**ENVIRONMENTAL
MANAGEMENT**

**Addendum to Engineering Evaluation of
the Proposed Alternative Salt Transfer
Method for the Molten Salt Reactor
Experiment
Oak Ridge National Laboratory
Oak Ridge, Tennessee**

BECHTEL JACOBS COMPANY LLC
OAK RIDGE ENVIRONMENTAL
MANAGEMENT CLEANUP CONTRACT
WITH THE UNITED STATES
DEPARTMENT OF ENERGY

**Addendum to Engineering Evaluation of the Proposed
Alternative Salt Transfer Method for the
Molten Salt Reactor Experiment
Oak Ridge National Laboratory
Oak Ridge, Tennessee**

Date Issued—October 2009

Prepared for the
U.S. Department of Energy
Office of Environmental Management

BECHTEL JACOBS COMPANY LLC
managing the
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East Tennessee Technology Park
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APPROVALS

Addendum to Engineering Evaluation of the Proposed Alternative Salt Transfer Method for the Molten Salt Reactor Experiment Oak Ridge National Laboratory Oak Ridge, Tennessee	BJC/OR-3301/A1
	October 2009

***USQD Review
Determination***

☒ USQD ☐ UCD ☐ CAT X ☐ Exempt (Select Criteria below.)
 USQD/UCD/CAT X No.: PSW-OR-7503-0178 Rev. 0

Exemption Criteria

- ☐ (1) Non-Intent Change
☐ (2) DOE-Approved Document
☐ (3) Clearly no impact on Nuclear Facilities
☐ (4) Chief Financial Officer, Internal Audit, Labor Relations, Legal, Public Affairs, or Project Controls Organization Document

USQD Preparer:

Signature on File
 Ron Travis, USQD Preparer

Oct. 26, 2009
 Date

***Exhibit L
Mandatory Contractor
Document***

☒ No
☐ Yes (Requires review by the Proforma Change Control Board.)

PCCB Reviewer:

Not Applicable
 Name

Date

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ACRONYMS AND INITIALISMS

FDT	Fuel Drain Tank
DOE	U.S. Department of Energy
FDT	Fuel Drain Tank
FFT	Fuel Flush Tank
FTIR	Fourier Transform InfraRed
MSRE	Molten Salt Reactor Experiment
ORNL	Oak Ridge National Laboratory
RGRS	Reactive Gas Removal System
PT	Pressure Transmitter
TE	Temperature Element

1. PURPOSE

The purpose of this addendum is to graphically publish data which indicate moisture inleakage and corrosion may have occurred during heating of the tanks at the Molten Salt Reactor Experiment (MSRE) for and during hydrofluorination, fluorination and transfer of uranium. Corrosion, especially by hydrofluoric acid, is not expected to occur uniformly over the tank and piping inner surfaces and therefore is not easily measured by nondestructive techniques that can measure only limited areas. The rate of corrosion exponentially escalates with both temperature and moisture. The temperature, pressure, and concentration data in this addendum indicate periods when elevated corrosion rates were likely to have been experienced. This data was not available in time to be considered as part of the evaluation that was the focus of the report. Pressure and temperature data were acquired via the LabViewTM Software, while concentration data was acquired from the Fourier Transform InfraRed (FTIR) system.

2. GRAPHICAL PRESENTATION OF FUEL DRAIN TANK 1 DATA

Fuel Drain Tank 1

Temperature
Carbon Dioxide
Molybdenum Hexafluoride
Hydrogen Fluoride
Pressure

FDT-1 Temperature

FDT-1 Temperature

FDT-1 Temperature

FDT-1 CO2(PPM)

FDT-1 MoF6(PPM)

FDT-1 HF(PPM)

FDT-1 CO2(PPM)

FDT-1 MoF6(PPM)

FDT-1 HF(PPM)

FDT-1 CO2(PPM)

FDT-1 MoF6(PPM)

FDT-1 HF(PPM)

FDT-1 CO2(PPM)

FDT-1 MoF6(PPM)

FDT-1 CO2(PPM)

FDT-1 MoF6(PPM)

