Entergy

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R.A. (Al) Dodds, III
Director, Nuclear Safety Assurance
Waterford 3

W3F1-2005-0007

February 5, 2005

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Supplement to Amendment Request NPF-38-249
Extended Power Uprate
Waterford Steam Electric Station, Unit 3
Docket No. 50-382
License No. NPF-38

REFERENCES:
1. Entergy Letter dated November 13, 2003, "License Amendment Request NPF-38-249 Extended Power Uprate"
2. Entergy Letter dated July 28, 2004, "Supplement to Amendment Request NPF-38-249 Extended Power Uprate"
3. Entergy Letter dated July 14, 2004, "Supplement to Amendment Request NPF-38-249 Extended Power Uprate"

Dear Sir or Madam:

By letter (Reference 1), Entergy Operations, Inc. (Entergy) proposed a change to the Waterford Steam Electric Station, Unit 3 (Waterford 3), Operating License and Technical Specifications to increase the unit's rated thermal power level from 3441 megawatts thermal (MWt) to 3716 MWt.

On January 26, 2005, Entergy and members of your staff met with the Advisory Committee on Reactor Safeguards (ACRS) Thermal Hydraulics Phenomena subcommittee to discuss the Extended Power Uprate (EPU) license amendment request. As a result of this meeting Entergy is submitting supplemental information regarding the Waterford 3 EPU long term cooling evaluation. This supplemental information is contained in Enclosure 1.

Enclosure 1 contains information proprietary to Westinghouse Electric Company (WEC), LLC. Enclosure 2 contains WEC's application for withholding the proprietary information from public disclosure.

As a result of various conference calls with the members of your staff, Entergy has agreed to revise one commitment and make additional commitments. Entergy is revising the commitment regarding the reactor vessel internals degradation monitoring program made in Reference 2. The revised commitment is provided in Enclosure 3 and supercedes the commitment previously made in Reference 2. Additionally, Entergy is making new commitments regarding instrument uncertainty and transmission grid communications capabilities at the staff's request. These new commitments are also provided in Enclosure 3.

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As discussed with the staff, Entergy concurs with the incorporation of the instrument uncertainty commitment as a condition in the Waterford 3 EPU amendment.

There are no technical changes proposed. The no significant hazards consideration included in Reference 3 is not affected by any information contained in the supplemental letter. This letter contains new commitments and one revised commitment as summarized in Enclosure 3.

If you have any questions or require additional information, please contact D. Bryan Miller at 504-739-6692.

I declare under penalty of perjury that the foregoing is true and correct. Executed on February 5, 2005.

Sincerely,

R A Dodds, III

RAD/dbm

Enclosures:
1. Supplemental Long Term Cooling Evaluation (contains proprietary information)
2. Westinghouse Electric Company Application for Withholding Proprietary Information from Public Disclosure
3. List of Regulatory Commitments

cc: Dr. Bruce S. Mallett
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Attachment 2

Increase in Solubility Limit as a Result of Trisodium Phosphate (TSP) in the Containment Sump Water

Attachment 2

Increase in Solubility Limit as a Result of Trisodium Phosphate (TSP) in the Containment Sump Water

I. Issues Addressed

When evaluating the potential for boric acid precipitation within the reactor core region for large break LOCA Design Basis Accidents (DBAs), one of the essential elements in the evaluation is the solubility limit of the dissolved acid. When the decay power is being removed from the reactor core by vaporization, i.e. the steam generation rate equals the rate at which water is being added to the core and consequently the boric acid concentrates. Table 1 shows the solubility limit of boric acid in water as a function of temperature at a pressure of 1 atm, as well as for increased pressures. (This information is taken from Cohen, 1969). This illustrates two aspects: (1) the weight fraction of boric acid in water for the limit at 100°C is 27.53 wt% and (2) the presence of boric acid in demineralized water elevates the normal boiling point to 103.3°C. For this latter temperature the fractional weight of the acid in solution is 29.97 wt%.

