INL USQ PROCESS
POTENTIAL INADEQUACY IN THE SAFETY ANALYSIS (PISA) FORM
(DO NOT USE FOR PROPOSED CHANGES)

Facility or Activity: ATR

USQ Process No.: RTC-USQ-2007-165

Subject: ATR Effective Plate Powers (EPP) used in the Safety Basis Analysis

Describe the New Information/Discovery:
During a review of the methodology used to derive safety basis power density limits from fuel element effective plate power (EPP), it was observed that the analysis in the safety basis assumed a core composed of all 7F elements. In reality, some non-7F elements (YA) are used in a typical ATR fuel loading. The YA element differs from the 7F elment in that the YA element has a non-fueled plate 19. Because of this difference, there would be a corresponding difference in power density for a given core power if YA elements are used in conjunction with 7F elements instead of all 7F elements. The concern was raised that the difference in power density might result in the safety basis power density limits being non-conservative.

Identify the applicable safety basis document(s) (e. g., DSA, SAR, BIO, TSRs, etc.):
SAR-153, Upgraded Final Safety Analysis Report for the Advanced Test Reactor, Revision 20, September 26, 2006

TSR-186, Technical Safety Requirements for the Advanced Test Reactor, Revision 16, June 13, 2006

I. PISA ASSESSMENT

a. Is there a potential inadequacy in the analytical methodology and/or tools used in the safety basis?
☐ Yes ☒ No

b. Is there a potential discrepancy between the safety basis assumptions, provisions, or conditions, in the accident analysis and the facility operation or parameters?
☐ Yes ☒ No

c. Is the actual physical condition of the facility different than as described in the safety basis (discrepant as-found condition)?
☐ Yes ☒ No

d. Has an actual or postulated operational event or incident revealed a potential inadequacy in the safety basis?
☐ Yes ☒ No

e. Is this an activity or condition not analyzed in the existing safety basis?
☐ Yes ☒ No

Provide an explanation of the assessment result:
EPPs used for input into the safety basis analysis are genetered from PDQ-7. PDQ-7 is a 2-dimensional diffusion computer code used to evaluate various ATR physics parameters during a proposed reactor operating cycle. PDQ accounts for differences in fuel density resulting from the use of various mixes of 7F and YA elements. PDQ scoping calcuations were performed using the current cycle information to derive EPPs for both an all 7F fuel element loading and a mixed loading of 7F and YA elements. The results indicated that the EPPs for the mixed loading were higher than for the all 7F elment loading. This is conservative, since these EPPs are closer to safety basis EPP limits. Therefore, a mixed core loading would be limited by the safety basis EPP limits before an all 7F element core loading.

A. W. LaPorta USQ Evaluator Print/Type Name	USQ Evaluator Signature	2/22/07 Date
M. B. McDONOUGH Nuclear Facility Manager Print/Type Name	M. B. McDonough Nuclear Facility Manager Signature	2/22/07 Date

If the answer to ALL of the assessment questions above is No, file the completed form. Do not complete Section II, III, or IV.