FDT-1 HF(PPM)

FDT-1 CO2(PPM)

FDT-1 MoF6(PPM)

FDT-1 HF(PPM)

FDT-1 CO2(PPM)

FDT-1 MoF6(PPM)

FDT-1 HF(PPM)

FDT-1 CO2(PPM)

FDT-1 MoF6(PPM)

FDT-1 HF(PPM)

The graph displays the daily number of cases over a ten-day period. The y-axis represents the count of cases, with major grid lines every 500 units from 0 to 5000. The x-axis marks dates from 3/11/08 to 3/20/08. The data shows a period of low activity (mostly below 500 cases) from 3/11 to 3/16. A significant surge begins on 3/17, with cases rising to nearly 2000 by 3/18. The peak occurs on 3/19 at approximately 4200 cases. On 3/20, the count drops sharply to around 1000 cases.

Date	Approximate Number of Cases
3/11/08	0
3/12/08	0
3/13/08	0
3/14/08	0
3/15/08	0
3/16/08	0
3/17/08	100
3/18/08	1800
3/19/08	4200
3/20/08	1000

rgrs_analog_data_mar_08 (02).xls

FDT-1 MoF6(PPM)

FDT-1 HF(PPM)

FDT-1 CO2(PPM)

FDT-1 MoF6(PPM)

FDT-1 HF(PPM)

FDT-1 CO2(PPM)

FDT-1 MoF6(PPM)

FDT-1 HF(PPM)

FDT-1 CO2(PPM)

FDT-1 MoF6(PPM)

FDT-1 HF(PPM)

FDT-1 CO2(PPM)

FDT-1 MoF6(PPM)

FDT-1 HF(PPM)

PT-572

PT-572

PT-572

PT-572

PT-572

PT-572

REH Data Mar-08.xls

PT-572

PT-572

3. GRAPHICAL PRESENTATION OF FUEL DRAIN TANK 2 DATA

Fuel Drain Tank 2

Temperature
Carbon Dioxide
Molybdenum Hexafluoride
Hydrogen Fluoride
Pressure

FDI-2 Temperature

FDT-2 Temperature

FIRE

FDT-2 Temperature

PT-574

PT-574

PT-574

PT-574

PT-574

PT-574

PT-574

PT-574

PT-574

PT-574

PT-574

PT-574

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PT-574

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PT-574

PT-574

PT-574

PT-574

PT-574

PT-574

PT-574

FDT-2 HF(PPM)

FDT-2 MoF6(PPM)

FDT-2 CO2(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 HF(PPM)

FDT-2 MoF6(PPM)

FDT-2 CO2(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF (PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

FDT-2 CO2(PPM)

FDT-2 MoF6(PPM)

FDT-2 HF(PPM)

4. GRAPHICAL PRESENTATION OF FUEL FLUSH TANK DATA

Fuel Flush Tank

Temperature
Carbon Dioxide
Molybdenum Hexafluoride
Hydrogen Fluoride
Pressure

FFT Temperature

FFT Temperature

FFT Temperature

FFT-CO2(PPM)

MoF6(PPM)

FFT-HF(PPM)

FFT CO2(PPM)

FFT MOF6(PPM)

FFT HF(PPM)

FFT CO2(PPM)

FFT MOF6(PPM)

FFT HF(PPM)

FFT-CO2(PPM)

FFT-MOF6(PPM)

FFT-HF(PPM)

FFT CO2(PPM)

FFT MoF6(PPM)

FFT HF(PPM)

FFT-CO2(PPM)

FFT-MoF6(PPM)

FFT-HF(PPM)

FFT CO2(PPM)

FFT MoF6(PPM)

FFT HF(PPM)

FFT CO2(PPM)

FFT MoF6(PPM)

FFT HF(PPM)

FFT CO2(PPM)

FFT MoF6(PPM)

FFT CO2(PPM)

FFT MoF6(PPM)

FFT HF(PPM)

FFT CO2(PPM)

FFT MoF6(PPM)

FFT HF(PPM)

FFT CO2(PPM)

FFT MoF6(PPM)

FFT HF(PPM)

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