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An Information Management System for a Spent Nuclear Fuel Interim Storage Facility

Karl Horak, Todd Giles, Hongnian Jow, Robert Finch, Hsien-Lang Chiu
Sandia National Laboratories, Albuquerque, New Mexico, USA
Taiwan Power Company, Taipei, ROC

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Interim Storage of Spent Nuclear Fuel

- **Expansion of nuclear energy**
- **Operating-life extensions for Nuclear Power Plants**
- **On-site Spent Nuclear Fuel storage pools nearing capacity**
- **No permanent geological disposal site**

- ✓ **Interim dry storage provides cost-effective, safe and secure spent-fuel management**
  - **Monitors & Sensor data**

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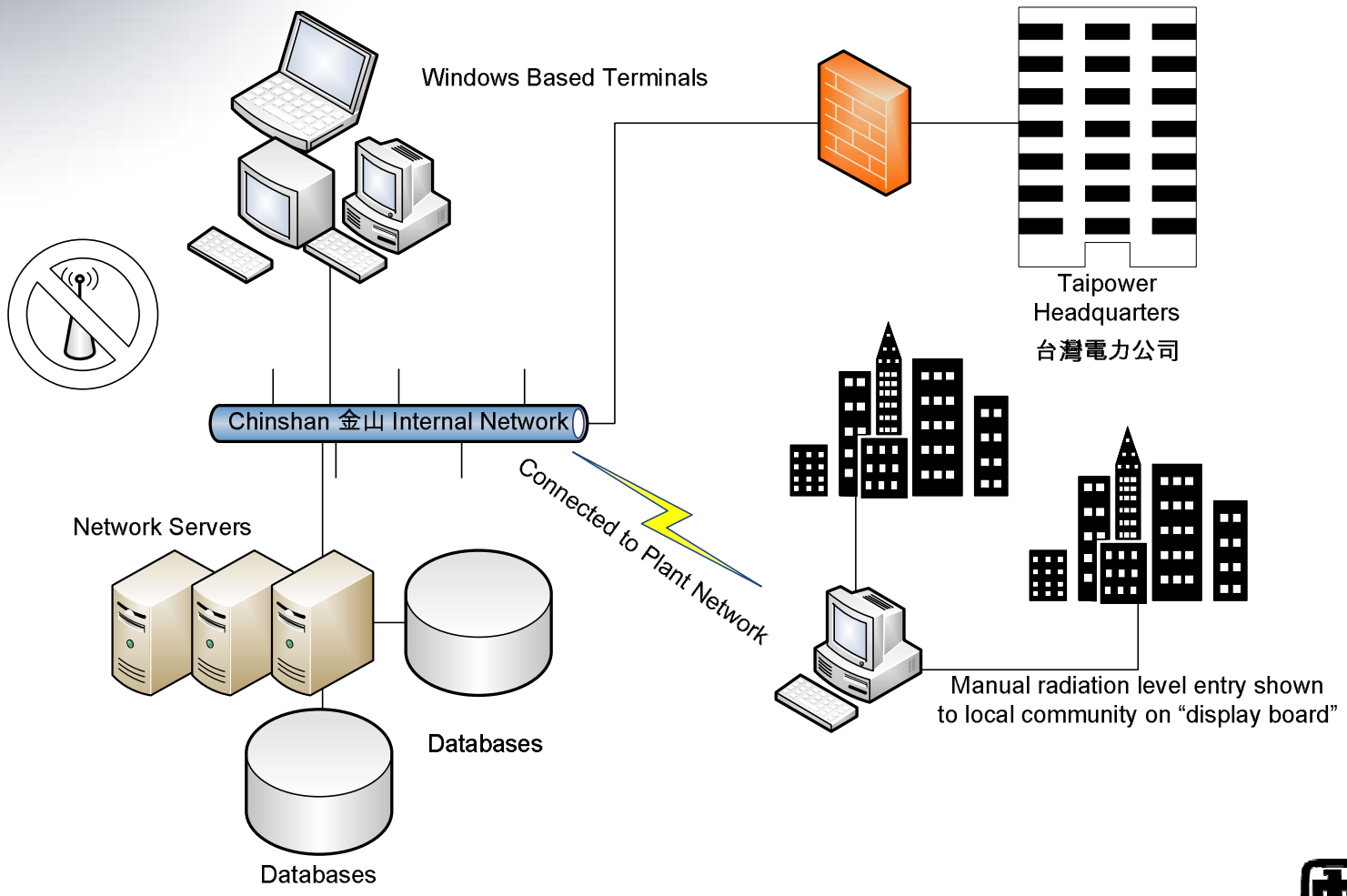
Efficient Monitoring & Information Management Stakeholder Support

