generically, so that they apply to all forms of electrification arrangements. This includes future more complex types introduced with high-speed train operations.

Part 6 - REFERENCES