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1	/	Cog. Eng. S. L. Hecht	<i>SLH</i>	10-24-00	46-35						
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Acceptance Test Plan for ANSYS Software

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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Key Words: ANSYS software, acceptance test plan, program execution, installation manuals, system modeling

Abstract: This plan governs the acceptance testing of the ANSYS software (Full Mechanical Release 5.5) for use on Project Hanford Management Contract (PHMC) computer systems (either UNIX or Microsoft Windows/NT). There are two phases to the acceptance testing covered by this test plan: program execution in accordance with the guidance provided in installation manuals; and ensuring results of the execution are consistent with the expected physical behavior of the system being modeled.

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1.0 INTRODUCTION

The ANSYS¹ computer program is a large-scale multi-purpose finite element program. The analysis capabilities of ANSYS program include the ability to solve static and dynamic structural analyses, steady-state and transient heat transfer problems, mode-frequency and buckling eigenvalue problems, and various types of field and coupled field applications.

Reference 1, Section 2.5 states that software acceptance shall be performed to an approved plan or process. This Acceptance Test Plan (ATP) is written to meet those requirements for the acceptance testing of ANSYS.TM

The vendor of the software is also known as ANSYS Incorporated. To reduce confusion in the balance of this document references to "the vendor" will be taken to mean ANSYS Inc., while references to ANSYSTM will mean the software product itself.

2.0 SCOPE

This plan governs the acceptance testing of the ANSYSTM software (Full Mechanical Release 5.5) for use on Project Hanford Management Contract (PHMC) computer systems (either UNIX² or Microsoft Windows³/NT). There are two phases to the acceptance testing covered by this test plan. The first phase deals with ensuring that the program executes in accordance with the guidance provided in the installation manuals; Reference 2 and Reference 3. The second phase will be focused on ensuring that the results of the execution are consistent with the expected physical behavior of the system being modeled. The problem set that will be the basis for that portion of the testing is supplied as a component of the software itself by the vendor.

3.0 ACCEPTANCE CRITERIA

3.1 Phase 1

The guidance provided in References 2 and 3 provides a section titled "Verifying the ANSYS Installation". Successful execution of the steps in this section on a particular computer system shall be cause for acceptance of the installation process on that particular computer system.

3.2 Phase 2

ANSYSTM includes a set of verification problems as part of the product. These include problems with adequate variability to challenge the full spectrum of capabilities that are possessed by ANSYSTM. Included in this set of documentation is the ratio of the ANSYSTM solution to the "true" solution. For more complex problems where several

¹ ANSYS is a trademark of Swanson Analysis Systems (SAS) IP, Inc. Corp.

² UNIX is a trademark of Unix Group, Inc.

³ Microsoft Windows is a trademark of the Microsoft Corp.

variables may be of interest this ratio may be included for each of the variables. The installation shall be deemed acceptable under any conditions if the ratio for these variables on the system being tested deviates from 1.0 by less than 3% i.e., (falls in the range of .97-1.03). If the deviation is greater than this but no more than twice the value that is published as part of the verification problem set documentation this shall also be unconditionally acceptable. This applies to all the variables for which a ratio is listed in the verification problem under consideration. Any cases that fall outside of these windows of acceptability will be evaluated on a case-by-case basis, and if accepted the rationale for accepting that case will be documented in the resulting test report.

4.0 FAILURE

Upon failure to meet the acceptance criteria for any of the tests above, either the errors that caused the failure shall be corrected and the test rerun, or the vendor shall be notified.

4.1 Error Correction

Reasonable efforts shall be made as part of the testing process to correct any failures due to *improper syntax, spelling, system configuration or similar user errors* prior to notifying the vendor that an error has occurred.

4.2 Suspension

There are no plans to suspend testing once it commences. If the software fails to meet the acceptance criteria and error correction is unsuccessful, then testing will be suspended until the vendor resolves the identified problem.

4.3 Resumption

Testing will resume after suspension upon *successful resolution of the problem* that initially caused the suspension.

5.0 REPORTS

The results of both installation testing and validation testing shall be included in a single test report. The computer on which the testing was performed will be identified in the report by the Hanford Property Control System Number (i.e., WD19137). That report shall be released through the Hanford Document Control System.

6.0 SCHEDULE

Installation Testing (Phase I) shall be performed at the time that the software is received and loaded on the system. Validation testing shall be done at any time after the successful conclusion of installation testing

7.0 REFERENCES

1. HNF-PRO-309, *Computer Software Quality Assurance Requirements*, Rev. 1, April 10, 2000
2. ANSYS Installation and Configuration Guide for Release 5.5.1 Windows NT Windows 95, 001152, October 1998.
3. ANSYS Installation and Configuration Guide for Release 5.5.1 Unix Platforms, 001151, October 1998.