- **Stakeholder support**
  - **Public confidence for safe operations**
    - **Public concern about safety, security, and environment**
- **Efficient and cost-effective operations**
  - **Reduce operator burden**
    - **National & international regulatory requirements and obligations**
- **Safety, Security, IAEA Safeguards**
  - **Monitors & Sensors⇨Information management**
    - **Data collection, dissemination, & analysis**

Current Plan for a Monitoring System at Chinshan Interim Dry Storage Facility

- **Radiation Monitoring**
  - Signal sent to **HP (Health Physics) Control Station** in Reactor Unit 1
- **Temperature Difference Monitoring**
  - Signal sent to **LLW (Low-Level Waste) Warehouse Monitoring Center**
- **Security Monitoring**
  - Signal sent to **Security Monitoring Center**

Current Chinshan internal network architecture



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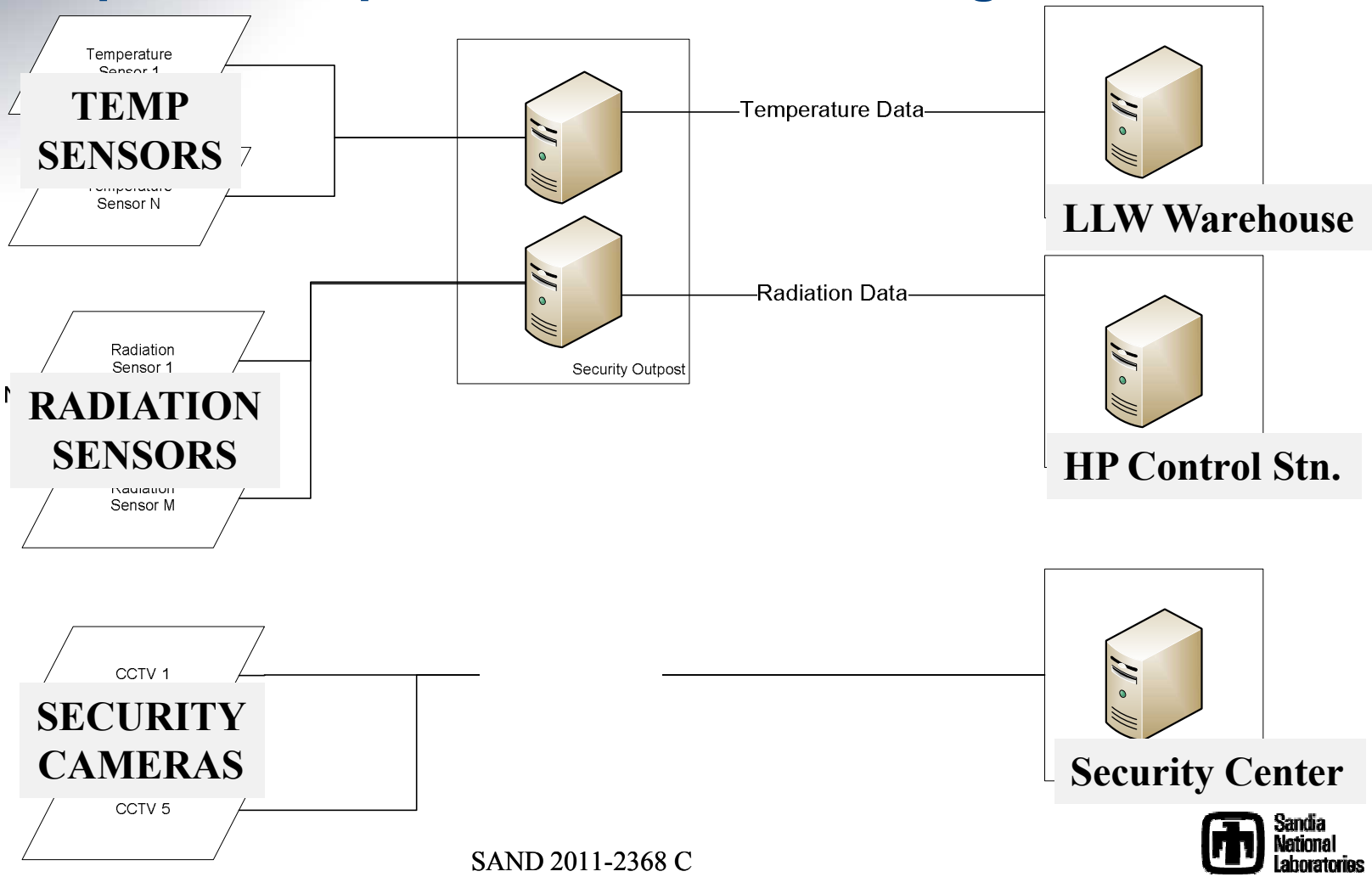
Current design of data flows for the Chinshan Independent Spent Nuclear Fuel Storage Installation