During the DBA accident progression, the blowdown for a large break LOCA would be finished within approximately 30 seconds and the Refueling Water Storage Pool (RWSP) would be injected into the RCS and containment over approximately 30 minutes. This is important since the water in containment would begin to dissolve the trisodium phosphate dodecahydrate (TSP) in containment. In this process 380 ft^3 of TSP is dissolved in 5.25 million pounds of borated water. The principle role of the TSP is to neutralize the boric acid for aqueous fission product retention; it has the additional consequence of increasing the acid solubility limit. For example, the REWET-II experimental studies reported by Tuunanen et al. (1988) and Tuunanen et al. (1994) observed that the addition of borax (disodiumtetraborate) "increased the solubility of boric acid in water and, hence, decreased the possibility of crystallization." This type of a process is termed "salting in" in Castellan (1964). In his discussion, it is noted that the use of an inert electrolyte can increase the solubility by about 25%. This is a meaningful increase in the solubility limit and needs to be examined for boric acid and TSP once recirculation from the containment to the Reactor Coolant System (RCS) has been initiated. This is addressed by basic laboratory experiments discussed in this attachment.

Table 1

Solubility Limits of H_3BO_3 in H_2O*

Temperature, °C	Solubility g H_3BO_3/100 g of Solution in H_2O
P = 1 atm	
0	2.70
5	3.14
10	3.51
15	4.17
20	4.65
25	5.43
30	6.34
35	7.19
40	8.17
45	9.32
50	10.32
55	11.54
60	12.97
65	14.42
70	15.75
75	17.41
80	19.06
85	21.01
90	23.27
95	25.22
100	27.53
103.3 (Boiling Point)	29.97
$P = P_{sat}$	
107.8	31.47
117.1	36.69
126.7	42.34
136.3	48.81
143.3	54.79
151.5	62.22
159.4	70.67
171° (Congruent Melting of H_3BO_3)	

* Taken from Cohen (1969).

II. Test Apparatus Description

To examine the increase in the solubility with TSP added, a basic experiment was performed with an initial mixture of 72.5 g of distilled water and 27.5 g of boric acid in an Erlenmeyer flask. A hot plate was used to increase the temperature of the aqueous solution and a magnetic stir was included in the bottom of the flask for mixing the materials. A stainless steel thermocouple was inserted in the solution to measure the bulk fluid temperature when the solution approached the solubility limit. The approach used the following steps.

1. Using a specified volume of water, an aqueous solution with a weight percent of 27.5% boric acid was produced. This is the concentration used in Waterford-3 DBA analyses as the solubility limit for 100°C.

2. Next the temperature of this solution was increased to measure the normal boiling point of the 27.5 wt% solution. Comparing this with the published information in Table 1 was a convenient means of checking the experimental approach.

3. With the solution, at or slightly below the normal boiling point, TSP was added to achieve a concentration value equal to specified nominal concentration increased by the same ratio as the boric acid due to boiling in the core, i.e. from the inlet concentration (~ 1.7 wt%) to 27.5 wt%. For Waterford-3 the TSP concentration in containment is 4.1 kg/m^3. Assuming the same concentration ratio as the boric acid results in an addition of 4.76 g of TSP. Once this has been dissolved, boric acid was added incrementally while maintaining the normal boiling point to determine the new solubility limit after the TSP has been added.

Through this step-by-step approach the influence of: (1) the increased normal boiling point due to boric acid and (2) the influence of TSP can be quantified.

III. Pertinent Results

When steps 1 and 2 were done, the boric acid mass was essentially completely dissolved. Furthermore, the boiling point of the 27.5 wt% solution was tested and found to be 103.4°C which is very close to that shown in Table 1. As noted previously , this was a convenient way of checking the experimental approach.

Next TSP was added to the solution, and as a consequence, the solution immediately became completely clear since the solution was now below its precipitation limit. At this juncture, the additional boric acid was added in steps as indicated in Table 2.

With the step-by-step addition of boric acid following the TSP addition, an additional 38.09 g were observed to be dissolved after the TSP was added in 66.46 g of water. Thus, the precipitation limit was found to be increased to 36.4 wt% which is over 30% grater than was observed as the solubility limit at 100°C. Most of this is due to the TSP but some of this integral effect is due to the elevated normal boiling point and the increased solubility limit. The experimental values are the net result of both influences. This behavior is in agreement with the general information given in Castellan (1964), i.e. about a 25% increase in solubility, and also provides considerable margin in the core precipitation evaluation. It should also be noted that the solution did not foam under boiling conditions as illustrated in Figure 1.

