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Software Requirements Specification for the Program Analysis and Control System Risk Management Module

J. C. Schaefer

On contract to

Lockheed Martin Hanford Corp., Richland, WA 99352

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Abstract: TWR Program Analysis and Control System Risk Module is used to facilitate specific data processes surrounding the Risk Management program of the Tank Waste Retrieval environment. This document contains the Risk Management system requirements of the database system.

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SOFTWARE REQUIREMENTS SPECIFICATION

for the

Program Analysis and Control System (PACS)

RISK MANAGEMENT MODULE

Prepared for
Lockheed Martin Hanford Company

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1 INTRODUCTION

1.1 PURPOSE

The purpose of the Program Analysis and Control System (PACS) Risk Module is: (1) to facilitate the input of risk management data and associated information into a database; (2) to provide the capability to output various reports on risk and related information; and (3) to maintain and organize the risk management information and historical data. The basic capabilities needed are user query, with define and save; output to file and hardcopy; and import and export with Microsoft EXCEL. A specific capability needed within the Risk Module is the interface with Microsoft EXCEL. EXCEL is used with a Monte Carlo simulation software product to produce probability of success curves to facility risk analysis.

1.2 SCOPE

This Software Requirements Specification (SRS) covers the data field requirements for the risk management data and related information. These data fields will be used to produce risk management reports and matrices. One of the main intents of the Risk Module database development is to automate the data sheet generation and maintenance now being accomplished manually in Microsoft EXCEL. This SRS is intended to provide the requirements for the testing and design parameters for the Risk Module of the PACS.

1.3 OVERVIEW

The TWRS risk management activities have been ongoing at Hanford for several years. However, during the Readiness to Proceed (RTP) activities in early FY98, the need was established for a more refined set of risk event information and risk management / risk analyses. The PACS application is intended to cover the broad scope of information required for the TWRS Program. The following are some of the functional areas: a TBR Module, a Program Requirements Module, and a Risk (Management) Module.

This SRS outlines the core functionality of the Risk Management process. This outline will provide the foundation for construction of the Risk Module database. This document encompasses the entire risk management methodology even though there may be overlap with related PACS modules. The overlap is not intended to place additional requirements on the PACS specification, but to capture all of the requirements until the Risk Module documentation is integrated into the overall PACS documentation.

Initially, the Risk Module will assist in performance of the first seven steps of Figure 1, the Risk Management Process Flow. Steps one through seven of the process flow address the data input and information reporting the Risk Module is to accommodate. In general, we collect risk management information in the early steps and provide outputs in the later steps, with preliminary outputs during a number of the intermediate steps. The data sheets we use to collect, capture, and report the risk management information are found later in this SRS, specifically section 5.

Figure 1. Risk Management Process Flow.

Presently, without the use of a database such as PACS, we collect risk management information from key project people in a series of meetings. We collect the information on the forms found in section 5. After each meeting the information is entered into a set of EXCEL spreadsheets, mostly for convenience and use in the risk analysis phase. Once we have the information for a project there are calculations and reports to generate. All of the reports are presently generated using EXCEL. Later we update the information and generate modified reports all the while providing periodic metrics reports that quantifies the effectiveness of the risk management process. Each TBR has a single worksheet, refer to Figure 2, the TBR Cost and Schedule Data Sheet. There are sources of risk events that are not related to TBRs. In this case, we use the Work Breakdown Structure (WBS) number as a reference. For the rest of this description, TBR and WBS numbers are synonymous. A given TBR may have none, one, or many Risk Events. We record the Risk Event information on the worksheets represented by Figure 3, the Risk Analysis Data Sheet. There will be one worksheet for each Risk Event. For each Risk Event there will be a Handling Action Plan Worksheet, Figure 4. And for specific handling action types, there are Handling Action Plan Closure Reports, Figure 5.

The "reports" we produce are seen in the following figures: Figure 6, The TBR Data Matrix; Figures 7-9, The Risk Data Matrix; Figures 10 and 11, the Summary Risk Management Event List, and Figure 12, the Risk Management Metrics Worksheet. At times we present a "report" containing incomplete data, and mark the report with identifiers such as, Draft, Rough, Final, or Other. When we have the complete project risk management information, we produce the reports in an EXCEL format and then perform Monte Carlo simulations on the Risk quantification data, both baseline and residual.

There are events that are the opposite of a risk event. We call these "opportunities" that will count positively against the negative consequences of risk events. In the past we have had only one or two such items. When an event is an opportunity, we flag it and record the likelihoods as usual, but record the "positive" consequences by placing a "-" (negative sign) in front of the numbers. To have this make sense, think of a credit card statement. Risk events are the credit card charges and the opportunities are the payments or return-item credits.

Throughout this document there will be informational comments. They are not intended to be requirements. To distinguish the informational comments from the requirements they will be contained within brackets [].

2 RISK MODULE GENERAL DESCRIPTION

2.1 RISK MODULE PERSPECTIVE

The Risk Module will rely on the same data sets as PACS. This module will depend on the PACS as a source of needed information. System performance and technical objectives are established within the PACS SRS and related documentation, and will not be repeated within this SRS. A working Risk Module will need to have input capability from, and the ability to output risk event data to, Microsoft Excel.

2.2 RISK MODULE FUNCTIONS / CAPABILITIES

The Risk Module shall provide a data element assembly for user-initiated creation, update, and deletion of data in the Risk Tables. Certain portions of the Risk Module will allow for multiple records, as defined in the following requirements.

In this document the use of the term “data element assembly” means any field, table, array, or other entities that have structure in the database. It provides a generic description that does not need to be specified until the database is designed. Unless otherwise specified, all required data element assemblies will be populated by user-initiated creation or update. Data elements that are to be generated by the module will be indicated in the data element assembly information, although the design details will be left to the designers.

The Risk Module capabilities are grouped into eight sets: General Risk capabilities, TBR Supporting Information and Quantification, Risk Events, Risk Event Quantification and Supporting Information, Risk Event Handling Action Quantification and Supporting Information, Residual Risk Event Quantification and Supporting Information, Risk Event Analyses and Reporting, and Risk Management Metrics. For output purposes, especially for use in Excel, user defined “queries” and “reports” will gather subsets of the data by using key database elements.

2.3 USER CHARACTERISTICS

The users of the Risk Module will mainly be of two types. There will be personnel assigned to handle risk and there will be personnel that perform the risk assessment and analyses. In some cases there will be overlap. Since a majority of the personnel will be using the Risk Module only occasionally, it needs to be user-friendly.

2.4 GENERAL CONSTRAINTS

At this point, the constraints on the Risk Module also apply to the PACS. Therefore, this SRS will not cover the general constraints.

2.5 ASSUMPTIONS AND DEPENDENCIES

The Risk Module will become a part of a larger, more comprehensive database, PACS. Successful Risk Analysis as part of PACS depends on the usability of the Risk Module and MS Excel interface.

