

# ORNL Status and Plans for Russian Pulsating Mixer Pump

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# Pulsating Mixer Pump

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- PMP unit #1 received on November 1, 1999
- Float for PMP received in January 2000
- PMP installed in Cold Test Facility in January 2000
- Remaining units and components to be delivered

# Tank Riser Interface

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- TRI and DSR received from Battelle Inc. on October 21, 1999 and installed at Cold Test Facility
- PMP mounted in TRI on January 21, 2000

# Decontamination Spray Ring

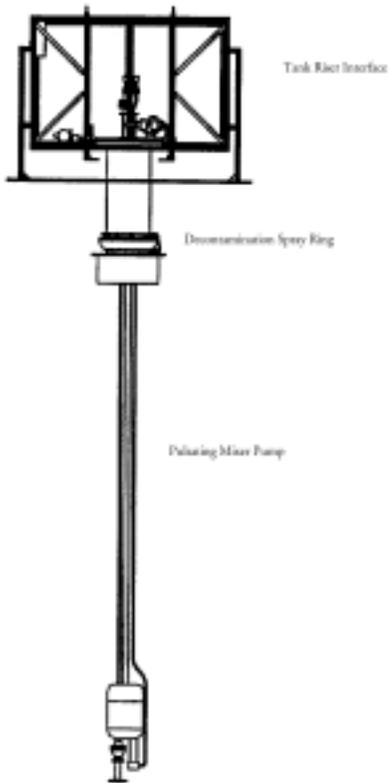
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- DSR received with TRI from Battelle Inc. on October 21, 1999
- Low pressure (100 psi) – high flow (2.5 gal/min) nozzles installed in January 2000

