Annex B

Software Functional Requirements for Analysis and Implementation of RCM System			
	Requirements	**Complaint**	**Comments**
1	**Equipment/functional Location Master Data**		
1.1	Must supports Enterprise deployment for multi user and multi site/ plant usgae.		
1.2	Must supports flexible taxonomy – functional location – equipment hierarchy		
1.3	Must Allow System definition and hierarchy – multi level system configuration with equipment properties data sheet		
1.4	Must Provides flexible system boundary definition, RCM template data collection sheets, operating context definition, etc.		
1.5	Must be Integrated to SAP PM System to synchronize Equipment/Tag master data from SAP		
1.6	Must provides dynamic, real time access to SAP Master data through standard NetWeaver integration approaches.		
1.7	Must be Integrated to SAP PM classification system		
2	**RCM Project Management**		
2.1	Must supports management of RCM teams – roles, responsibilities		
2.2	Must allow explorer style tracking of RCM status of analysis		
2.3	Must provides link to documents including Functional Block diagrams, bubbles, design drawings, procedure instructions, etc.		
2.4	Must provides basic workflow support with E-Mail (Outlook) integration during RCM project analysis		
2.5	Must supports Analysis planning tool which will keep track of ground rules, estimated completion dates, scheduled work sessions, etc.		
2.6	Must support easy sharing of reports / analysis, publishing reports within Team members and also revision tracking		

3	**Criticality and Risk**		
3.1	Configurable Risk Matrix based on consequence and probability (based on parameter from production, HSEF, failure etc.)		
3.2	Determination of risk, and criticality based on risk. A risk matrix needs to be associated with Systems, individual assets, and possibly work plans		
3.3	Ability to determine criticality for assets according to risk matrix (Low-Medium-High) and suggest appropriate evaluation method.		
4	**Failure codes / Modes / causes data**		
4.1	Must provides ready-to-use industry standard failure analysis templates including failure modes / causes based on types of equipments which can be customized for NRL		
4.2	Must provides facility to analyze SAP Failure codes / causes from SAP work history and map directly Failure Modes and SAP Catalogs		
4.3	Must synchronizes and map with NRL specific failure causes in SAP PM Database		
4.4	Must maintain failure mode database including Failure mode description, local effects, other effects, detection method, severity class, MTBF, P-F etc.		
5	**RCM Methodology / Strategy**		
5.1	Must support RCM methodologies and FMCEA analysis as per standards such as SAE JA 1011 and 1012, etc		
5.2	Must support Equipment selection for RCM analysis using Criticality Factors Analysis which allows prioritization of equipment based on pre-defined scale and ranking by sum of all scores		
5.3	Ability to prepare a list of required functions and performance standards in its present operating context are identified, and loss calculations for loss of function as RCM Step 1		
5.4	Ability to list functional failures identifying the ways in which the equipment can fail as RCM Step 2		
5.5	Ability to identify the effects of the failure on the plant, process or operating context, including safety and environmental risks in analysis as RCM Step 3		
5.6	Ability to identify the consequence of failures in terms of risk and cost as RCM Step 4		
5.7	Ability to prepare a list of possible causes of failures which need to be prevented as RCM Step 5		

5.8	Ability to identify and develop new or adjusted maintenance and inspection tasks to predict or prevent failure as RCM Step 6		
5.9	Ability to identify the default actions that should be taken if no suitable proactive task can be found. (Clearly identify Primary/Secondary task re. Risk Mitigation) as RCM Step 7		
5.1	Must support the process and database of detailed Functional Failure Analysis, effects, and causes and Failure Effect Categorization based on drill down question / answer template which is customizable		
5.11	Must supports flexible FMEA worksheet template to facilitate analysis		
5.12	Must allow easy to view / update feature using flexible hierarchical structure/or tabular worksheet all the way down from System / equipment level to FMEA actions		
5.13	Must support consequences or system effects analysis using qualitative analysis as well as costs, and risks to safety / environment factors		
5.14	Should generates FMEA reports / excel spreadsheets, failure cause reports, etc. in graphical / report format using flexible queries		
5	**RCM task recommendations**		
5.1	Must support logical maintenance task selection as part of RCM failure mitigating tasks based on FMEA analysis against each equipment		
5.2	Mus allow definition of primary and secondary actions to mitigate failure modes		
5.3	Must support maintenance optimization using algorithms for different failure behaviors and performing financial/cost benefit calculations to select appropriate maintenance strategy		
5.4	Must maintain RCM task definition in terms of frequency, cost-benefit information and how effectively task can mitigate failure		
5.5	Must support generic Job plans (work specifications or steps) against equipment type level and also allows specific tasks to equipments		
5.6	Must support optimum interval calculator for optimum schedule for repair/replacement tasks		
5.7	Must allow segregation of RCM tasks – time based PM tasks / routines, condition based tasks, operator tasks (rounds), proactive (RFCA etc) tasks, design modifications or no action items which are Run To Failure (RTF) and also Inspection tasks to address hidden failures		