3 GENERAL REQUIREMENTS

3.1 RISK MODULE FUNCTIONAL REQUIREMENTS

The requirements in this section are divided into functional areas. The following sections address the Risk Module characteristics. The reader is reminded that there are overlapping requirements with other PACS modules, this is only to facilitate documenting the Risk Module and is not intended to levy additional/redundant requirements on PACS.

3.1.1 General Risk Capability

Using the PACS database management system (DBMS) capabilities the Risk Module will be able to:

- a. Generate reports based on a query/filter for selected fields. These reports will be of two types. The first type will be standard reports that will be generated periodically. The second type of report will be unique, that is non-standard. The DBMS shall provide the ability to create, save, edit, reuse, and delete the queries that produce the reports, and to print in soft and hard copy the generated reports.
- b. Perform general word processing functions. There is a large amount of text generated in describing the information for Risk Management. The DBMS shall allow for creation, editing, deletion, etc. using general word processing functions.
- c. Perform user-initiated Find via the database application.
- d. Perform archive, save, and delete of data elements.
- e. Exit and update, and exit without update.
- f. Track data changes and updates.
- g. Perform automatic data error checking and automatic consistency checks on the entered data. The checks will be defined and entered into the DBMS. The DBMS shall allow creation, edit, save, and deletion of the consistency checks. In most cases an override capability is desired due to the nature of the risk information.

3.1.2 TBR Supporting Information and Quantification Capability

This section, containing the requirements of the TBR Supporting Information and Quantification Capability, will be known as "Folder 1". The Technical Basis Review (TBR) process, within TWRS, generates information helpful in Risk identification and quantification. This Risk Module Folder 1 will need to have access to the PACS data elements. For now, the required data elements are in the following subparagraphs (even though PACS has requirements for these, we include the requirements to be complete). Figures 2 and 6 represent how this information is currently handled.

- 3.1.2.1 Folder 1 shall provide a data element assembly for a TBR Identification Number. The data element assembly for the TBR Identification Number shall allow for alpha and numeric characters. This will be the key data element for the Risk Module.
- 3.1.2.2 Folder 1 shall provide a data element assembly for a WBS (Work Breakdown Structure) Number. This will be a lookup data element for the Risk Module. There are cases where there will not be a TBR number but there will be a WBS number. When risk

information is WBS related, we indicate it on the input sheet in the TBR location. [It is recommended that there be a TBR Master List with WBS number.]

- 3.1.2.3 Folder 1 shall provide a data element assembly for a Project Information / Assignment element. This data element will be text. [This field is to help us associate the TBR/WBS information to a Project or Program.]
- 3.1.2.3.1 For risk events that are deemed critical, and need to be presented on a higher level critical risk list, Folder 1 shall provide an input screen for user input and selection, or user selection, of the name of the program/project/department and applicable manager.
- 3.1.2.3.2 Deleting names from the list shall require special administrative options.
- 3.1.2.4 Folder 1 shall provide a data element assembly for a TBR/WBS Title element. This data element will be text.
- 3.1.2.5 Folder 1 shall provide a data element assembly for a TBR/WBS Activity Manager element. This data element will be text.
- 3.1.2.6 Folder 1 shall provide data element assemblies for one or more Enabling Assumption elements related to a TBR (or WBS, if there are no associated TBR numbers). The data element assemblies for the Enabling Assumption shall provide the title, number, and description of the Enabling Assumption(s). These data elements will be of a text nature, the description field contains lengthy text, and therefore it needs to be similar to the Memo field of Access. [Each Enabling Assumption needs to be separate for sorting purposes.]
- 3.1.2.7 Folder 1 shall provide data element assemblies for the following TBR/WBS Budget data:
 - 3.1.2.7.1 Most Likely Budget. The data element assembly for the Most Likely Budget shall be numeric, which is provided by a Lookup to the projected budget information. Folder 1 shall allow for the lookup information to be overwritten by the user.
 - 3.1.2.7.2 Minimum Budget. The data element assembly shall provide the ability to record the Minimum Budget in only one of the following two ways. 1. As a percent change (negative) of the Most Likely Budget. 2. As a Minimum Budget number that is less than or equal to the Most Likely Budget number.
 - 3.1.2.7.3 Maximum Budget. The data element assembly shall provide the ability to record the Maximum Budget in only one of the following two ways. 1. As a percent change (positive) of the Most Likely Budget. 2. As a Maximum Budget number that is greater than or equal to the Most Likely Budget number.
 - 3.1.2.7.4 Budget variance justification. This will be a text field to describe the reason for the variance in the budget numbers.

- 3.1.2.8 Folder 1 shall provide data element assemblies for the following TBR/WBS Schedule data:
 - 3.1.2.8.1 Most Likely Schedule. The data element assembly for the Most Likely Schedule shall be in calendar days.
 - 3.1.2.8.2 Minimum Schedule. The data element assembly shall provide the ability to record the Minimum Schedule in only one of the following two ways. 1. As a percent change (negative) of the Most Likely Schedule. 2. As a Minimum Schedule number that is less than or equal to the Most Likely Schedule number.
 - 3.1.2.8.3 Maximum Schedule. The data element assembly shall provide the ability to record the Maximum Schedule in only one of the following two ways. 1. As a percent change (positive) of the Most Likely Schedule. 2. As a Maximum Schedule number that is greater than or equal to the Most Likely Schedule number.
 - 3.1.2.8.4 Schedule variance justification. This will be a text field to describe the reason for the variance in the schedule numbers.
- 3.1.2.9 Folder 1 shall provide a data element assembly for a Notes field. This data element will be of a text nature, but contain lengthy descriptions; therefore it needs to be similar to the Memo field of Access.

3.1.3 Risk Event Capability

This section, containing the requirements of the Risk Event Capability, will be known as "Folder 2". The Risk Events are the specific "risks" with the associated likelihood and consequence data. For TBRs/WBSs with risks, there will be at least one set of Risk Event information. Figures 3 and 7 - 11 represent how this information is currently handled.

- 3.1.3.1 Folder 2 shall provide a data element assembly for a Risk Event Number. Risk Event Number data elements will be generated by using the TBR number (or WBS, if there is no associated TBR number). Folder 2 shall number each risk by appending a sequence number, starting with "1" to the end of the TBR number. The data element assembly is automatically generated. A risk number is unique when assigned, and if the risk event is deleted, then the risk number shall not be re-assigned.
- 3.1.3.2 Folder 2 shall provide a data element assembly for a Risk Owner element. The Risk Owner field will be text, containing the last name and initials of the Risk Event owner.
- 3.1.3.3 Folder 2 shall provide a data element assembly for a Risk Statement element. The Risk Statement will be text, but could be lengthy, therefore it needs to be similar to the Memo field of Access. [Most of the risk event statements will be in an IF THEN format. It would be helpful if this data element field could be entered in a field that showed two sections, one for IF and one for THEN wording.]

3.1.3.4 Folder 2 shall provide a data element assembly for a Risk Title element. This data element will be of a text nature.

