

**PLANTS**

**(PLANT ANALYTE AND FLOW TRACKING SYSTEM)**

TECHNICAL DOCUMENTATION

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# Definitions:

PLOP = Plant Operations

PLANTS = Plant Analyte and Flow Tracking System

CDN = Content Delivery Network

AJAX­ = Asynchronous Javascript and XML

CSS= Cascading Stylesheets

# Purpose

This document exists to provide a technical point of reference for the PLANTS System. It begins with useful definitions of terms and abbreviations followed by information on the programming languages used for developing the system. Technical justification is given for the choices of languages and libraries used to build the system.

# Disclaimer

The driving force for developing the PLANTS system was to find a suitable replacement for the existing PLOP system, which is soon to be decommissioned as it nears the end of its service/support lifecycle.

Development of the PLANTS system started as a proof-of-concept effort to develop an in-house software solution as opposed to purchasing costly software from a third party vendor.

Because the first PLANTS prototype was borne out of the need for a conceptual alternative to third party vendor solutions, the initial programming was approached from a functional/procedural point-of-view.

Having stated that, the PLANTS system will be upgraded and maintained going forward via sub versioning with modifications focused on separating the logic layer from the presentation layer.

# About the Development Technology

## Technological Overview

The PLANTS system’s core was written in the ColdFusion programming language (major version 11) hosted on a Windows Server 2008 R2 (ColdFusion server).

Supporting Technologies

Supporting technologies used in the development include the following:

1. Bootstrap CDN was utilized for certain aspects of styling the presentation layer.
2. CSS (Native) was used to customize parts of the application where it was necessary to style elements that did not fit the general layout of the system.
3. JQuery 1.12.1 was used for some of the front-end validation, especially when it was necessary to make asynchronous calls (i.e. AJAX calls) to the database to validate input without triggering a page refresh.

JQuery was also used incorporate things like the date picker functions in the data entry pages.

1. Javascript (Native) was used for validating front-end user input that did not require asynchronous database calls.
2. Chart.js 2.6.0 is an open-source javascript library that we configured and used to render the graphical representation of the data.
3. Oracle 12C Database ver. 12.1.0.1.0 was used for backend data storage.

Data Schemes

The PLANTS application consists of [number] main tables:

### PACKAGEPLANTANALYTES

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **COLUMN\_NAME** | **DATA\_TYPE** | **NULLABLE** | **COLUMN\_ID** | **COMMENTS** |
| PPA\_NUM | NUMBER(10,0) | No | 1 | (null) |
| ANALYTE\_NAME | VARCHAR2(10 BYTE) | No | 2 | (null) |
| COLLECTION\_DATE | DATE | No | 3 | (null) |
| UNITS | VARCHAR2(10 BYTE) | No | 4 | (null) |
| LOCATION | VARCHAR2(50 BYTE) | Yes | 5 | (null) |
| RESULTS | NUMBER(10,0) | Yes | 6 | (null) |
| COMMENTS | VARCHAR2(250 BYTE) | Yes | 7 | (null) |
| PLANT\_AREA\_NUM | NUMBER(5,2) | Yes | 8 | (null) |

### PO\_FLOW\_METER\_READINGS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **COLUMN\_NAME** | **DATA\_TYPE** | **NULLABLE** | **COLUMN\_ID** | **COMMENTS** |
| AREA\_RESERVOIR\_CD | VARCHAR2(7 BYTE) | No | 1 | FOREIGN KEY - Plant Area Number or Reservoir Code identifier, unique |
| MEASURED\_DT | DATE | No | 2 | Date reading was taken by operator, part of unique key |
| READING\_DESCRIPTOR\_CD | VARCHAR2(3 BYTE) | No | 3 | Type of recorded reading, part of unique key |
| FLOW\_PUMPAGE\_NUM | NUMBER(8,0) | No | 4 | NUMBERIC PK FOR (AREA\_RESERVOIR\_CD,READING\_DESCRIPTOR\_CD,MEASURED\_DT) |
| PUMP\_RESERVOIR | VARCHAR2(3 BYTE) | No | 5 | Designates a pump or reservoir super type of reading. |
| MEASUREMENT | NUMBER(6,3) | Yes | 6 | Reading in Million Gallons per Day (Read, measured, calculated, etc.) |
| CURRENT\_RESERVOIR\_LEVEL | NUMBER(5,2) | Yes | 7 | Measured reservoir level used for corresponding MGD calculation. |
|  |  |  |  |  |

### PO\_OPERATORS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **COLUMN\_NAME** | **DATA\_TYPE** | **NULLABLE** | **COLUMN\_ID** | **COMMENTS** |
| USER\_ID | NUMBER(4,0) | No | 1 | Assigned to operator as an oracle user\_id |
| USER\_NAME | VARCHAR2(30 BYTE) | No | 2 | Assigned to operator along with oracle user id. |
| PLANT\_CD | VARCHAR2(4 BYTE) | No | 3 | FOREIGN KEY designating what plant the user works at. |

### PO\_RAINFALL\_READINGS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **COLUMN\_NAME** | **DATA\_TYPE** | **NULLABLE** | **COLUMN\_ID** | **COMMENTS** |
| RAINFALL\_READING\_NUM | NUMBER(8,0) | No | 1 | NUMERIC PRIMARY KEY FOR (READING\_DATE,PLANT\_CD) |
| READING\_DATE | DATE | No | 2 | Date of measured rainfall for respective plant |
| PLANT\_CD | VARCHAR2(4 BYTE) | No | 3 | Plant where rainfall occurred. |
| MEASUREMENT | NUMBER(4,2) | Yes | 4 | Reading of rainfall in inches. |
| READING\_COMMENTS | VARCHAR2(80 BYTE) | Yes | 5 | Comments about rainfall reading like TRACE when not measureable inches |

### PO\_READING\_DESCRIPTORS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **COLUMN\_NAME** | **DATA\_TYPE** | **NULLABLE** | **COLUMN\_ID** | **COMMENTS** |
| READING\_DESCRIPTOR\_CD | VARCHAR2(3 BYTE) | No | 1 | Type of reading as in daily, hourly, max, min, etc. |
| DESCRIPTOR\_MEANING | VARCHAR2(30 BYTE) | Yes | 2 | Description of the respective reading type. |