5.8	Must allow grouping or task packaging of individual tasks based on criteria like frequency and resource requirements		
5.9	Must generate flexible user configurable Graphical charts / reports for RCM analysis in different formats (HTML / PDF) – e.g. Functional failure analysis, failure categorization, task summary / details, maintenance packages, etc.		
6	**Gap Analysis and Implementation**		
6.1	Interface data from SAP or provide access to current SAP PM tasks for doing comparison and gap analysis		
6.2	Easy to Use interface for comparison of SRCM tasks against current SAP PM routines		
6.3	Generation of gap analysis report for review and identify changes to be done for existing tasks – frequency change, addition / deletion of tasks		
6.4	Facility to revise and update the Final task list before interface to SAP or passed on to other systems		
6.5	Facility to interface to SAP PM by way of PMRs (PM routines) or		
6.6	Facility to interface to SAP by way of Work notifications or order in case of recommendations in some cases		
6.7	Maintain the link of SAP PM Maintenance plan to RCM recommendation for future re-evaluation		
6.8	Update equipment criticality in SAP based on RCM recommendations		
6.9	Optionally update material spare parts (BOM) criticality in SAP based on equipment criticality for procurement improvement and inventory optimization		
7	**KPI Monitoring and analysis thru SAP Business Warehouse**		
7.1	Allow set up of performance measures by way of KPIs which includes – MTBF, Average repair cost, number of failures, downtime, etc.		
7.2	Seamless Interface data from SAP work history to RCM database for analysis and reporting		
7.3	Identify top ten Bad actors list against different KPI measures		
7.4	Pareto charts and analysis for breakdowns, cost and KPI measures		
7.5	Support set up of alert criteria and automatic alerts for exceptions like new failure modes, significant KPI deviations etc.		
7.6	Support evergreen RCM process for continuous improvement by way of maintenance strategy re-evaluation		

7.7	Generate graphical time profiles for costs and resources		
7.8	Provides audit / reporting on data compliance in SAP PM work orders with regard to key fields like failure data, equipment, work center, data etc., for ongoing improvement of data quality		
8	**System Architecture**		
8.1	Multi-user / shared enterprise level software package		
8.2	Supports Flexible user defined Report / query generating facility		
8.3	Must have Audit Trail processing and reporting included in your security package.		
8.4	Must be able to utilize Single Sign On technology		
8.5	Supports Security Administration – users / roles and authorizations		
8.6	Easy to administer workflow support		
8.7	Must utilize SAP User Management for secured data access		
8.8	Support Integration to MS Office – Excel, Word Export Import		
8.9	Support MS Outlook integration for workflow Notifications, mails and alerts		
8.10	Supports Web enabled intranet access for managers / key users		
9	**General Questions for Technical Review**		
9.1	Is there additional hardware either for application or database or interface required?	Elaborate your answer	
9.2	What is the cost implication of the above?	Elaborate your answer	
9.3	How do you propose to support needs in different continents in the world - provide details of your locations and any additional costs to Client	Elaborate your answer	
9.4	What is the % of license fee based on one year service and support ?	Elaborate your answer	
9.5	What is your long term upgrade strategy and support	Elaborate your answer	
9.6	If there are third-party interfaces required, What interfaces are provided (ready) for implementation of the product?	Elaborate your answer	
9.7	How is integration with third-party software performed (if any)?	Elaborate your answer	
9.8	Does the software include or support any workflow associated with the development of an equipment maintenance strategy? (e.g. approval of an analysis, peer reviews, creation of master data, activation in SAP PM) If so, describe how it is used in your product.	Elaborate your answer	
9.9	How does the product ensure information and data security?	Elaborate your answer	
9.10	Does the product have the ability to define security rights for given roles.	Elaborate your answer	