It is to be noted that the experiments were done in an open system, i.e. at 1 atm. For the RCS and containment system, the pressure within the reactor core would be equal to or greater than the containment pressure. In additional analyses performed for the Waterford-3 plant, the minimum containment pressure during the time for hot and cold leg simultaneous injection is found to be 20 psia. Considering this higher pressure, the saturation temperature will also increase thereby increasing the solubility limit further than that observed in the Erlenmeyer flask test. We can estimate this increase by using the change in the saturation temperature in pure water as this temperature increase, i.e. a pressure increase from 1 to 1.38

Table 2

Summary of Boiling Boric Acid Solubility Experiment - Feb. 3, 2005

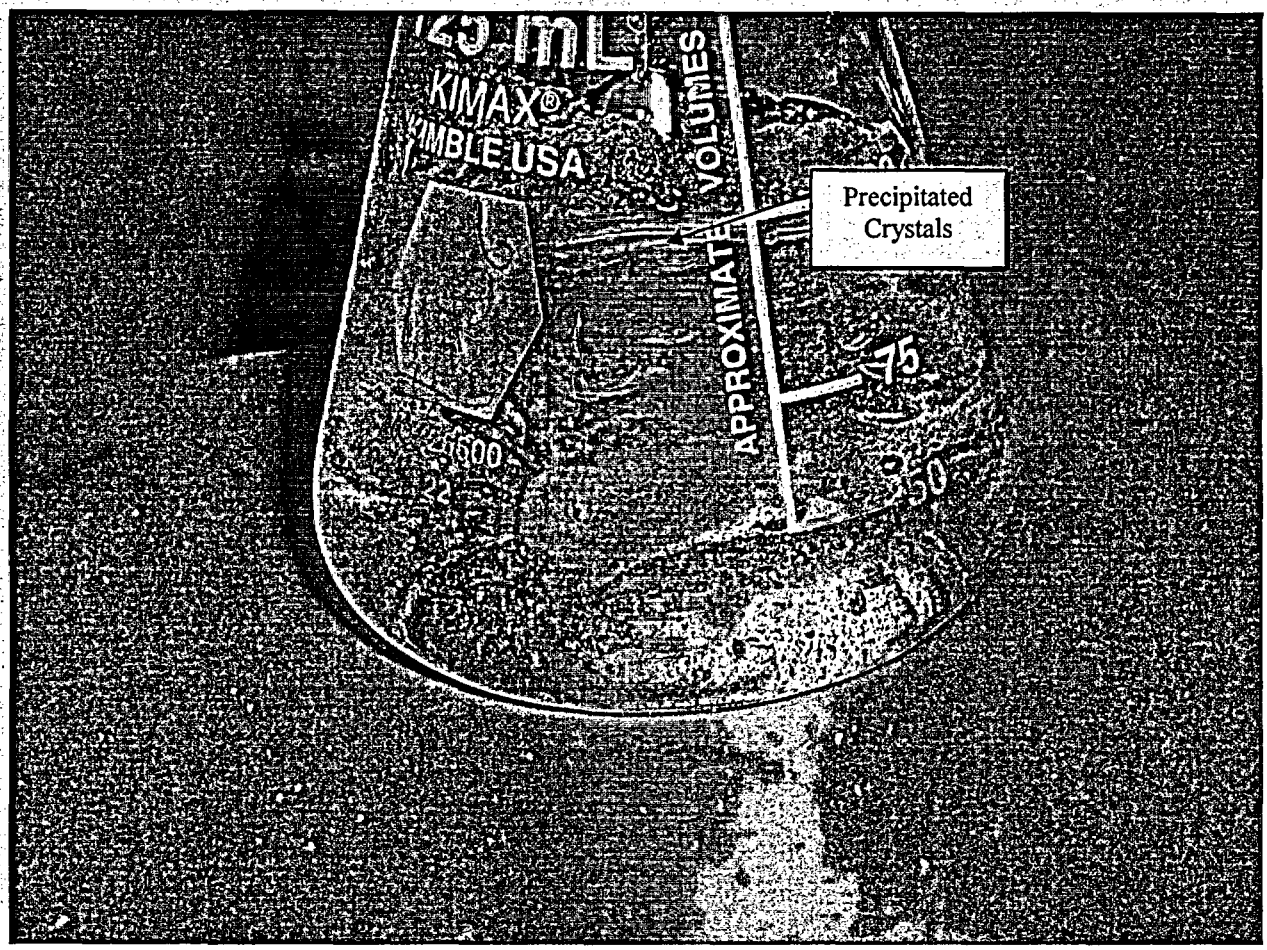
Time (PM)	Bulk Temp. of the Solution(°C)	Boric Acid Addition (g)	TSP•12H2O Addition (g)	Gross Mass of Reagents and Flask (g)	Observations
				91.39	Tare Mass.
		27.48		191.54	72.67 g DI water. 100.15 g net sample mass.
~1:25					Begin sample heat-up.
1:43	57.6				Stirrer on 3.7; Heat set on 3.5
1:46	65.4				
1:50	76.1				
1:55	86				
1:57	90.9				
2:01	96.5				
2:03	98.8				
2:04	99.5				
2:06	102.5				All Boric Acid dissolved. NBP.
2:07				190.77	99.38 g net sample mass.
2:10			4.74	195.51	Add TSP.
2:13		7.01		202.52	Add Boric Acid.
2:25					All solids dissolved.
2:28	101.9				NBP(1)
2:29	102.5				NBP
2:30				201.75	110.36 g net sample mass.
2:32		0.48		202.14	110.75 g net sample mass.
2:36	102.8				NBP
2:38	102.7				Steady boiling at NBP.
2:39		0.56			Add Boric Acid.
2:40	102.9				NBP
2:41		0.53			Add Boric Acid.
2:43	102.6				NBP
				201.55	110.16 g net sample mass.
				201.19	109.80 g net sample mass.
2:48		0.53			Add Boric Acid.
				201.14	109.75 g net sample mass.
2:55		0.52			Add Boric Acid.
2:58	103.0				NBP
3:01		0.54		201.21	Add Boric Acid. 109.82 g net sample mass.
3:04	103.1				NBP
3:06				201.26	109.87 g net sample mass.
3:08		0.47			Add Boric Acid.
				201.43	110.04 g net sample mass.
					All solids dissolved.