3.1.4 Risk Event Quantification and Supporting Information Capability

This section, containing the requirements of the "baseline" Risk Event Quantification and Supporting Information Capability, will be known as "Folder 3". The Risk Event Quantification information contains the specific likelihood and consequence data. For TBRs/WBSs with risks, there will be at least one set of Risk Event information and each set of Risk Events will have a set of Risk Event Quantification information. For each Risk Event the following fields shall be provided. Figures 3 and 7 - 11 represent how this information is currently handled.

3.1.4.1 Folder 3 shall provide a data element assembly for a Risk Event Critical Designator. A Risk Event is either Critical or it is not, and a Risk Event may be labeled Critical at a later time. Folder 3 shall provide a simple "yes/no" indicator, such as a Radio Button. [Critical Risks will need to be "presented" at the next higher level for management review. It is possible that a given Critical Risk will need to be "presented" at more than one level. There will be few, if any changes in the information, therefore, the relational data fields need to allow for different Risk Event Numbers to signify the different levels. This is a discussion item.]

3.1.4.2 Folder 3 shall provide a data element assembly for an Opportunity Designator. An "Event" is either a Risk or an Opportunity. Folder 3 shall provide a simple "yes/no" indicator, such as a Radio Button.

3.1.4.3 Folder 3 shall provide data element assemblies for the following baseline Risk Event Likelihood data:

3.1.4.3.1 Minimum Likelihood in Percent. The data element assembly shall provide the ability to record a Minimum Likelihood percent that is less than or equal to the Most Likely percent and greater than or equal to zero.

3.1.4.3.2 Most Likely Likelihood in Percent. The data element assembly for the Most Likely shall be in percent.

3.1.4.3.3 Maximum Likelihood. The data element assembly shall provide the ability to record a Maximum Likelihood percent that is greater than or equal to the Most Likely percent and less than or equal to 1 (100 percent).

3.1.4.3.4 Likelihood variance justification. This will be a text field to describe the reason for the variance in the Likelihood percentages. [Presently, we place variance information in the notes section of the input forms, see Figure 3.]

3.1.4.4 Folder 3 shall provide data element assemblies for the following baseline Risk Event Budget Consequence data:

- 3.1.4.4.1 Minimum Budget Consequence in Thousands of dollars. The data element assembly shall provide the ability to record a Minimum Consequence Budget number that is less than or equal to the Most Likely Budget number.
- 3.1.4.4.2 Most Likely Budget Consequence in Thousands of Dollars.
- 3.1.4.4.3 Maximum Budget Consequence in Thousands of Dollars. The data element assembly shall provide the ability to record a Maximum Budget Consequence number that is greater than or equal to the Most Likely Budget Consequence number.
- 3.1.4.4.4 Budget variance justification. This will be a text field to describe the reason for the variance in the budget consequence numbers. [Presently, we place variance information in the notes section of the input forms, see Figure 3.]
- 3.1.4.5 Folder 3 shall provide data element assemblies for the following Risk Event Schedule Consequence data:
 - 3.1.4.5.1 Minimum Schedule Consequence in Calendar Days. The data element assembly shall provide the ability to record a Minimum Schedule Consequence number that is less than or equal to the Most Likely Schedule Consequence number.
 - 3.1.4.5.2 Most Likely Schedule Consequence in Calendar Days.
 - 3.1.4.5.3 Maximum Schedule Consequence in Calendar Days. The data element assembly shall provide the ability to record a Maximum Schedule Consequence number that is greater than or equal to the Most Likely Schedule Consequence number.
 - 3.1.4.5.4 Schedule variance justification. This will be a text field to describe the reason for the variance in the schedule numbers. [Presently, we place variance information in the notes section of the input forms, see Figure 3.]
- 3.1.4.6 Folder 3 shall provide a data element that auto-generates the baseline Risk Value (Refer to Table 1, RV(B)) for both Cost and Schedule data. This field shall have the capability of being overwritten by the user by manual entry or importing from Excel.

3.1.5 Risk Event Handling Action Quantification and Supporting Information Capability

This section, containing the requirements of the Risk Event Handling Action Quantification and Supporting Information Capability, will be known as "Folder 4". The Risk Event Handling Action information contains the tasks and related information and specific costs for handling the risk event, and for reporting on the closure of the Handling Actions. For each TBR (or WBS, if there is no associated TBR number) with a risk, there will be a set of Risk Event information and each set of Risk Events will have at least one set of Risk Event Handling Action information. For each Risk Event Handling Action the following fields shall be provided. Figures 4, 5, and 7-11 represent how this information is currently handled.

- 3.1.5.1 Folder 4 shall provide a data element assembly for a Risk Handler element. This will be a text field for the last name and initials of the person responsible for performing the risk handling actions and steps. There will be the ability to verify that names are not duplicated in the Risk Handler name list.
- 3.1.5.2 Folder 4 shall provide a data element assembly for the Date the Risk Handling Action elements are recorded. This will be a date field.
- 3.1.5.3 Folder 4 shall provide a data element assembly for a Handling Action Type designator. The possible types are Assume, Avoid, Control, Defer, Share, and Transfer. Folder 4 shall provide the list of possible types, with explanations, and allow one to be chosen. For each Handling Action Type, there are Recommended fields and Optional fields, refer to Figure 4 for how the type determines the fields. [Presently, this information is recorded on Figures 3 and 4, usually first recorded on the Handling Action Plan Worksheet (Figure 4), then copied onto the Risk Analysis Data Sheet (Figure 3).]
- 3.1.5.4 Folder 4 shall provide a data element assembly for a Handling Action Description. This data element will be of a text nature, the description field contains lengthy text, and therefore it needs to be similar to the Memo field of Access.
- 3.1.5.5 Folder 4 shall provide data element assemblies for the following Risk Handling Action Cost data [Presently, this information is recorded on Figures 3 and 4, usually first recorded on the Handling Action Plan Worksheet (Figure 4), then copied onto the Risk Analysis Data Sheet (Figure 3).]:
 - 3.1.5.5.1 Minimum Handling Action Cost in Thousands of dollars. The data element assembly shall provide the ability to record a Minimum cost that is less than or equal to the Most Likely Handling Action Cost.
 - 3.1.5.5.2 Most Likely Handling Action Cost in Thousands of Dollars.
 - 3.1.5.5.3 Maximum Handling Action Cost in Thousands of Dollars. The data element assembly shall provide the ability to record a Maximum cost that is greater than or equal to the Most Likely Handling Action Cost.
- 3.1.5.6 Folder 4 shall provide data element assemblies for the following Risk Handling Action Plan impacts to Schedule [Presently, this information is recorded on Figures 3 and 4, usually first recorded on the Handling Action Plan Worksheet (Figure 4), then copied onto the Risk Analysis Data Sheet (Figure 3).].
 - 3.1.5.6.1 Minimum Handling Action Schedule Impact in Calendar Days. The data element assembly shall provide the ability to record a Minimum Handling Action Schedule Impact number that is less than or equal to the Most Likely Handling Action Schedule Impact number.
 - 3.1.5.6.2 Most Likely Handling Action Schedule Impact in Calendar Days.

