material properties and minimum strength levels (as the burst testing was done at room temperature), tube burst capability significantly exceeds the safety factor requirements of RG [Regulatory Guide] 1.121 [''Bases for Plugging Degraded PWR Steam Generator Tubes'']. As stated earlier, tube burst criteria are inherently satisfied during normal operating conditions due to the proximity of the tube support plate [TSP]. Test data indicates that tube burst cannot occur within the tube support plate, even for tubes which have 100% throughwall electric-discharge machined notches 0.75 inch long, provided the tube support plate is adjacent to the notched area. Since tube-to-tube support plate proximity precludes tube burst during normal operating conditions, use of the criteria must, therefore, retain tube integrity characteristics which maintain the RG 1.121 margin of safety of 1.43 times the bounding faulted condition (steam line break) pressure differential.

During a postulated main steam line break, the TSP has the potential to deflect during blowdown, thereby uncovering the intersection. Based on the existing data base, the RG 1.121 criterion requiring maintenance of a safety factor of 1.43 times the steam line break pressure differential on tube burst is satisfied by 7/8 inch diameter tubing with bobbin coil indications with signal amplitudes less than 9.6 volts, regardless of the indicated depth measurement. A 2.0 volt plugging criteria compares favorably with the 9.6 volt structural limit considering the previously calculated growth rates for ODSCC [outer diameter stress corrosion cracking] within Cook Nuclear Plant Unit 1 SGs. Considering a voltage growth component of 0.8 volts (40% voltage growth based on 2.0 volts BOC [beginning of cycle]), and a nondestructive examination uncertainty of 0.40 volts (20% voltage uncertainty based on 2.0 volts BOC), when added to the BOC IPC [interim plugging criteria] of 2.0 volts, results in a bounding EOC [end of cycle] voltage of approximately 3.2 volts for cycle 15 operation. A 6.4 volt safety margin exists (9.6 structural limit - 3.2 volt EOC - 6.4 volt margin).

For the voltage/burst correlation, the EOC structural limit is supported by a voltage of 9.6 volts. Using this structural limit of 9.6 volts, a BOC maximum allowable repair limit can be established using the guidance of RG 1.121. The BOC maximum allowable repair limit should not permit a significant number of EOC indications to exceed the 9.6 volt structural limit and should assure that acceptable tube burst probabilities are attained. By adding NDE [nondestructive examination] uncertainty allowances and an allowance for crack growth to the repair limit, the structural limit can be validated. The previous IPC submittal established the conservative NDE uncertainty limit of 20% of the BOC repair limit. For consistency, a 40% voltage growth is extremely conservative for Cook Nuclear Plant Unit 1. Therefore, the maximum allowable BOC repair limit (RL) based on the structural limit of 9.6 volts can be represented by the expression:

RL + (0.2 x RL) + (0.4 x RL) = 9.6 volts,

or,the maximum allowable BOC repair limit can be expressed as,

RL = 9.6 volt structural limit/1.6 = 6.0 volts

This structural repair limit supports this application for cycle 15 IPC implementation to repair bobbin indications greater than 2.0 volts based on RPC [rotating pancake coil] confirmation of the indication. Conservatively, an upper limit of 5.6 volts will be used to repair bobbin indications which are above 2.0 volts but do not have confirming RPC calls.

The conservatism of this repair limit is shown by the EOC 13 (Spring 1994) eddy current data. The overall average voltage growth was determined to be on 1.4% (of the BOC voltage). In addition, the EOC 13 maximum observed voltage increase was 0.40 volts, and occurred in a tube with a BOC indication of 0.96 volts. The applicability of cycle 14 growth rates for cycle 15 operation will be confirmed prior to return to service of Cook Nuclear Plant Unit 1. Similar large structural margins are anticipated.

