Appendix B
WCP04-Drill Spindle Controller Requirements

ID #	Req. Description	Source of Req.	Acceptable Value Range	Qualification Method	Test ID #	Pass /Fail
WCP04 -R-01	Document drill capabilities/interfaces in Theory of Operations Manual	Provided by Client	N/A	Demonstration		
WCP04 -R-02	Use Proof of Concept Controller to demonstrate Theory of Operations Manual	Provided by Client	N/A	Demonstration		
WCP04 -R-03	Proof of Concept Controller will have enough capability to show correctness of Theory of Op. Manual	Provided by Client	N/A	Demonstration		
WCP04 -R-04	Provide a conceptual software package for user/Drill Controller interaction	Provided by Client	N/A	Demonstration		
WCP04 -R-05	Develop understanding of all Spindle Drill controller, power, & pneumatics	Created by team	N/A	Analysis		
WCP04 -R-06	Develop understanding of Spindle Drill cooling	Created by team	N/A	Analysis		
WCP04 -R-07	Gain detailed knowledge of how each component of drill works together	Created by team	N/A	Analysis		
WCP04 -R-08	Develop a controller that moves spindle drill on X-Y plane	Created by team	N/A	Test		
WCP04 -R-09	Test provided controller chassis to determine its ability to serve as spindle controller	Created by team	N/A	Test		

WCP04-R-10	Develop understanding of how drill cooling system works/ what operations require it	Created by team	N/A	Analysis		
WCP04-R-11	Identify if necessary, what coolant will be needed	Created by team	N/A	Analysis		
WCP04-R-12	If cooling is required, use proper coolant for necessary operations	Created by team	N/A	Demonstration		
WCP04-R-13	Identify optimal voltages for each component	Created by team	TBD	Test		
WCP04-R-14	Test provided controller chassis to determine its ability to regulate drill power	Created by team	N/A	Test		
WCP04-R-15	Identify to what extent drill operation is controlled by pneumatics	Created by team	N/A	Inspection		
WCP04-R-16	Develop understanding of how drill pneumatics system works/ what operations require it	Created by team	N/A	Analysis		

WCP04-R-01-04 : Sponsor Requirements

WCP04-R-01 We shall document the capabilities and interfaces in a Theory of Operations manual.

WCP04-R-02 We shall demonstrate the correctness of the Theory of Operations manual by developing a Proof of Concept Controller.

WCP04-R-03 The Proof of Concept Controller shall have just enough capability to demonstrate the correctness of the Theory of Operations manual.

WCP04-R-04 We shall provide a concept for a software package that will interface between the user and the Spindle Controller. The purpose of the software package is to facilitate the development of games and demonstrations. The concept for the software package shall be guided by input from CT&I as to the types of games and demonstrations desired and by input from our teams investigation of the Spindle Drill.

WCP04-R-05-07 : General Understanding and of the Spindle Drill Components

> **WCP04-R-05** As a team, we shall develop a good understanding of the Spindle Drill
> Controller, power and pneumatics.

> **WCP04-R-06** We should develop an understanding of the Spindle Drill cooling system
> provided that it is necessary to the operation of the Spindle Drill.

> **WCP04-R-07** We shall have detailed knowledge of how each component of the Spindle
> Drill should work with the others so that the Spindle Drill can function, as

demonstrated
in the Theory of Operations Manual.

WCP04-R-08-09 : Drill Controller

> **WCP04-R-08** We should develop a controller that will be able to move the Spindle Drill
> in the x and y directions.

> **WCP04-R-09** We shall test the provided controller chassis to determine if it has the
> capability to control the Spindle Drill functions. If the chassis proves unusable, we shall
> implement our own device controller.

WCP04-R-10-12 : Drill Cooling

> **WCP04-R-10** We shall develop a good understanding of how the Spindle Drill cooling
> system works, what drill operations it is required for.

> **WCP04-R-11** We should identify what coolant(s) is(are) used to cool the Spindle Drill.

> **WCP04-R-12** We should implement the cooling system using the identified coolant if
> cooling is required for the Spindle Drill operations that we plan on utilizing.

WCP04-R-13-14 : Drill Power

> **WCP04-R-13** We shall identify the different voltages required by each component to
> function.

> **WCP04-R-14** We shall test the provided controller chassis to determine if it has the
> capability to regulate power. If the provided power control chassis proves

unusable, we   shall implement our own power regulating device.

WCP04-R-15-16 : Drill Pneumatics

WCP04-R-15 We shall identify how much of the drill's operation is controlled by
pneumatics.

WCP04-R-16 We shall develop a good understanding of how the Spindle Drill
pneumatics work, what drill operations it is required for.