- 3.1.5.6.3 Maximum Handling Action Schedule Impact in Calendar Days. The data element assembly shall provide the ability to record a Maximum Handling Action Schedule Impact number that is greater than or equal to the Most Likely Handling Action Schedule Impact number.
- 3.1.5.7 Folder 4 shall provide data element assemblies for the following Risk Handling Action fields:
 - 3.1.5.7.1 The Action Plan Description. There may be more than one Action Plan defined for a Risk Handling Action. This data element will be of a text nature, the description field contains lengthy text, and therefore it needs to be similar to the Memo field of Access.
 - 3.1.5.7.2 The Action Plan Responsibility for each Task. This field will be text containing the last name and initials of the responsible person.
 - 3.1.5.7.3 The Action Plan Due Date. This field will be a date containing the estimated date of completion.
 - 3.1.5.7.4 The Completion Date for each Action Step.
 - 3.1.5.7.5 The Resources (Equipment, facilities, personnel, and funding) for each Action Plan. These data elements will be of a text nature. Some of the items will contain lengthy text, and therefore need to have the fields similar to the Memo field of Access. [Presently, the information collected for resources is for the overall Handling Action Plan.]
 - 3.1.5.7.6 The Handling Action Status for the current review cycle. There are four types of status, Unfunded, Pending, Complete, and Ongoing. Folder 4 shall provide the list of possible types, with explanations, and allow one to be chosen.
 - 3.1.5.7.7 The Handling Action Status for the previous review cycle. Folder 4 shall provide the status as chosen at the last update of this Risk Event.
 - 3.1.5.7.8 Folder 4 shall provide data element assemblies for Multi-Year Work Plan (MYWP) Activity ID Numbers by Handling Action Task. These will be text fields. [Presently, the software application used to track MYWP Activity Identification numbers is P3. We refer to "MYWP" in an effort to be more generic and not restrict the ID numbers to P3.]
 - 3.1.5.8 Folder 4 shall provide data element assemblies for a Closure Criteria element and Closure Criteria status element. These data elements will be of a text nature. The status field will be text, with a list of dynamic choices, and the description field will contain lengthy text, and therefore it needs to be similar to the Memo field of Access.
 - 3.1.5.9 Folder 4 shall provide a data element assembly for a MOA (Memorandum of Agreement) Number. This will be a text field.
 - 3.1.5.10 Folder 4 shall provide a data element assembly for a POC (Point of Contact) name (last name and initials). This will be a text field.

- 3.1.5.11 Folder 4 shall provide a data element assembly for a Handling Action Rationale element. This will be a text field.
- 3.1.5.12 Folder 4 shall provide a data element assembly for a Handling Action Review Date element. This will be a date field containing a date in the future. [The Review Date is set by the Risk Owner and Risk Handler as a reminder of when to address the risk event designated as Handling Action type "Defer".]
- 3.1.5.13 Folder 4 shall provide a data element assembly for the Closure Date of the Risk Event Handling Actions. [Note: see Figure 5.]
- 3.1.5.14 Folder 4 shall provide data element assemblies for the Residual Risk at Closure Handling Action Likelihood data:
 - 3.1.5.14.1 Minimum Handling Action Likelihood in percent. [Note: Minimum Likelihood is less than or equal to the Most Likely Likelihood.]
 - 3.1.5.14.2 Most Likely Handling Action Likelihood in percent.
 - 3.1.5.14.3 Maximum Handling Action Likelihood in percent. [Note: Maximum Likelihood is greater than or equal to the Most Likely Likelihood.]
- 3.1.5.15 Folder 4 shall provide data element assemblies for the Residual Risk at Closure Handling Action Cost data:
 - 3.1.5.15.1 Minimum Handling Action Cost in Thousands of dollars. [Note: Minimum cost is less than or equal to the Most Likely cost.]
 - 3.1.5.15.2 Most Likely Handling Action Cost in Thousands of Dollars.
 - 3.1.5.15.3 Maximum Handling Action Cost in Thousands of Dollars. [Note: Maximum cost is greater than or equal to the Most Likely cost.]
- 3.1.5.16 Folder 4 shall provide data element assemblies for the following Risk Handling Action impacts to Schedule.
 - 3.1.5.16.1 Minimum Handling Action Schedule Impact in Calendar Days. [Note: Minimum Schedule is less than or equal to Most Likely Schedule.]
 - 3.1.5.16.2 Most Likely Handling Action Schedule Impact in Calendar Days.
 - 3.1.5.16.3 Maximum Handling Action Schedule Impact in Calendar Days. [Note: Maximum Schedule is greater than or equal to Most Likely Schedule.]

3.1.5.17 Folder 4 shall provide a data element assembly for a Handling Action Plan Closure Report Lessons Learned. This data element will be of a text nature, the description field contains lengthy text, and therefore it needs to be similar to the Memo field of Access. Folder 4 shall provide for multiple "Lessons Learned" with a keyword legend/search field.

3.1.5.18 Folder 4 shall provide a data element assembly for a Handling Action Plan Closure Report Note. This data element will be of a text nature, the description field contains lengthy text, and therefore it needs to be similar to the Memo field of Access.

3.1.6 Residual Risk Event Quantification and Supporting Information Capability

This section, containing the requirements of the Residual Risk Event Quantification and Supporting Information Capability, will be known as "Folder 5". [Quantification of residual risk assumes successful completion of the Handling Action(s) identified. This does not mean that the Handling Actions are complete when the information is entered into the Risk Module.] The Residual Risk Event Quantification information is composed of the specific likelihood and consequence data plus related information. For TBRs with risks, there will be at least one set of Risk Event information and each set of Risk Events will have a set of Risk Event Quantification information. When the Risk Event Handling Action steps reduce the Risk Likelihood and/or Risk Consequence, there will be residual risk. For each Risk Event with Residual Risk, after the Handling Action, the following fields shall be provided. [Note that the information is similar to section 3.1.4.] Figures 3 and 7 - 11 represent how this information is currently handled.

3.1.6.1 Folder 5 shall provide data element assemblies for the following Residual Risk Event Likelihood data:

3.1.6.1.1 Minimum Residual Likelihood in Percent. The data element assembly shall provide the ability to record a Minimum Residual Likelihood percent that is less than or equal to the Most Likely Residual percent. A warning will be given if it is greater than the Minimum Likelihood percent (refer to 3.1.4.3.1).

3.1.6.1.2 Most Likely Residual Likelihood in Percent. A warning will be given if the Most Likely Residual Likelihood is equal to or greater than the Most Likely Likelihood percent (refer to 3.1.4.3.2).

