APPROVAL SHEET

DEVELOPING ENVIRONMENTAL MODEL INTEGRATING GIS WITH DCS SYSTEMS FOR MONITORING AND CONTROL

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صفحة الموافقة علي الرسالة

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رسالة مقدمة من الطالب

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لاستكمال متطلبات الحصول علي درجة دكتوراه فلسفة

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ABSTRACT

The key structure in connection real-time and geo-spatial database via Open Database Connectivity drivers (ODBC) for analysis events into real time manner, is transmission between distributed systems. The overload of unacceptable levels of industrial pollutions imposes system engineers to control operation remotely through network connection system. This emerges LAN/WAN technology to exchange multimedia type (e.g. data, audio, and video) and reform virtual applications in industrial operations to predict faults. This rank-way transmission system optimizes response time, storage volume and system structure to permit multi-levels user environment. The capability of manipulation spatial and numerical analysis of large-data sets encourage integration of (GIS) with environmental model to correlate datasets and state maps. These maps reflect operations related to production rate, facility inventory and manipulate power distribution in contrast to developing issues. In other ward, integration supervisory control and data acquisition (SCADA) assist operators in monitoring electronic devices for real-time management system.

SUMMARY

This study has investigated accidental oxides emission in different fail-safe operations with environmental model. The model has a forward transmission technology from different sources to predict levels of pollutions that influence services and hence, sustainable development. The objective of study is to use a methodology in the analysis of accidental release and describe variations corresponding to environmental conditions in case of operational failure or system malfunction at plant. In order to gain the most stringent productivity of model, open processing is proposed for object technology. The configuration of GIS-SCADA connection has taken into consideration three stages during design and implementation of basic discipline:

- The basic figure of data integration through JDBC-ODBC connection to estimate the failure rate by usage of FMEA.
- The air emission with relevant Gaussian plume model to perform analysis with parametric formulas:
  - Pasquill-Gifford
  - Hosker Graph
  - Equation of Continuity, and
  - The Energy Equation

- The web technology has turned into the most important resources to exchange information between layers, perform query based structure and operations depending on service-oriented architecture.

This concept is organized to evaluate methods and techniques in chapters;

In the 1st chapter, system engineering and requirement are suite technical survey of SCADA and GIS system preparation. The system communication with distributed network services, are described for motivation operations and monitor environment conditions. These objectives are mentioned to point's stage activities with expected boundaries and limitations that scale the study. The basic figure of industrial facility is aggregated material, for controlling criticality analysis and traced model baseline for management system.

In the 2nd chapter, system architecture of SCADA with distributed based functions, is mentioned in term of model elements. The geospatial data sets are discussed to detail GIS system in spatial forms as model structure. These are grouped in module structure to analyses data and integrate different sources in central catalogue contain physical properties of object. The object oriented database, is declared query strategy interaction with functions and physical entities in relational classes. Detail object variables are defined in hierarchy structure with patterns of algebra expressions. The mathematic model, is simplified in query construct step line-tree structure,

or associate in lattice form structure. The concept of JDBC connection with drivers in java programming package, is explored to specify data source and parameters to control data access, security in layers exchange data forms.

In the 3rd chapter, data collection and verification is manipulated at northern coast locations to demonstrate environmental conditions. Air temperature, pressure variations, and wind speed during annual means, are observed to describe variations in case of oxides emission. The data transmission is discussed in case of delay or loss. These have primarily concern in SCADA while abandon in GIS because of object extension relation. The algorithm security with flags to base dynamic tracking is achieved in model verification. Layers exchange in different forms and code is developed in client/server architect model. In the context, the network technology and web services based applications are indicated for transferring data of faults for analysis consequences before chemical releases at different conditions. Message transfer model is indicated for object oriented programming to exchange data layers into different forms and standard. The communication with different code will browse different application.

In the 4th chapter, profile power facility and breakdown critical operations in main stages are manipulated combined cycle system to investigate emission and release from mechanical failures. The main operations are classified according to criticality analysis of failure mode and effect

analysis (FEMA). This method is determined to control process, or eliminate contamination process from relevant electro-mechanical devices. The analysis of system faults has assessed critical operations with a composite model relevant to Gaussian dispersion. This model is developed to predict the dispersion of oxides emission in ambient area. Where, spatial proximity analysis, is used to calculate distance in urban and rural area which influenced dispersion behaviors. The comparison reflects elevation effects in urban area which increases levels of concentration in vicinity areas. The model is investigated system at operational conditions to indicate that:

1. Currently, quantification assessment techniques are limited with their associated operations in delivery points of defects to discern before failure. The equipment damages contribute in increasing losses, while the outrages losses are relatively small. The future application is propagated to analysis environmental aspect through regulation limits to control system. Other efforts are tent to maintenance and inspection critical operations that quantify impact of failure in production stage for modeling process in term of strategic handling.

2. This is incumbent upon all expert practitioners, to properly limit the expectation of 'layperson' users of such integration. Once executives are appreciating data quality, their decisions will largely explore models benefits in analysis results, with interconnection social concerns and overcome limitations

relevant to communication technology in least possible failure-safe criticality mode. These provide a computational infrastructure for multi-level user environment, or research application issues for development decision. While, access large integral geospatial data is set for management information and control disseminated operation in different institutions.

3. The proposed methodology would be a valuable tool to system planner to determine levels of SCADA transmission, system reliability, and exchange drivers within method specify system reliability, for control transmission between stations. The model determines, whether dispersion or release practices use repository data of operations in analysis faults from historical record and specify location for appropriate actions.

4. The model reflects the elevation effects in urban areas and illustrates the dispersion behavior of the plume in contrast to open terrain.

CONTENTS

LIST OF TABLES