Legacy Metal Fuel Data Exploration for Commercial Scale-Up

Final CRADA Report

Chemical and Fuel Cycle Technologies

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**Non Proprietary
Final CRADA Report**

Date: 2/7/19

CRADA Number: 2016-16144

CRADA Title: Legacy Metal Fuel Data Exploration for Commercial Scale-Up

CRADA Start/End Date: 8/30/2016 to 8/30/2017

Argonne Dollars: \$170,000

Participant Dollars: \$42,500

Argonne PI: Abdellatif M Yacout

Participant(s):

Oklo, Inc. \$42,500
Name Participant Dollars

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DOE Program Thomas Sowinski
Manager:

Summary of Major Accomplishments:

This work was based DOE-NE GAIN small business voucher award to Argonne. Argonne has started the CRADA activities with discussing information regarding Oklo's specific fast reactor design, and established the key fuel design data needs to support Oklo's licensing related activities. It was established that Oklo's design utilizes metallic fuel, and that their data needs are focused on data relevant to the fuel system irradiations at EBR-II to specific fuel burnup range.. Those data were part of the existing metallic fuel irradiation database available at Argonne. Based on the identification of Oklo's fuel data needs, Argonne effort was focused on compiling the specific irradiation data of interest to their design, including digitization of data that have not been implemented into the database at the time, and

Summary of Major Accomplishments:

established a subset of Argonne's fuels irradiation and physics database (FIPD) [1] that is focused on these data and all relevant documentations. Meanwhile, Argonne staff supported Oklo's communications with the NRC in relation to Oklo's reactor design licensing activities. Argonne staff attended a meeting with the NRC December 14, 2016, and provided both public and non-public presentations on metallic fuel data and fuel irradiation behavior, and information relevant to metallic fuel qualification activities [2,3]. A web based access of the FIPD subset of data relevant to Oklo's design was established, allowing Oklo to access all data pertinent to the design. The data included all documentations of the specific EBR-II experiments on irradiation of U-10Zr of interest, post irradiation examination (PIE) data, detailed operating parameter data, as well as all documents relevant to quality assurance of the PIE data.

During the duration of the CRADA, Argonne has worked closely with Oklo to support their access to the data and answer relevant questions, as well as help exploring the database. Feedback from Oklo experiences with access to database has been helpful in improving the database interface and content.

Summary of Technology Transfer Benefits to Industry:

Qualified fuel performance data are required by the NRC in support of reactor licensing activities. Metallic fuel irradiation data and relevant documentations made available to Oklo, through this CRADA's activities, are key to the effort to license their specific fast reactor design, and engagement with the NRC in related fuel licensing activities.

Other Information/Results: (Papers, Inventions, Software, etc.)

[1] A. M. Yacout, A. Oaks, W. Mohamed, K. Mo, "FIPD: EBR-II Fuels Irradiation & Physics Database," ANL-ART-124, September 2017 (<https://www.osti.gov/biblio/1480520-fipd-ebrii-fuels-irradiation-amp-physics-database>)

[2] <https://www.nrc.gov/docs/ML1634/ML16343A221.pdf>

[3] <https://www.nrc.gov/docs/ML1703/ML17031A321.pdf>

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