­­ **Change History**

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Tiffany Gold Mine Environmental Management Reporting System Test Plan

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# Introduction

## Purpose

The purpose of this document is to describe the testing processes which are to be performed for the entire TiGERS software system. It describes the types of testing to be performed and lists the actual tests which will be performed with data to be input and expected results.

## Intended Audience

The document is aimed primarily at the project developers, and indeed, the test cases have been written by them, to enable them to have a full understanding of the functionality of the system and to ensure that a quality product is delivered to the end user. It also serves a secondary purpose as reassurance for the project sponsor that quality assurance is of the utmost importance and something the project team members take seriously.

## Test Plan Structure

Section 2 of the document describes the testing strategy adopted for the project. It describes the type of testing to be performed, areas where testing will be focussed, areas which will not be tested and reasons why, and justifications for these decisions.

Section 3 lists assumptions that have been made in the preparation of this test plan. Any constraints affecting the test plan are also documented here.

Section 4 lists the test cases which have been developed in order to test the system. The unit test cases have been derived directly from the use cases described in the System Requirements Specification document.

## Definitions, terms and acronyms

This section provides the definition of all terms required to properly interpret this document. It contains some terms that have a special meaning in this project.

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| Term | Definition |
| TiGERS | Tiffany Gold Mine Environmental Management Reporting System |
| Map | A visual representation of the mine site in form of an aerial photo. |
| Sampler | A generic term for an observation station that is set up at a specific sampling location to allow samples to be taken. |
| Sampling location | A geographical position at the Tiffany Gold Mine defined by a latitude/longitude pair and represented by a marker on a map at which a water sample is taken at a prescribed frequency. Samples can be taken above ground (creek, domestic water tank) and below ground (bore). |
| (Environmental) parameter | A numerical description of an observed property of the environment such as pH or EC. |
| (Screening) frequency | The period of time between sampling events which may vary from sampler to sampler and from parameter to parameter. Frequencies are divided into *screening frequency* (only some parameters are analysed) and *comprehensive screening frequency* (all parameters are analysed). The latter always occurs less often. |
| Screening program | An activity in which many pre-defined sampling locations are visited to retrieve samples that have to be analysed for a set of parameters at that time. |
| Sampling date | Date at which a water sample is taken for later analysis in a laboratory. |
| EC | Electrical conductivity measured in micro Siemens per centimetre (μS/cm), one of the many environmental parameters measured in a water sample indicative of salinity. |
| .kml | KML is a file format used to display geographic data in an Earth browser such as Google Earth, Google Maps |
| User Experience | Another term for Usability. Test of how easy or difficult it is for a user to use a system in order to achieve a particular goal. |
| DBA | Database Administrator. Person responsible for database setup and maintenance. |
| Unit testing | Testing for the behaviour of components of a product to ensure their correct behaviour. |
| Functionality testing | Validating an application conforms to its specifications and correctly performs all its required functions. |
| Requirements testing | Testing based on objectives derived from requirements for a software component. |
| Black-box testing | Testing without knowledge of the internal workings of the item being tested. |
| Performance testing | Performance testing is the process of determining the speed or effectiveness of a computer, network, software program or device. |
| Regression testing | Regression testing allows a consistent, repeatable validation of each new release of a product. |
| Stress testing | Testing conducted to evaluate a system or component at or beyond the limits of its specified requirements. |
| Recovery testing | Testing aimed at verifying the system's ability to recover from varying degrees of failure. |

## References and Applicable Documents

Dell Topel et al. System Requirements Specification. 19th May 2010. Print.

# Testing Strategy

## Type of testing to be performed

We will perform unit tests, functionality tests, and requirements tests to ensure that TiGERS behaves as the users and stakeholders expect. We will also perform user experience testing to ensure the application is easy for users to navigate and use as well as contribute positively to productivity.

Automated testing will cover the unit tests and much of the functionality tests. The testing paradigm which we will use extensively for automated tests is black-box testing. Manual testing will be more appropriate for some functionality tests and most requirements tests and all user experience tests because we can better simulate how users will interact with the application.

## Areas of testing to be focused

The tests will have a strong focus on data manipulation (add, update, delete) and data retrieval for all users of TiGERS. Data manipulation will be tested against various constraints related to the type of data being processed and the security policy associated with that data. Data retrieval will be tested against expected results both in terms of correctness of the data and appropriate organization of the data. We will perform brief manual tests for data manipulation and extensive automated tests.

There will also be a strong focus on functional areas of the application such as security and workflow. Security tests will be performed both manually and automatically while workflow testing will be done manually.

We will also test the email, map, and report generation components but the tests for these components will not be comprehensive because, although they are important to TiGERS, they are not essential (it is possible to perform the same functions through more traditional means such as phones, physical maps and other report software). Email, map and report system tests will be performed manually.

User experience tests will mainly focus on the user’s ability to quickly and accurately navigate the various pages associated with their authenticated role. There will also be testing focused on appropriate design which will allow users to be more productive by mitigating eye stress, keeping the users engaged through interactive elements, and limiting the number of actions necessary to perform a given task. User experience tests must be done manually to better simulate how users will interact with the application. We will pay close attention to visual, logical, and navigational design considerations.

## Areas which will not be tested

We will not perform regression, stress, or performance tests due to strict financial and time constraints. The risks associated with these tests are very low since the set of users contains employees of Tiffany Gold Mine and a select few external contracting organizations and their laboratories (each of which has only one employee interacting with the application).

We also will not perform recovery testing as it has been agreed with stakeholders that system recovery is not a requirement of the software.

## Justification of testing types and areas chosen

Unit tests have been chosen to ensure the correctness of code as it has been envisioned by the developer. It is especially important to unit test all classes and methods which manipulate data to minimize the possibility of data corruption and increase data integrity in the application and database layers. The reason we must give this area high importance is because the risk associated with incorrect data is very high—without proper testing of data integrity, the integrity of Tiffany Gold Mine may come under scrutiny in civil and/or criminal action.

Functionality tests ensure that logically related sections of code perform correctly as indicated by the Software Requirements Specification. After unit tests have passed, we must be confident that each unit can work with the others to provide a well-functioning system. This includes security of the system and a well-designed workflow for users of the system. Security testing is just as important as data manipulation testing (as mentioned above) but because of the high risk associated with malicious or unintentional corruption of data by users of the application as opposed to incorrect software design. Workflow testing is essential in allowing users to access any and all sections of the application which they are entitled to—the risk of poor workflow is poor performance leading to a poor ROI.

Requirements tests ensure that the application as a whole behaves correctly as indicated by the Software Requirements Specification and further meetings with stakeholders. If stakeholders do not agree that the application meets their requirements, they will not accept the version as-is and will expect development to continue lowering their ROI and increasing the time before release.

User experience testing ensures that the interface between users and the system optimizes productivity and minimizes user rejection. If users reject the software because of inadequate experiences, they will turn to more familiar tools which they believe are better to work with and only use TiGERS when absolutely necessary. This will decrease productivity and lower the ROI for the stakeholders.

# Assumptions and Constraints

## Assumptions

All testing will be carried out internally by members of the TiGERS project team.

## Constraints

Time is the biggest constraint affecting this project. Deadlines are fixed and consequently, testing will not be as comprehensive as it ought to be. That said, however, testing has been targeted so that a high quality end product will still be achieved.

The team has been told that there is no further access to the project sponsor. Therefore user acceptance testing cannot be performed and so no test cases have been developed for this.

Database security is handled by granting the correct privileges to the TiGERS application and to the system DBA. Tables will not be accessed directly by anybody other than the DBA.

# Test Cases