Relative to the expected leakage during accident condition loadings, it has been previously established that a postulated main steam line break outside of containment but upstream of the main steam isolation valve represent the most limiting radiological condition relative to the IPC. In support of implementation of the IPC, it will be determined whether the distribution of crack indications at the tube support plate intersections at the end of cycle 15 are projected to be such that primary to secondary leakage would result in site boundary doses within a small fraction of the 10 CFR 100 guidelines. A separate calculation has determined this allowable steam line break leakage limit to be 12.6 gpm. Although not required by the Cook Nuclear Plant design basis, this calculation uses the recommended Iodine-131 transient spiking values consistent with NUREG-0800 [Standard Review Plan], and the T/S [technical specification] reactor coolant system activity limit of 1.0 micro curie per gram dose equivalent Iodine-131. The projected steam line break leakage rate calculation methodology prescribed in [Draft] GL 94-XX [''Voltage-Based Repair Criteria for the Repair of Westinghouse Steam Generator Tubes Affected by Outside Diameter Stress Corrosion Cracking,'' August 12, 1994] and WCAP 14277 [''SLB Leak Rate and Tube Burst Probability Analysis Methods for ODSCC at TSP Intersections''] will be used to calculate EOC 15 leakage, based on actual EOC 14 distributions and EOC 15 projected distributions. Due to the relatively low voltage growth rates at Cook Nuclear Plant Unit 1 and the relatively small number of indications affected by the IPC, steam line break leakage prediction per GL 94-XX is expected to be significantly less than the acceptance limit of 12.6 gpm in the faulted loop.

Prior to issue of GL 94-XX, projected EOC 14 leak rates were calculated, based on draft NUREG-1477 [''Voltage-Based Interim Plugging Criteria for DG Tubes, Draft for Comments''], for a total of twelve cases, the combination of six probability-of-leak correlations and two leak rate calculation methodologies. Results of the calculations show that the projected EOC 14 leak rates ranged from 0.001 gpm to 1.360 gpm. These results are well below the 12.6 gpm allowable; therefore, implementation of the 2 volt IPC during cycle 15 would not adversely affect SG tube integrity and results in acceptable dose consequences.

Current GL 94-XX methodology requires only the log-logistic probability of leakage correlation be used. Projected EOC 14 SLB leakage using this function was calculated to be only 0.001 gpm. Based on the relatively few numbers of intersections at Cook Nuclear Plant Unit 1 to which the IPC are applied and extremely small Cook Nuclear Plant Unit 1 plant-specific growth rate, a similar value would be expected based on the EOC 14 eddy current data. The inclusion of all IPC intersections in the leakage model, along with application of a probability of detection of 0.6, will result in extremely conservative leakage estimations, especially so since close examination of the available data shows that indications of less than 2.8 volts will not be expected to leak during SLB conditions. All Unit 1 IPC indications are expected to be below 2.8 volts at the EOC 15 conditions.

The proposed amendment does not result in any increase in the probability or consequences of an accident previously evaluated within the Cook Nuclear Plant Unit 1 FSAR.

2) The proposed license amendment does not create the possibility of a new or different kind of accident previously evaluated.

Implementation of the proposed SG tube IPC does not introduce any significant changes to the plant design basis. Use of the criteria does not provide a mechanism which could result in an accident outside of the region of the tube support plate elevations. Neither a single or multiple tube rupture event would be expected in a SG in which the plugging criteria has been applied (during all plant conditions).

Specifically, we will continue to implement a maximum leakage rate limit of 150 gpd (0.1 gpm) per SG to help preclude the potential for excessive leakage during all plant conditions. The cycle 15 T/S limits imposed on primary to secondary leakage at operating conditions are: a maximum of 0.4 gpm (600 gpd) for all SGs with a maximum of 150 gpd allowed for any one SG.

The RG 1.121 criteria for establishing operational leakage rate limits that require plant shutdown are based upon leak-before-break considerations to detect a free span crack before potential tube rupture during faulted plant conditions. The 150 gpd limit should provide for leakage detection and plant shutdown in the event of the occurrence of an unexpected single crack resulting in leakage that is associated with the longest permissible crack length. Regulatory Guide 1.121 acceptance criteria for establishing operating leakage limits are based on leak-before-break considerations such that plant shutdown is initiated if the leakage associated with the longest permissible crack is exceeded. The longest permissible crack is the length that provides a factor of safety of 1.43 against bursting at faulted conditions maximum pressure differential. A voltage amplitude of 9.6 volts for typical ODSCC corresponds to meeting this tube burst requirement at a lower 95% prediction limit on the burst correlation