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An Integrated Monitoring and Information-Management System

Manage information from the facility's monitoring tools that *also* provides appropriate information to stakeholders

- **Information access …**
  - **Operations are conforming to stakeholder needs**
  - **Critical system requirements are being met**
  - **Major functions and technologies have been implemented**
- ***AND facilitate optimum operations***

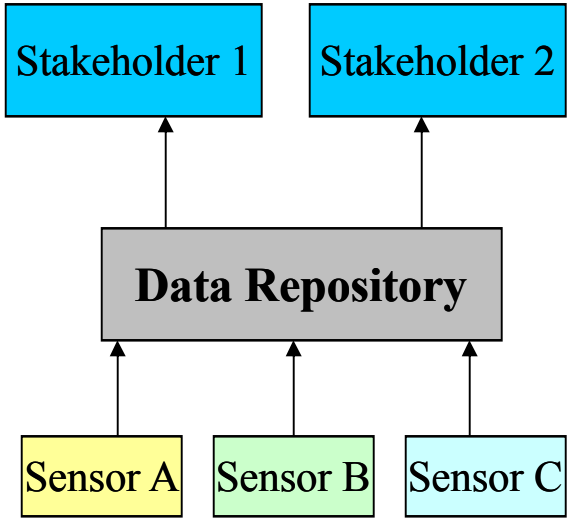
General Approach

- **Develop an integrated approach to facility monitoring**
  - **Full assessment of data needs & constraints;**
  - **Avoid redundancies;**
  - **Employ multiple-use sensors**
- **Include facility monitoring tools and approach in initial design**
  - **Maximize use of existing design for sensor data;**
  - **Limit need to refit facility;**
  - **Minimize conflicts;**
  - **Ensure data authenticity & security**
- **Single data management repository for all facility information**
- **Develop secure access to defined data streams**

Understanding stakeholder needs early and designing-in an integrated approach to monitoring can significantly reduce costs and increase operational efficiencies.

An Integrated Monitoring and Information Management System Concept

- **An integrated monitoring and information-management system provides:**
  - **A single, integrated data source**
    - **Optimize facility operation & reduce operator burden**
  - **Managed access to information**
    - **build stakeholder support & confidence**



Critical Elements of an Integrated Approach

Data security is critical to each component

- ***Acquisition*** **of key facility information**
- ***Authentication*** **of acquired data**
- ***Aggregation*** **of multiple, data streams by using advanced information systems**
- ***Analysis*** **of acquired data by using innovative statistical evaluations**
  - **Meaningful, reliable, and transparent conclusions**
- ***Access*** **to data and data analyses in a secure, managed environment**
  - **Allow multiple stakeholders remote access to appropriate information**