3.1.6.1.3 Maximum Residual Likelihood in Percent. The data element assembly shall provide the ability to record a Maximum Residual Likelihood percent that is greater than or equal to the Most Likely Residual percent. A warning will be given if it is greater than or equal to the Maximum Likelihood percent (refer to 3.1.4.3.3).

3.1.6.1.4 Residual Likelihood variance justification. This will be a text field to describe the reason for the variance in the Residual Likelihood percentages. [Presently, we place variance information in the notes section of the input forms, see Figure 3.]

3.1.6.2 Folder 5 shall provide data element assemblies for the following Residual Risk Consequence data:

- 3.1.6.2.1 Minimum Residual Consequence in Thousands of dollars. The data element assembly shall provide the ability to record a Minimum Residual Consequence number that is less than or equal to the Most Likely Residual Consequence number. A warning will be given if it is greater than the Minimum Consequence percent (refer to 3.1.4.4.1).
- 3.1.6.2.2 Most Likely Residual Consequence in Thousands of Dollars. A warning will be given if the Most Likely Residual Consequence number is greater than the Most Likely Consequence number (refer to 3.1.4.4.2).
- 3.1.6.2.3 Maximum Residual Consequence in Thousands of Dollars. The data element assembly shall provide the ability to record a Maximum Residual Consequence number that is greater than or equal to the Most Likely Residual Consequence number. A warning will be given if it is greater than the Maximum Consequence number (refer to 3.1.4.4.3).
- 3.1.6.2.4 Residual Consequence variance justification. This will be a text field to describe the reason for the variance in the Residual Consequence numbers. [Presently, we place variance information in the notes section of the input forms, see Figure 3.]

3.1.6.3 Folder 5 shall provide data element assemblies for the following Residual Risk Event Schedule Consequence data:

- 3.1.6.3.1 Minimum Residual Risk Schedule Consequence in Calendar Days. The data element assembly shall provide the ability to record a Minimum Residual Risk Schedule Consequence number that is less than or equal to the Most Likely Residual Risk Schedule Consequence number. A warning will be given if it is greater than the Minimum Schedule Consequence number (refer to 3.1.4.5.1).
 - 3.1.6.3.2 Most Likely Residual Risk Schedule Consequence in Calendar Days. A warning will be given if the Most Likely Residual Risk Schedule number is greater than the Most Likely Schedule Consequence number (refer to 3.1.4.5.2).
 - 3.1.6.3.3 Maximum Residual Risk Schedule Consequence in Calendar Days. The data element assembly shall provide the ability to record a Maximum Residual Risk Schedule Consequence number that is greater than the Most Likely Residual Risk Schedule Consequence number. A warning will be given if it is greater than or equal to the Maximum Schedule Consequence number (refer to 3.1.4.5.3).
 - 3.1.6.3.4 Residual Risk Schedule variance justification. This will be a text field to describe the reason for the variance in the Residual Risk schedule numbers. [Presently, we place variance information in the notes section of the input forms, see Figure 3.]
- 3.1.6.4 Folder 5 shall provide a data element that auto-generates the Residual Risk Value (Refer to Table 1, RV(R)). This field shall have the capability of being overwritten by the user by manual entry or importing from Excel.

3.1.7 Risk Event Analyses and Reporting Capability

This section, containing the requirements of the Risk Event Analyses and Reporting Capability, will be known as "Folder 6". The Risk Event Analyses information is composed of the calculated data from the data previously entered by Folders 1 - 5. The Risk Event Reporting needs are from the inputs and the calculations. Reports will be both hardcopy and electronic, with a specific interface with Microsoft EXCEL. For each Risk Event the following fields shall be provided. Figures 6 - 11 represent how this information is currently handled.

3.1.7.1 Folder 6 shall provide data element assembly for the internally calculated Cost-Benefit Analysis number, for each Risk Event [Presently, we use the Cost-Benefit Analysis number to sort the Risk Events on the Risk Management Event List.]:

3.1.7.1.1 Calculate the Cost-Benefit Analysis (C-B) number for each Risk Event using the formulae in Table 1, Values Used for Calculations.

3.1.7.1.2 Calculate the C-B number using the rules in Table 2, Rules for User Input and Auto-Generation, and Table 3, Rules for Risk Value and Cost-Benefit Calculations.

3.1.7.2 Folder 6 shall provide the ability to create and generate the following Risk Management type reports:

3.1.7.2.1 Current reports as represented in Figures 6 through 11.

3.1.7.2.2 Sorting and filtering for the current set of reports and for future reports shall be provided. Examples of Sorts are Risk Events, Risk Value, C-B number, and Risk Handling Action Type. Examples of Filters are ones by project and by owner.

3.1.7.2.3 Future reports and sorting abilities shall be supported through the typical database management system utilities.

3.1.7.2.4 For all reports Folder 6 shall provide the capability for user selection of a header and footer "stamp". The user shall have a set of selections for the header and footer: DRAFT, PROPRIETARY, FINAL, or user defined (by user input before report initiation).

3.1.8 Risk Management Metrics Reporting Capability

This section, containing the requirements of the Risk Management Metrics Reporting capabilities, will be known as "Folder 7". This Risk Management Metrics information is used to create the metrics report. The metrics report provides information concerning risk management list (RML) development, TBR assessment, RML updates, risk exposure characteristics, and cost benefit factors. The Risk Management Metrics Worksheet will include:

1. Sum of all incomplete RMLs
2. Sum of all complete RMLs

3. Sum of all analyzed TBRs
4. Sum of all unanalyzed TBRs
5. Sum of all updated RMLs

Reports will be both hardcopy and electronic, with a specific interface with Microsoft EXCEL. Figure 12 represents how this information is currently handled.

3.1.8.1 Folder 7 shall provide date fields related to RMLs to include: Date RML Entered, Date RML Completed, Date RML Updated

3.1.8.1.1 Date RML Entered will only be entered once and not be modified.

3.1.8.1.2 Date RML Completed will only be entered once and not be modified.

3.1.8.1.3 Date RML Updated will be modified every time the RML is updated. No previous records of when RMLs were updated are necessary.

3.1.8.2 Folder 7 shall provide date fields related to TBRs to include Date TBR Analyzed. This field will be updated every time a TBR is analyzed. No previous records of when TBRs were analyzed are necessary.

3.1.8.3 Folder 7 shall provide data element assembly for the quantity of RMLs that are incomplete.

3.1.8.4 Folder 7 shall provide data element assembly for the quantity of RMLs that are complete.

3.1.8.4.1 Risk Management Metrics Worksheet data filters will include an option to specify a range of calendar dates in which the RMLs were completed.

3.1.8.4.2 Risk Management Metrics Worksheet data filters will include an option to specify all RMLs that have been completed to date.

3.1.8.5 Folder 7 shall provide data element assembly for the quantity of all TBRs that have been analyzed.

3.1.8.5.1 Risk Management Metrics Worksheet data filters will include an option to specify a range of calendar dates in which the TBRs were analyzed.

3.1.8.5.2 Risk Management Metrics Worksheet data filters will include an option to specify all TBRs that have been completed to date.