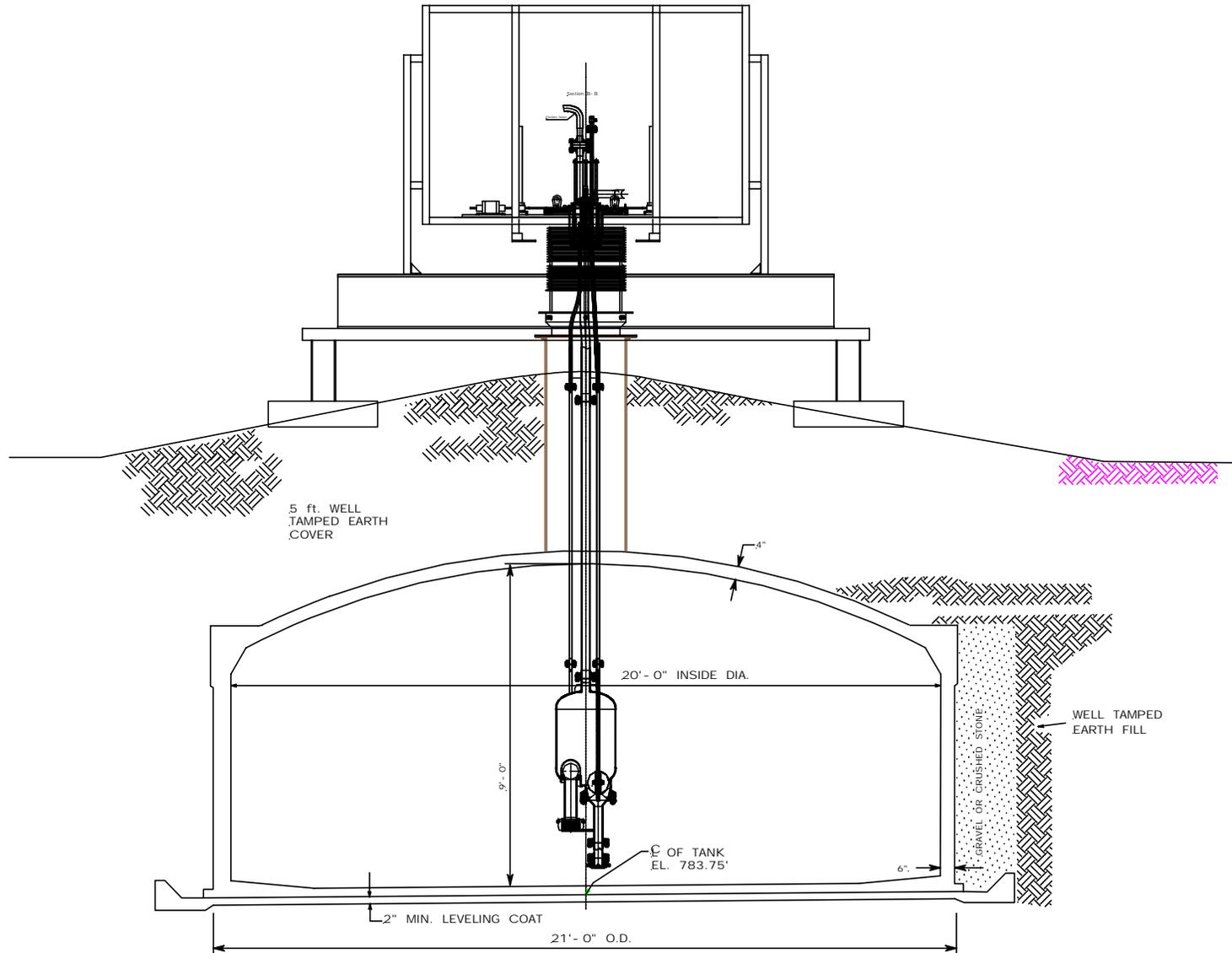
# Transport Cradle

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- Designed and fabricated by Battelle Inc. to transport PMP and TRI
- Delivered to ORNL February 18, 2000

# PMP at GAAT TH-4



# Status

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- Deviation from US Codes and Standards
  - Approved for fabrication on July 27, 1999
  - Requires internal approval of deviations from known noncompliance items to proceed with cold testing
  - Requires successful completion of cold testing and readiness assessment to proceed with hot deployment
- Safety documentation preparation and review – **Completed for cold testing**
- Initial Test facility preparation – **Completed**
- Quality Engineering and Inspection (QE&I) department evaluation of PMP unit #1 – **In progress**

# Status and Plans

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- Technical evaluation and internal approval to proceed with cold testing – **In progress**
- Test plan – **Under review**
- Initial cold testing – **Awaiting internal approval to proceed**
  - Functionality tests
  - Performance tests
- QE&I of remaining PMPs
- Cold test remaining units after internal approvals

# Status and Plans

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- Site preparation – **In progress**
  - Piping
  - Utilities and services
  - Riser installation
  - Platform and footers
- Readiness assessment prior to deployment in Gunitite & Associated Tank (GAAT) TH-4
- Deployment at GAAT TH-4 – **May/June 2000**
- Demobilize system

# Quality Engineering & Inspection

## Department Evaluation – PMP Unit #1

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- Ultrasonic examination of Pressure Vessel welds – **Complete**
- Documentation review – **In progress**
- Visual inspection – **Complete**
- Review of MCC supplied radiographs – **Complete**
- Hydrostatic testing to ~345 psi – **Complete**
- Boiler and pressure vessel code calculations – **Complete**

# Planned Functionality Tests

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- TRI operation
  - Height adjustment and system stability
- DSR operation
- Valves, actuators, sensors, and control system
- Support fixtures – Hoisting and Rigging
  - Transport cradle
  - PMP
  - PMP and TRI
- Contamination Control
  - Bag out and interaction with transport cradle

# Planned Performance Tests

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- DSR test
  - Use PMP mock-up of pipe section
  - Simulant
    - Kaolin clay
    - Wet
    - Dry
  - Use TRI drive table to pull PMP and/or PMP stand-in through DSR
  - Sludge simulant removal effectiveness

# Planned Performance Tests

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- PMP debris tolerance
  - Debris: Plastic bags, rubber gloves, rope, tie wraps, wire, and tape
  - Operating conditions:
    - Air supply pressure – 90 psi
    - Pulse frequency – 2/min
    - Rotation angle – 0 degree
  - Effect of debris on PMP operation

# Planned Performance Tests

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- PMP water only tests
  - Operating conditions
    - 4 ft depth in test pit
    - Air supply pressure – 90, 45, and 150 psi
    - Pulse frequency – 2/min, 4/min
    - Rotation angle – 0 and 90 degrees
  - Observation of system performance
  - Operator familiarization

# Planned Performance Tests

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- PMP sludge surrogate displacement tests
  - Off-set sand pile
  - Off-set sand, clay, gravel pile
  - In-line sand, clay, gravel pile
  - Assess ability to mobilize sludge surrogate pile

# Planned Performance Tests

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- PMP cleaning radius tests
  - Multiple nozzle sizes, 12, 14, and 16 mm
  - Surrogate: 2 in layer of sand
  - Operating conditions:
    - Air supply pressure – 90 psi
    - Pulse frequency – 2/min
    - Rotation angle – 0 degree
  - Maximum cleaning radius
    - Include rotation angle of 90 degree

# Summary of Issues

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- Delivery schedule
  - Remaining PMPs, valves, control system, and hoses
  - Transport cradle
- Weld radiography
- Acceptance tests for remaining system components