9.11	Describe the Audit Trail processing and reporting included in your security package.	Elaborate your answer
9.12	Ability to utilize Single Sign On technology	Elaborate your answer
9.13	What are the RCM related standards supported by the tool? What are the preferred standard or method to which your product best suits?	Elaborate your answer
9.14	What are the requirements for system definition (system for analysis)? - Is this done purely from the SAP TOS? Is there any need for pre-configuration of the tool (system definition, failure codes, etc.)	Elaborate your answer
9.15	Describe functionality for assessment of criticality within defined system (if any)?	Elaborate your answer
9.16	Describe functionality to display history of failures, repairs and costs for the functional location under analysis - Does it allow visualization of notifications and/or WOs, count of breakdowns (SAP data) and costs accumulated on a certain period?	Elaborate your answer
9.17	Describe functionality to do cost benefit analysis of proposed tasks (if any)? - i.e. comparison of cost of executing proposed maintenance task (parts+labour) versus cost of loss due to occurrence of the failure (including some estimation of the probability of failure)	Elaborate your answer
9.18	Describe functionality to track and display historical analysis (RCM, Streamlined RCM, PMO/MTA) - including current maintenance plan - display and access to previous analysis on the same F/L or plant section. Can this be copied as a template if the user wishes to do so. Describe how to display and access the current version of the equipment strategy/task lists for the functional location under analysis	Elaborate your answer
9.19	Discuss if the use of historical analysis (5) in the tool also supports or allows the use of a library of standard strategies/task lists/work instructions. This is the ability to replicate best practice strategies / task lists	Elaborate your answer
9.20	Describe functionality to show-display a consolidated view of maintenance activities (PM plans) allocated to functional locations (including downtime, costs, manpower). i.e. this to visualize at a high level ALL the maintenance activities associated with a F/L - in time frames of 12, 24 or 36 months displaying labor required and costs associated	Elaborate your answer

9.21	Describe functionality to map failure modes to 1SAP catalogue codes - Does the tool allow mapping of failure modes as identified in the analysis of codes captured in notifications associated to breakdowns (1SAP Catalogue codes)?	Elaborate your answer
9.22	Describe the functionality associated to a mechanism for review-comparison of effectiveness of the applied strategy (e.g. want to look at how effective the strategy is after being applied for say 12 months)- Does the tool allow a mechanism for reviews of effectiveness of the maintenance tasks by comparing the assumptions of the analysis (failure models and effects) against the observed actual failure modes	Elaborate your answer
9.23	Describe functionality or thinking for future use (if any) of task lists designed for operator rounds that include the capture of reading from measuring points-counters. Think of this as the use of handheld devices used by operators or maintainers that collect information relative to pre-defined measuring points and enter them via handhelds. If this is to be specified as part of the strategy, does it require anything special to be done from the tool perspective.	Elaborate your answer
9.24	Describe if the functionality of the tool allows visibility of spare for: a) cost analysis of a proposed task, b) selection of spare parts when specifying a Task List.	Elaborate your answer
9.25	Describe if the functionality of the tool regarding the creation of maintenance items, maintenance plans.	Elaborate your answer
9.26	Does the tool specify the type of maintenance plan to be used based on strategy? (time, activity, combination of both, etc)	Elaborate your answer
9.27	Describe if the functionality of the tool regarding maintenance tasks that require the use of measuring points, counters (condition based maintenance). Does the tool provide any functionality to specify the attributes required for the measuring point?	Elaborate your answer
9.28	Describe if the functionality of the tool regarding the grouping of maintenance tasks (tasks identified as required in the RCM, streamlined RCM, MTA/PMO) - i.e. regarding grouping by frequency, trade-skills, routes. Does the tool provide any help to balance demand of downtime or manpower in a maintenance plan?	Elaborate your answer
9.29	Describe if the functionality of the tool regarding the creation of Task List - How is the SAP required information for the task list specified (work centre, spares from BOM, PRT, hours duration per task)?	Elaborate your answer

9.30	Describe if the functionality of the tool regarding the specification of the schedule start information for each maintenance plan (if any)? (this refers to the synchronisation of the parameters for a plan - e.g. operated hours, tonnes, time-date, etc.	Elaborate your answer
9.31	How is integration with SAP PM performed (is there a separate Interface development required - after Scope is finalized for individual Sites) - is there data table building within the Interface part of the Integration?	Elaborate your answer
9.32	How does the product ensure information and data security?	Elaborate your answer