**Summary of Results for Phase Overrun Predictions in Production Tanks:**

**Tank Details: 22 MT**

* **Capacity of Tank:** 22 MT
* **No. of Batches:** 20
* **Interpretability of the Model:** The Random Forest Regressor provides a robust method of interpreting relationships between the feature variables and the target, especially given its ensemble nature. However, the LSTM Neural Network, being a deep learning model, does not provide intuitive interpretations.
  + **Overall Phase:** Best Model - Random Forest Regressor; Least Effective Model - LSTM Neural Network
  + **Deaeration Phase:** Best Model - Linear Regression; Least Effective Model - LSTM Neural Network
  + **Agitation Phase:** Best Model - Decision Tree Regressor; Least Effective Model - Dense Neural Network (FCN)
  + **Gum Addition Phase:** Best Model - Linear Regression; Least Effective Model - Simple Neural Network

**Tank Details: 23 MT**

* **Capacity of Tank:** 23 MT
* **No. of Batches:** 20
* **Interpretability of the Model:** Gradient Boosting Regressor is an ensemble model which offers some level of interpretation, albeit less transparent than simpler models like Linear Regression. The K-Nearest Neighbors (KNN) model is non-parametric and may not give intuitive interpretations.
  + **Overall Phase:** Best Model - Gradient Boosting Regressor; Least Effective Model - K-Nearest Neighbors (KNN)
  + **Deaeration Phase:** Best Model - Gradient Boosting Regressor; Least Effective Model - K-Nearest Neighbors (KNN)
  + **Agitation Phase:** Best Model - Linear Regression; Least Effective Model - Lasso Regression
  + **Gum Addition Phase:** Best Model - Random Forest Regressor; Least Effective Model - Lasso Regression

**Tank Details: 25 MT 4**

* **Capacity of Tank:** 25 MT 4
* **No. of Batches:** 4
* **Interpretability of the Model:** Again, while the Random Forest Regressor allows for a degree of interpretation due to its tree-based approach, the LSTM Neural Network remains difficult to interpret.
  + **Overall Phase:** Best Model - Random Forest Regressor; Least Effective Model - LSTM Neural Network
  + **Deaeration Phase:** Best Model - Gradient Boosting Regressor; Least Effective Model - LSTM Neural Network
  + **Agitation Phase:** Best Model - Linear Regression; Least Effective Model - K-Nearest Neighbors (KNN)
  + **Gum Addition Phase:** Best Model - Linear Regression; Least Effective Model - LSTM Neural Network

**Tank Details: 25 MT 10**

* **Capacity of Tank:** 25 MT 10
* **No. of Batches:** 10
* **Interpretability of the Model:** Gradient Boosting Regressor provides a moderately interpretable solution, though not as straightforward as Linear Regression. LSTM Neural Networks, however, consistently show up as the least effective model in terms of interpretability.
  + **Overall Phase:** Best Model - Gradient Boosting Regressor; Least Effective Model - LSTM Neural Network
  + **Deaeration Phase:** Best Model - Gradient Boosting Regressor; Least Effective Model - LSTM Neural Network
  + **Agitation Phase:** Best Model - Gradient Boosting Regressor; Least Effective Model - Lasso Regression
  + **Gum Addition Phase:** Best Model - Linear Regression; Least Effective Model - LSTM Neural Network

**Tank Details: 26 MT**

* **Capacity of Tank:** 26 MT (1400kg)
* **No. of Batches:** Not specified
* **Interpretability of the Model:** Linear Regression provides the most interpretable relationships due to its parametric nature. However, the LSTM Neural Network appears to be consistently challenging in terms of understanding its predictive power.
  + **Overall Phase:** Best Model - Linear Regression; Least Effective Model - LSTM Neural Network
  + **Deaeration Phase:** Best Model - Linear Regression; Least Effective Model - LSTM Neural Network
  + **Agitation Phase:** Best Model - Gradient Boosting Regressor; Least Effective Model - LSTM Neural Network
  + **Gum Addition Phase:** Best Model - Gradient Boosting Regressor; Least Effective Model - LSTM Neural Network

In conclusion, while ensemble methods and linear regressions are providing significant performance in predicting phase overruns across the tanks, deep learning models like LSTM Neural Network consistently appear less effective and harder to interpret in this specific scenario.