3.1.8.6 Folder 7 shall provide data element assembly for the total quantity of TBRs

- 3.1.8.7 Folder 7 shall provide data element assembly for the quantity of RMLs that have been updated.
- 3.1.8.7.1 Risk Management Metrics Worksheet data filters will include an option to specify a range of calendar dates in which the RMLs were updated.
- 3.1.8.7.2 Risk Management Metrics Worksheet data filters will include an option to specify all RMLs that have been updated to date.

3.2 EXTERNAL INTERFACE REQUIREMENTS

(Much of this section is only necessary at the PACS level, including the user interface, hardware and software interfaces, and communications interfaces.)

3.2.1 User Interfaces

The PACS Risk Module user interface shall be based on current Microsoft Windows defacto standard practices for design of screens including data entry, file access, printing, print set-up, and other user commands.

- 3.2.1.1 User Screens. In general, PACS Risk Module screens for the user shall meet the criteria in the PACS System Requirements Specification.
- 3.2.1.2 Timing of Input and Output. In general, PACS Risk Module input and output timing shall meet the criteria in the PACS System Requirements Specification.

3.2.2 Hardware Interfaces

No special requirements have been identified for the Risk Module beyond those that satisfy the functions and requirements of PACS.

3.2.3 Software Interfaces

There is a requirement for the Risk Module data, especially the Likelihood and Consequence data to be readily imported from and exported to Microsoft Excel. There are no other special requirements for the Risk Module beyond those that satisfy the functions and requirements of PACS.

3.2.4 Communication Interfaces

This section is only necessary at the PACS level. The PACS SRS covers the requirements. There are no other special requirements for the Risk Module beyond those that satisfy the functions and requirements of PACS.

3.3 PERFORMANCE REQUIREMENTS

This section is only necessary at the PACS level. The PACS SRS covers the requirements. There are no other special requirements for the Risk Module beyond those that satisfy the functions and requirements of PACS.

3.4 DESIGN CONSTRAINTS

This section is only necessary at the PACS level. The PACS SRS covers the requirements. There are no other special requirements for the Risk Module beyond those that satisfy the functions and requirements of PACS.

3.5 ATTRIBUTES

- For security requirements, refer to Section 3.1.1 of the PACS SRS.
- Maintenance shall be performed under configuration control, in compliance with the Software Practices Hanford procedures.
- Data integrity from other systems is the responsibility of those System Administrators. Data received from a hyperlink will not be checked for proper format prior to being launched in its application.
- Where possible, PACS Risk Module should be modular in design to allow ease of programming, maintenance, isolated, and system testing.
- PACS Risk Module shall be portable to new workstations.

3.6 OTHER REQUIREMENTS

This section will discuss the PACS Risk Module requirements not related to functionality.

3.6.1 Data Dictionary

Information items provided in [] are characteristics of the data elements. The information may change, but has been provided as a reference. The word "text", when used as a data type, refers to the alphanumeric text that may include special keyboard characters (e.g., dash, period, slash).

3.6.1.1 Folder 1 Data Elements.

TBR (Technical Basis Review) Identification Number. [Text field.]

WBS (Work Breakdown Structure) Number. [Text field, with Lookup capabilities.]

Project Information / Assignment element. [Text field]

TBR Title element. [Text field, with Lookup capabilities.]

TBR Activity Manager element. [Text field, with Lookup capabilities.]

Enabling Assumption elements related to a TBR. [Text field, with Lookup capabilities.]

TBR Budget numbers, minimum, most likely, and maximum. [Field type = "currency", with Lookup capabilities to CEIS data, the projected budget.]

TBR Budget variance justification. [Text field.]

TBR Schedule numbers: minimum, most likely, and maximum. [Numeric field in calendar days, with Lookup capabilities to MYWP (P3) data, the projected schedule duration.]

TBR Schedule variance justification. [Text field.]

TBR Notes field. [Memo field.]

3.6.1.2 Folder 2 Data Elements.

Risk Event Number data elements will be generated by using the TBR number. [Text field that can be auto-generated using the TBR number.]

Risk Event Owner element. [Text field.]

Risk Event Statement element. [Text field.]

Risk Event Title element. [Text field.]

3.6.1.3 Folder 3 Data Elements.

Risk Event Critical Designator. [This field could be a "Yes/No" Button.]

Opportunity Designator. [This field could be a "Yes/No" Button.]

Risk Event Likelihood: minimum, most likely, and maximum. [Numeric field in percent, 0 to 1.]

Risk Event Likelihood variance justification. [Text field.]

Risk Event Budget Consequence: minimum, most likely, and maximum. [Currency data field.]

Risk Event Budget Consequence variance justification. [Text field.]

Risk Event Schedule Consequence: minimum, most likely, and maximum. [Numeric field in calendar days.]

Risk Event Schedule Consequence variance justification. [Text field.]

Risk Event Risk Value. [Numeric field.]

3.6.1.4 Folder 4 Data Elements.

Risk Handler element. [Text field.]

Risk Handling Action Date of Record. [Date field.]

Handling Action Type designator. [Text field, with the capability to select from the known list of types.] [Presently, this information is recorded on Figures 3 and 4, usually first recorded on the Handling Action Plan Worksheet (Figure 4), then copied onto the Risk Analysis Data Sheet (Figure 3).]

Handling Action Cost data: minimum, most likely, and maximum. [Field type = "currency".] [Presently, this information is recorded on Figures 3 and 4, usually first recorded on the Handling Action Plan Worksheet (Figure 4), then copied onto the Risk Analysis Data Sheet (Figure 3).]

Handling Action Schedule impacts: minimum, most likely, maximum. [Numeric field in calendar days.] [Presently, this information is recorded on Figures 3 and 4, usually first recorded on the Handling Action Plan Worksheet (Figure 4), then copied onto the Risk Analysis Data Sheet (Figure 3).]

Handling Action Plan Description. [Text field, with multiple fields as necessary.]

Handling Action Plan Responsibility. [Text field, with multiple fields as necessary.]

Handling Action Plan Due Date. [Date field, with multiple fields as necessary.]

Handling Action Plan Completion Date. [Date field, with multiple fields as necessary.]

The Handling Action Resources (Equipment, facilities, personnel, and funding) for each Action Step. [Text field, with multiple fields as necessary.]

The Handling Action Status for the current review cycle. [This could be a selection from a list field.]

The Handling Action Status for the previous review cycle. [This could be a selection from a list field. This is expected to be updated with the current review cycle status information before the current status is changed. This needs to be discussed.]

MYWP Activity ID Number. [Text field.]

Handling Action Closure Criteria element. [Text field.]

Handling Action MOA (Memorandum of Agreement) Number. [Text field.]

Point of Contact name. [Text field.]

Handling Action Rationale element. [Text field.]

Handling Action Review Date element. [Date field.]

Closure Date of the Risk Event Handling Actions. [Date field.]

