## See, Kenneth

**From:** Melanie Galloway
**Sent:** Monday, February 23, 2009 3:16 PM
**To:** Kenneth See
**Subject:** RE: Oconee Flood Issue

Thanks, Ken.

So when I talk about 3 problems with their analysis, there's really only (!) two since the saturated soil issue is wholly reflected in the curve number, right?

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**From:** Kenneth See
**Sent:** Monday, February 23, 2009 1:28 PM
**To:** Melanie Galloway
**Subject:** RE: Oconee Flood Issue

Mellanie,

Some technical info.....curve number are used to quantify the amount of storm runoff. These curve numbers are estimated based on soil type (HSG - Hydrologic Soil Group), landuse (wooded, residential, agricultural, etc.) and moisture conditions (ARC - Antecedent Runoff Condition). The curve number is usually determined using the soil type (which determines the HSG) and landuse assuming average soil moisture conditions. the curve number is then adjusted to fit the appropriate design conditions. For Jocassee, the area upstream is wooded, so a curve number of 55 is OK with me under average moisture conditions, but NOT OK under PMP/PMF conditions. Under near saturated conditions, a curve number of 74 is much more appropriate.

Here is my suggested rewording.

While the NRC staff agree that a curve number of 55 is representative of the area above Jocassee dam under average runoff conditions, there are two aspects of the analysis that would underestimate the amount of storm runoff and the potential for overtopping the dam.

1. Justify why you did not include any antecedent precipitation in your model.

2. Provide a reevaluation of the impacts of a PMP on Jocassee reservoir and dam by adjusting the curve number to reflect the saturated soil conditions during the PMP/PMF event.

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**From:** Melanie Galloway
**Sent:** Monday, February 23, 2009 12:36 PM
**To:** Kenneth See
**Subject:** RE: Oconee Flood Issue

thanks much, Ken. I will read it and get back to you.

In addition to the table, I want to include your more specific overtopping concerns in the letter and specific questions in the attachment. Please let me know how you would improve these first attempts below. Thanks.

Something like, "You will note that the senstivity analysis requested includes an assessment across possible NRCS curve numbers. Because your chosen curve number does not appear reflective of the precipitation and runoff expected during a probable maximum precipitation (PMP) event, we need a better understanding of the



B-40

sensitivity of this value, along with other related information regarding the PMP event as noted in Attachment 1, to draw a conclusion as to whether overtopping of the dam is possible."

Attachment 1 (following the table)

In addition to the apparent low curve number used in your PMP/PMF analysis, there are two other aspects of the analysis that would underestimate the amount of storm runoff and the potential for overtopping the dam.

1. Justify why you did not include any antecedent precipitation in your model.

2. Provide a reevaluation of the impacts of a PMP on Jocassee reservoir and dam by accounting for saturated soil conditions during the PMP/PMF event.

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**From:** Kenneth See
**Sent:** Monday, February 23, 2009 11:17 AM
**To:** Melanie Galloway
**Cc:** Scott Flanders; Nilesh Chokshi; Andy Campbell
**Subject:** Oconee Flood Issue

Melanie,

I have attached the word file with my writeup on the Oconee flood issue. This paper discusses all of my technical concerns, not just the breach issue.

Ken

Key Issues Bullets for Oconee Discussion:

- The licensee has failed to adequately to explain how they derived their dam breach parameter values. These parameter values greatly affect the flood height at the SSF
    1. Calculations performed by the NRC staff using currently accepted methods conflict with the values chosen by the licensee for their dam breach analysis.
    2. Since the licensee has used non-conservative values for their dam breach analysis parameters, they need to perform a sensitivity analysis on these parameters to assess the impact on flood height at SSF.

- The licensee proposes to use HEC-RAS, a one-dimensional model to estimate the flood height at the SSF.
    1. The NRC staff believes that a two-dimensional model should be used for this purpose and that the use of HEC-RAS to estimate the flood height is inappropriate for this site because it is incapable of accurately predicting the flood height at the SSF.

- The licensee has not adequately explained the bases for their estimate of runoff and the potential for overtopping of the Jocassee Dam.
    1. The NRC staff believes that this parameter value directly impacts the ability of the Jocassee Dam to safely pass the PMF without overtopping and also impacts the flood height at the SSF.
    2. The NRC staff requests that a sensitivity study of this parameter be included as part of the previously mentioned sensitivity studies.
    3. Additionally, the staff requests the licensee to provide a copy of the HEC-1 model used to model the PMP/PMF for Jocassee Resevoir.

- In addition, the licensee has failed to address the effects of wind-waves occurring at the SSF.
    1. The NRC staff believes these impacts must be considered to ensure adequate safety of the SSF.