Time (PM)	Bulk Temp. of the Solution(°C)	Boric Acid Addition (g)	TSP•12H2O Addition (g)	Gross Mass of Reagents and Flask (g)	Observations
3:13	103.0				NBP
3:15		0.50			Add Boric Acid.
3:19	102.9				NBP.
3:20				200.68	109.29 g net sample mass. Solids precipitated during weighing and a crust appeared on the top surface. Solubility limit reached.

The pH of condensate measured to be approximately 7.

(1) Normal boiling point (NBP).

Figure 1: Bulk boiling in a boric acid-TSP-water solution near the solubility limit.



bars results in a temperature increase of approximately 9°C. Referring to the information in Table 1, an increase of 9°C from the normal boiling point in the table gives a value of 112.3°C and this results in an increase of approximately 4 wt% in the solubility limit. This increment is then added to the effects that were observed when the TSP was added. Beginning with the current analysis limit of 27.5 wt% used for the Waterford-3 DBA analyses, the TSP experiments showed that this was increased by 30% such that the wt% would be approximately 36.4 wt%, and extrapolating the conditions for higher temperature 4 wt% are added for a total of 40.4 wt% as the solubility limit of boric acid at 20 psia with the TSP addition. Comparing this value with that used in the Waterford-3 analysis (27.5 wt%) gives a margin of approximately 45%.

It should also be noted that the precipitation of the boric acid crystals were on the surface of the water pool, which is likely due to the small temperature difference that exists as a result of limited surface vaporization. However, crystallization did not occur on the internal Teflon coated magnetic stirrer nor did it occur on the stainless steel thermocouple when it was inserted to measure the bulk temperatures. These are indications that the system is essentially in equilibrium and other foreign objects do not promote crystallization. Conversely, those processes which could result in small temperature reductions, such as the surface vaporization in the laboratory experiments will influence the crystallization processes. This is not an important phenomenon for a reactor core and upper plenum because of the large heat input and the fact that there is generally some heat transfer from the internals (metal heat) for a long time after the accident is initiated.

In a previous study, small scale laboratory experiments had been performed with boric acid and TSP to evaluate the potential for foaming. These tests are summarized in the appendix to this attachment. The conclusion from these fundamental experiments was that TSP causes no significant foaming potential. This was concluded through the use of a bubble column to examine the behavior of water only, TSP and water, TSP with boric acid and water, boric acid and water and lastly a known detergent. Only the known detergent resulted in a significant foaming behavior. Therefore, the solution of boric acid, TSP and water should not be considered as having a foaming characteristic.