Residual Risk at Closure Handling Action Likelihood data: minimum, most likely, and maximum. [Numeric field in percent, 0 to 1.]

Residual Risk at Closure Handling Action Cost data: minimum, most likely, and maximum. [Field type = "currency".]

Risk Handling Action impacts to Schedule: minimum, most likely, maximum. [Numeric field in calendar days.]

Handling Action Plan Closure Report Lessons Learned. [Memo field.]

Handling Action Plan Closure Report Note. [Memo field.]

3.6.1.5 Folder 5 Data Elements.

Residual Risk Likelihood data: minimum, most likely, and maximum. [Numeric field in percent, 0 to 1.]

Residual Risk Likelihood variance justification. [Text field.]

Residual Risk Budget Consequence data: minimum, most likely, and maximum. [Field type = "currency".]

Residual Risk Budget Consequence variance justification. [Text field.]

Residual Risk Schedule Consequence data: minimum, most likely, and maximum. [Numeric field in calendar days.]

Residual Risk Schedule Consequence variance justification. [Text field.]

Residual Risk Value auto-generated. [Numeric field.]

3.6.1.6 Folder 6 Data Elements.

Cost-Benefit Analysis number, for each Risk Event. [Numeric field.] [Presently, we use the Cost-Benefit Analysis number to sort the Risk Events on the Risk Management Event List.]

Header and footer "stamp" field. [User selection field.]

3.6.1.7 Folder 7 Data Elements.

Date RML Entered. This field is only specified once and is not modified. [Date Field.]

Date RML Completed. This field is only specified once and is not modified. [Date Field.]

Date RML Updated. This field is modified each time a RML is updated. No record of previous updates is necessary. [Date Field.]

Date TBR Analyzed. This field is modified each time a TBR is analyzed. No record of previous updates is necessary. [Date Field.]

Sum of all incomplete RMLs. This field is an input to the Risk Management Metrics Worksheet. [Numeric Field.]

Sum of all complete RMLs. This field is an input to the Risk Management Metrics Worksheet. [Numeric Field.]

Sum of all analyzed TBRs. This field is an input to the Risk Management Metrics Worksheet. [Numeric Field.]

Sum of all unanalyzed TBRs. This field is an input to the Risk Management Metrics Worksheet. [Numeric Field.]

Sum of all updated RMLs. This field is an input to the Risk Management Metrics Worksheet. [Numeric Field.]

3.6.2 Operations

These operations are the same as for PACS. The PACS Risk Module will need the same requirements as PACS. The PACS System Administrator, in close conjunction with the software developers and HLAN network support personnel, shall perform initial start-up of the system.

Normal operations have the domain controllers provide the PACS application to HLAN users. Users shall be allowed to start-up and logon to the PACS from their workstations via HLAN, but only with the proper security level and access. Special operations may involve setting up the PACS for development testing over the network, and is outside the scope of this document.

Shutdown of the system, for maintenance or new PACS releases, shall be handled by alerting those users with a registered PACS password of the system outage date and time and will be arranged with LMSI Network Support.

The PACS System Administrator shall perform backups of the PACS data. LMSI shall assist the PACS System Administrator in system recovery of any data files that are lost or corrupted.

The PACS System Administrator in conjunction with LMSI shall provide maintenance of all workstation and fileserver systems, software and hardware components.

3.6.3 Site Adaptation

No special requirements have been identified for the Risk Module.

3.6.4 Options

No special requirements have been identified for the Risk Module.

3.6.5 Scheduling

No special requirements have been identified for the Risk Module. Users require that the system is available during normal work operations (Monday through Friday; 6:00 a.m. – 5:00 p.m.). Normal supported work hours for the HLAN Customer Technical Support (CTS) is around the clock for computer and HLAN issues.

Maintenance of the file servers shall be handled during off-normal work hours. When a file server is not in service during normal work operations, then the backup file server shall take over as the primary.

3.6.6 Reliability and Recovery

No special requirements have been identified for the Risk Module.

3.6.7 Audit

No special requirements have been identified for the Risk Module.

3.6.8 Priorities

No special requirements have been identified for the Risk Module.

3.6.9 Transferability

No special requirements have been identified for the Risk Module.

3.6.10 Conversion

There is a requirement that Microsoft EXCEL Workbooks containing risk data be imported into the Risk Module to populate the fields with the current, existing data.

3.6.11 Testing and Acceptance Criteria

The baseline software version of PACS and the Risk Module shall be tested by end-to-end and user testing prior to formal release and approval of the customer. All approved changes shall be tested in accordance with the Risk Module Test Plan.

3.6.12 Documentation

A user's guide or desk instruction, accessible via the user's workstation, shall be generated. The guide will discuss the use of the Risk Module within PACS. A formal user's manual is to be documented in the *User Guide for the Program Analysis and Control System*.

From Release 1 of PACS there will be the following documents: the SRS, the Test Plan, the Software Configuration Management Plan (SCMP), and the User's Guide. With the development and release of the Risk Module, the PACS SRS will receive a limited amount of impact. The PACS Test Plan will be revised to accommodate the testing of the Risk Module. The SCMP will require revision for the Risk Module, most likely an appendix to address the

Risk Module. The User's Guide will require the most updates, and need to be rewritten to accommodate the Risk Module.

3.6.13 Training

All Risk Module users who are to be given access to the initial application will be provided with training in 1999 per the *User Guide for the Program Analysis and Control System*. All future users may require a training session in the PACS application. All other training, including training of software development and HLAN communications personnel, is outside the scope of this document.

3.6.14 Security and Privacy

The data in PACS and in the Risk Module have not been designated. The requirements for user authorization, security, and safeguards are in the PACS SRS, Section 3.1.1. Only privileged users shall have access to specific data and the PACS System Administrator shall assign these privileges. In some cases, for example, a "non-baseline" scenario, shall have the ability to be defined by a user its own security and limit access.

4 References

HNF-PRO-496, *Software Practices - System Requirements Specifications*, Fluor Daniel Hanford, Richland, Washington.

HNF-3718, *System Requirements Specifications for the Program Analysis and Control System (PACS)*, Release 1.0, Lockheed Martin Hanford Company, Richland, Washington.

Miscellaneous documents: PACS Test Plan, PACS User's Guide, and PACS Software Configuration Management Plan.

5 Background Information

5.1 AUTO-GENERATION AND CALCULATED VALUE RULES

The following tables present the rules for how certain data elements are auto-generated or calculated relative to other data elements. We use these rules in our current Risk Management process.

Table 1. Values Used for Calculations.