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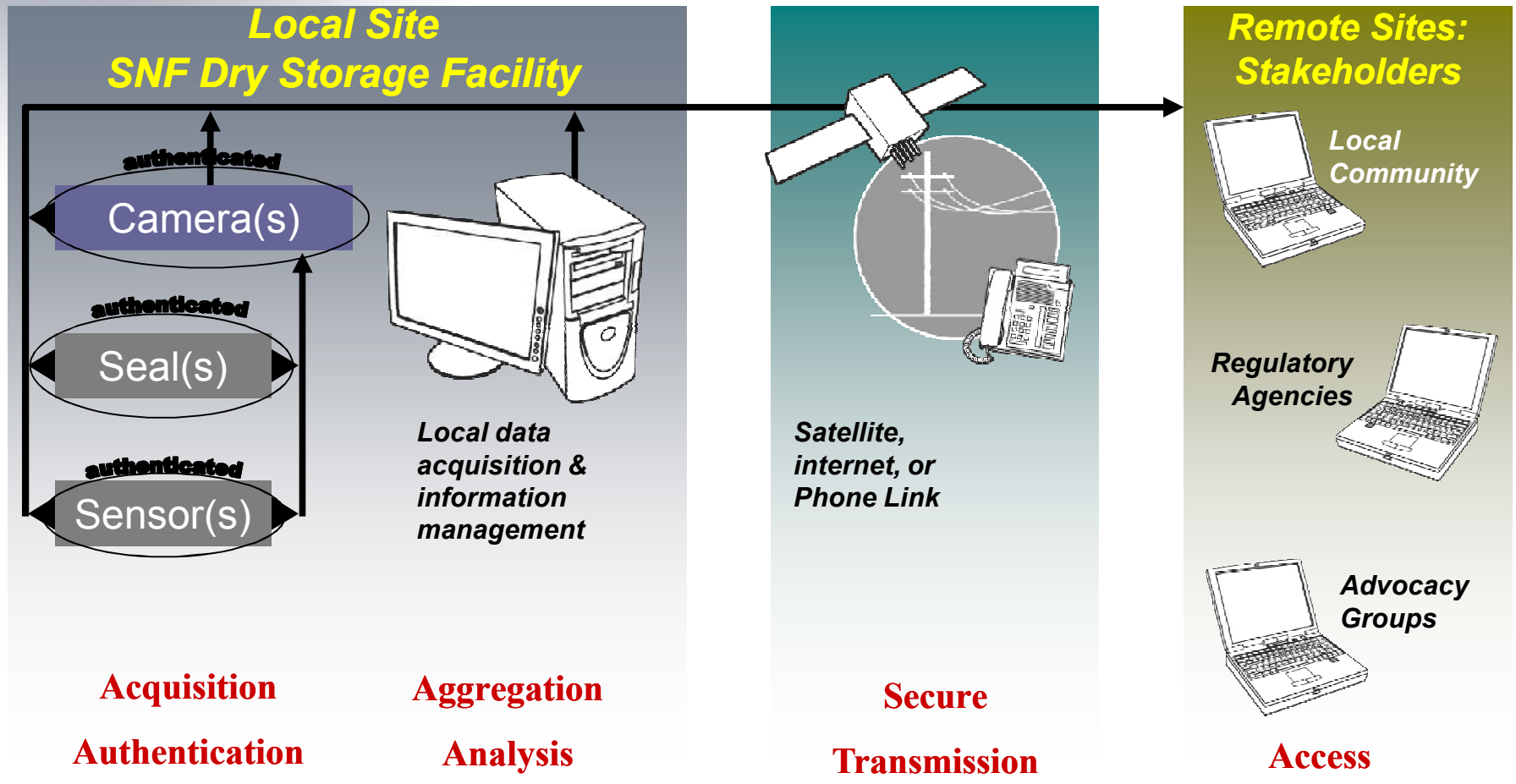
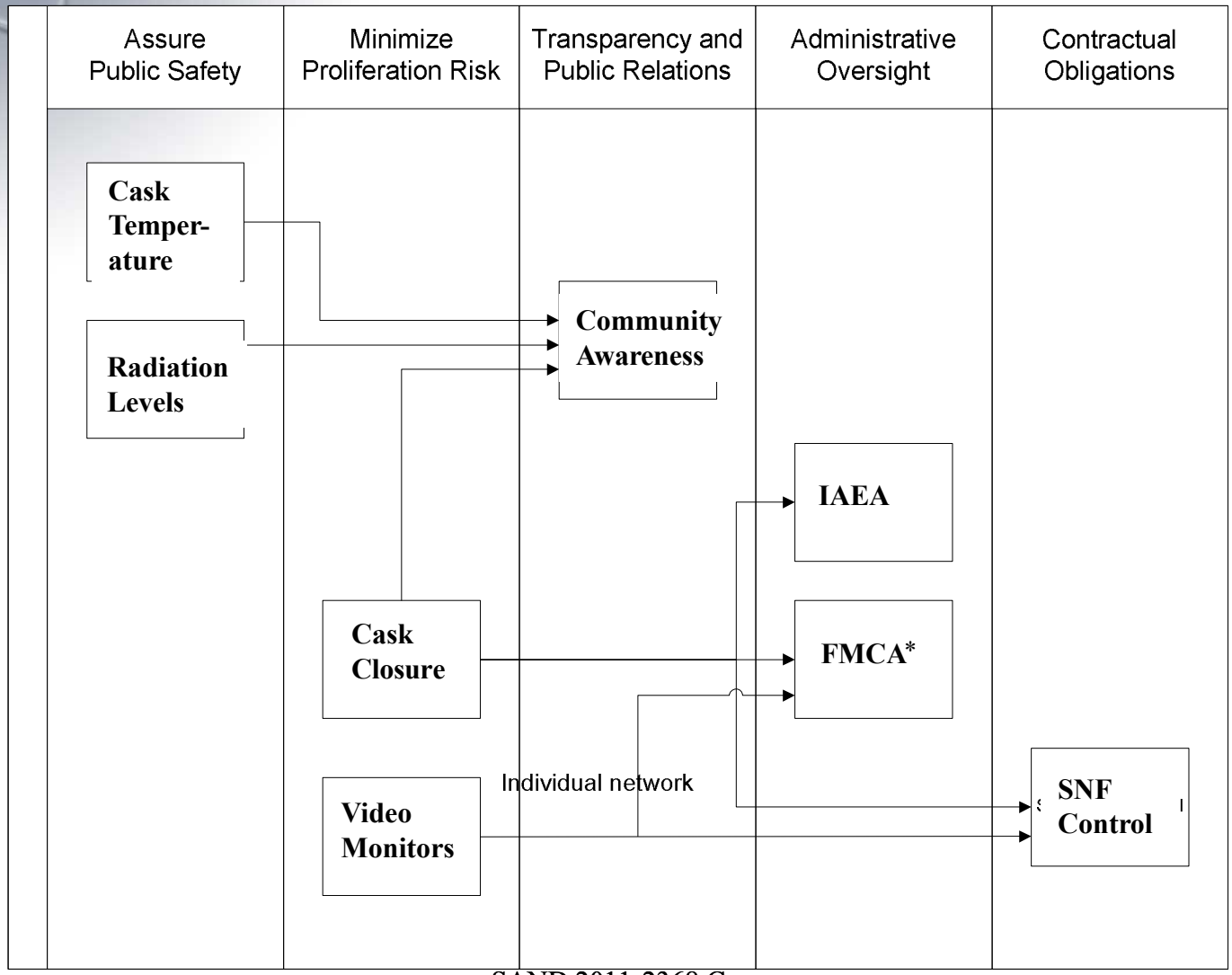
Remote Data Monitoring and Communication



