Green Irrigation Management System (GIMS)
Phase II: Business Process Modeling

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1 Business Process Model (BPMN)

The following Business Process Model and Notation (BPMN) diagram outlines the automated transaction lifecycle for the Green Irrigation Management System (GIMS). The process begins with an irrigation requirement and ends with data logging, forming the basis for the PL/SQL automation.

BPMN Diagram: Automated Irrigation Session Management

2 Process Scope and Documentation

2.1 Scope and Objectives

- **Process Scope:** The model describes the **Automated Water Allocation and Monitoring** lifecycle, specifically the initiation, validation, execution, and termination of a single irrigation event.

- **MIS Relevance:** This process is highly relevant to MIS as it involves **automated transaction proc** (logging sessions) and **control mechanisms** (checking pump availability) which are implemented using PL/SQL stored procedures and functions.

- **Key Objective:** To minimize resource wastage (water and energy) by ensuring irrigation occurs only when needed and equipment is operational.

2.2 Key Entities and Swimlanes

The BPMN uses three swimlanes to clearly delineate responsibilities and system boundaries.
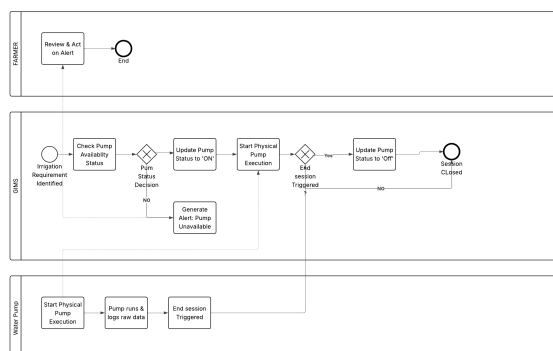
- **Farmer / User:** Responsible for manual input (e.g., override requests) and responding to system-generated alerts.

- **GIMS (PL/SQL System):** The **core decision engine**. Responsible for validation checks (e.g., "Pump Status = 'OFF'?" Gateway), transaction logging, and calculation of final metrics.

- **Water Pump / Sensor:** The physical layer. Responsible for executing commands and providing **raw sensor data** (e.g., flow rate, run time) back to the GIMS.

2.3 MIS Functions and Organizational Impact

- **PL/SQL Functions Used:** The process is driven by PL/SQL logic:

  1. The **Check Pump Availability Status** activity utilizes the **IS_PUMP_AVAILABLE** function for validation.

  2. The **Update Pump Status to 'ON'** activity is part of the **START_IRRIGATION_SESSI** procedure (**Transaction Processing**).

  3. The **Execute END_SESSION Procedure** activity is part of the **END_IRRIGATION_SE** procedure (**Calculation and Logging**).

- **Organizational Impact:** Automation reduces manual labor and improves financial efficiency by ensuring precise water use. The **clear handoff points** (Message Flows) reduce human error.

2.4 Analytics Opportunities

The successful completion of this process generates crucial data for Business Intelligence (BI):

- **Fact Table Data:** The process directly populates the central **IRRIGATION_SESSION** fact table with quantifiable metrics: WATER_CONSUMED_L and ENERGY_USED_KWH.

- **KPIs:** The logged data allows for calculating KPIs like **Water Usage Efficiency Ratio** (Water Consumed/Acreage) and **Pump Utilization Rate**.