Risk Event Quantification		Minimum	Most Likely	Maximum	Calculations for Data Element
BASELINE	LIKELIHOOD (See Note 1)	a	b	c	$RV(B) = [(a+b+c)/3]*[(d+e+f)/3]$
	CONSEQUENCE (Dollars or Schedule) (See Note 1)	d	e	f	
RESIDUAL	LIKELIHOOD (See Note 2)	g	h	i	$RV(R) = [(g+h+i)/3]*[(j+k+l)/3]$
	CONSEQUENCE (Dollars or Schedule) (See Note 2)	j	k	l	
HANDLING ACTION COSTS		m	n	o	$HA = (n+o)/2$
NOTES: Note 1 = Always USER Input. Note 2 = USER Input or Auto Input, See Table 2. RV(B) = Risk Value of Baseline Risk Event Quantification data. RV(R) = Risk Value of Residual Risk Event Quantification data. HA = Handling Action "average costs".					

Table 2. Rules for User Input and Auto-Generation.

If the Risk Handling Action Type is:	RESIDUAL RISK EVENT QUANTIFICATION						HANDLING ACTION INPUTS
	LIKELIHOOD			CONSEQUENCE			
	MIN	MOST LIKELY	MAX	MIN	MOST LIKELY	MAX	
ASSUME (See Note 1)	g = a	h = b	i = c	j = d	k = e	l = f	{m,n,o} = 0
AVOID (See Note 1)	g = 0	h = 0	i = 0	j = 0	k = 0	l = 0	{m,n,o} = 0
CONTROL	g = user input	h = user input	i = user input	j = user input	k = user input	l = user input	User input {m,n,o}
DEFER (See Note 1)	g = 0	h = 0	i = 0	j = 0	k = 0	l = 0	{m,n,o} = 0
SHARE	g = user input	h = user input	i = user input	j = user input	k = user input	l = user input	User input {m,n,o}
TRANSFER (See Note 1)	g = 0	h = 0	i = 0	j = 0	k = 0	l = 0	{m,n,o} = 0
NOTES: Note 1 = Auto-input, with ability for USER INPUT. See Table 1 for specifics on letters a-o. The {m,n,o} = 0 indicates that are three values are 0.							

Table 3. Rules for Risk Value and Cost-Benefit Calculations.

IF THE RISK HANDLING TYPE IS:	RISK VALUE CALCULATION	COST BENEFIT CALCULATION	
		if $HA > 0$	if $HA = 0$
ASSUME	$RV(R) = RV(B)$	N/A	N/A
AVOID	N/A	N/A	N/A
CONTROL	$RV(R) = \text{calculated}$	$CB = [RV(B) - RV(R)]/HA$	N/A
DEFER	N/A	N/A	N/A
SHARE	$RV(R) = \text{calculated}$	$CB = [RV(B) - RV(R)]/HA$	N/A
TRANSFER	N/A	N/A	N/A
NOTE: See Table 1 for definition of $RV(B)$, $RV(R)$, and HA . CB = Cost-Benefit Analysis number. N/A = not applicable.			

5.2 RISK MANAGEMENT INFORMATION INPUT FORMS

The following figures are the input forms we use for gathering Risk Management information and also for output during periodic updates to the risk information. We use the form in Figure 2 to gather TBR specific information. There will be one sheet for each TBR, but the number of Risk Events will vary, depending on the TBR. We gather risk event information on the forms in Figures 3 and 4. There is always one Risk Analysis Data Sheet and Handling Action Plan Worksheet for each risk event. Once the information on the Handling Action Plan Worksheet is gathered, we link it to the same fields on the Risk Analysis Data Sheet. So far, the Closure information has not been gathered because we have not had risk events handled to completion.

When we update the Risk Event Handling Actions by periodically presenting them for review to a project team, we use these forms to make "redlines" and then transfer the updates to the present electronic files.

Figure 2. TBR Cost and Schedule Data Sheet.

TBR Number: _____

Title: _____

TBR Manager: _____

	Minimum	Most Likely	Maximum	Rationale
Baseline Budget (\$K)				
Baseline Schedule (Calendar Days)				

Enabling Assumptions

1.

2.

3.

4.

5.

Notes:

Prepared by: _____

Date: _____

Figure 3. Risk Analysis Data Sheet.

Risk Event #: _____ **Risk Owner:** _____
Risk Event Title: _____
 Are risk handling costs already included in the budget/schedule? _____
 Is this Risk Event linked to an Enabling Assumption? _____
 If so, which Enabling Assumption? _____
 Is this Risk Event Critical? _____

Risk Event Statement			

Risk Quantification (Original)	MINIMUM	MOST LIKELY	MAXIMUM
Likelihood (%)			
Consequence: (\$K)			
(Calendar Days)			

Handling Action Type (Select the Appropriate Box)					
Assume	Avoid	Control	Defer	Share	Transfer

Handling Action Costs	MINIMUM	MOST LIKELY	MAXIMUM
Budget (\$K)			
Schedule (Calendar Days)			

Residual Risk Quantification	MINIMUM	MOST LIKELY	MAXIMUM
Likelihood (%)			
Consequence: (\$K)			
(Calendar Days)			

Notes:

Prepared by: _____

Date: _____

Figure 4. Handling Action Plan Worksheet.

Risk Event #: _____	Date: _____					
Risk Handler: _____						
MYWP Activity ID #: _____						
Risk Event Statement						
Handling Action Types (Select the Appropriate Box)						
Assume	Avoid	Control	Defer	Share	Transfer	
Provide information in the indicated blocks.						
D.	D. & E.	E. thru I.	A. & D.	B. thru I.	B. thru D.	
A. Review Date:						
B. Point of Contact:						
C. MGR #:						
D. Rationale						
E. Approach						
F. Closure Criteria						
G. Resources:			H. Cost and Schedule			
<div style="border: 1px solid black; height: 40px; width: 100%;"></div> <div style="border: 1px solid black; height: 20px; width: 100%;"></div> <div style="border: 1px solid black; height: 20px; width: 100%;"></div> <div style="border: 1px solid black; height: 20px; width: 100%;"></div>			(in \$K) (in Calendar Days)			
			Min: _____	Min: _____		
			Like ly: _____	Like ly: _____		
			Max: _____	Max: _____		
I. Tasks/Details of Action Plan						
Description	Responsibility	Due	Complete			

Figure 5. Handling Action Plan Closure Report.

Risk Event #: _____

Closure Date: _____

Residual Risk at Closure	MINIMUM	MOST LIKELY	MAXIMUM
Likelihood (%)			
Consequence: (\$K)			
(Calendar Days)			

Lessons Learned

Notes

Prepared by: _____

The following figures are the report forms we use for performing Risk Management Analysis and Simulation and for reporting the information during periodic updates to the risk information. The columns represented on the forms are there for two purposes. The first purpose is to have the correct data to run the Monte Carlo simulation using data from EXCEL spreadsheets. The second purpose is to make available the risk information for the readers of the reports to have an understanding of the risk analyses.

Figure 6. The TBR Data Matrix.

Budget = \$0

[illegible]

Figure 8. The Risk Data Matrix (part 2 of 3).

[illegible]

[illegible]

Figure 10. Summary Risk Management Event List (part 1 of 2).

[illegible]

Figure 11. Summary Risk Management Event List (part 2 of 2).

[illegible]