Functional process relationships for Chinshan ISFSI



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* Fuel Cycle Materials Administration

Information-Management System Benefits to FCMA

- **Enhance Transparency**
  - **Licensing and operational phases**
  - **Enhance Public Acceptance**
    - **Streamline future facility licensing and construction**
- **Efficient Information Management**
  - **Operational safety, security, and safeguards**
  - **Remote access to appropriate information**
- **Adaptability & Flexibility**
  - **Future changes/requirements/regulations**
  - **New technologies**
- **Integrated data analysis**

Information Management System Benefits to TaiPower

- **Cost effectiveness**
  - **More efficient data management**
  - **Improved operational efficiency**
    - **Increase security with reduced burden and personnel costs**
  - **Integrated safety, security and safeguards systems**
    - **Reduce redundancies through multiple-use sensors**
- **Future facility acceptance through transparency**
  - **Streamlined approval process means reduced cost**
  - **Potential to significantly *reduce* –**
    - **Litigation costs**
    - **Construction delays**
- **Adaptability & Flexibility**
  - **Future changes/requirements/regulations**
  - **New technologies**
- **Integrated data analysis**

Summary

- **EXTENDABILITY**
  - **The system must be capable of being extended to new, different, and/or more numerous sensors.**
- **INTEGRATED DATA WAREHOUSE**
  - **All data streams originating in the ISFSI will be consolidated into a single database.**
  - **Stakeholders such as Taipower Headquarters, AEC, FCMA, and the IAEA will have access to information based on need-to-know and predetermined permissions.**
  - **The integrated data warehouse will store all incoming data streams in a Relational Database Management System (RDBMS).**
- **USER INTERFACE REQUIREMENTS**
  - **Existing display interfaces will be used for facility users in Health Physics, Security, and Operations. Browser-based interfaces may be created as needed and will be specified by Taipower or other stakeholders**

Acknowledgements

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