III.A Flow Through the Hot Leg Gaps

As the hot leg leaves the upper plenum region, there is a gap between the part of the hot leg attached to the downcomer and the penetration through the vessel wall. This gap is necessary for assembling of the Reactor Pressure Vessel (RPV) internals and provides a small leakage path for flow between the hot leg and downcomer region. For those conditions of interest in the large break LOCA DBA accidents, flow through the gaps in the two hot legs is a path for higher concentration boric acid solution to drain back into the downcomer and therefore reduce the boric acid concentration in the upper plenum region. For design basis conditions, the gap flow area that is assumed is 1.45 in^2 for each 42 in/dia hot leg. This results in a gap width of 0.011 inches (0.28 mm) for design basis evaluations. While this is a small dimension, it is also important to recall that the concentration of the solution that could leak through this path back to the downcomer could be 20 times that which is being added to the core inlet. Therefore, considering a decay heat of approximately 37.4 MWt (1% of the nominal power) the steaming rate under these conditions would be about 19 kg/sec and this also represents the inlet flow to the core to maintain the water level. The flow through these gaps would be at the concentration of the upper plenum water. If this approached the solubility limit of 39.8 wt%, this would have a concentration in excess 20 times the incoming water. Hence, a leakage rate through these gaps of about 1 kg/sec would be sufficient to prevent further increase in the boric acid concentration.

While the size of the gap is small (0.28 mm) for those conditions in which the downcomer water level could be essentially at the bottom of the cold leg and the hot leg water level could be at the midpoint of the hot leg due to the two-phase level within the core, it is helpful to quantify the flow rate through this narrow gap and therefore the margin in the DBA calculations associated with neglecting this flow path. Under these conditions, the accumulated water head in the hot leg could exceed the capillary forces and therefore flow would occur. Evaluating this as flow between two parallel plates gives a Reynolds number in the transition regime, hence a friction factor of about 0.04 should be used and frictional forces dominate the flow. For those conditions where the two-phase level in the hot leg is at the midpoint, a total flow rate through two hot legs of approximately 0.33 kg/sec is calculated, i.e. about one-third of that which would be required to remove boric acid at the solubility limit. Therefore, while this is not included in the Waterford DBA analyses, this small flow rate would provide a significant

fraction of the liquid removal rate that would prevent reaching the solubility limit. Hence, this is a meaningful conservatism in the Waterford calculation.

III.B Entrainment

For systems with heat removal by boiling, the exiting of the steam at the water surface results in water droplets of various sizes due to the steam-water hydrodynamics. The sizes of these droplets determine their capabilities to be swept along with the steam flow and the geometry of the downstream configuration has a substantial influence on whether these droplets remain airborne or are deposited on downstream surfaces. The REWET II experiments reported by Tuunanen et al. (1988) and Tuunanen et al. (1994) were focused on measuring the boron concentration levels associated with long term cooling. In particular, these experiments were to be conducted until the boric acid reached is solubility limit and began to precipitate in the heated core. The original experiments found that the boron concentration level increased but after about 3 hours, no further increase was observed. It was found that there was sufficient moisture carryover to remove the highly concentrated boric acid at a rate that was being added by the feedwater.

Subsequent experiments in both the REWET II apparatus as well as in the larger scale VEERA facility, which represented one full-scale VVER-440 fuel rod bundle with 126 full length simulated fuel pins, included moisture separators in the downstream steam release path. These served their intended purpose of removing the airborne water droplets and returning them back to the simulated reactor core region. Consequently, these experimental systems, by design, did not permit water droplets to escape the system, and as a result, the concentrations within the core region eventually reached the solubility limit and boric acid crystals were precipitated in the apparatus. A similar experimental technique was included in the larger scale BACCHUS test performed by MHI (Brown and Fink, 2004) which prevented any entrained droplets from leaving the heat producing region.

For the reactor system, there is substantial downstream structure associated with the hot leg and steam generator configurations. This provides for droplet deposition that could collect and return moisture to the heated region. Nonetheless, for the DBA conditions of a large cold leg or pump suction break, steam flow could pass through one generator with a sufficient velocity to carry along the smaller droplets. Here again it should be noted that the boric acid

concentration in these smaller droplets can be far greater than that which is being added to the bottom of the core. For example, if the incoming concentration is 1.7 wt% and that at the top of the core is at the solubility limit of 39.8 wt%, the entrained droplets have a concentration 23.4 times the injection flow. Therefore, when considering those processes which would limit the boric acid concentration, water removal rates due to entrainment flows which are a few percent of the incoming water flow rate to the core are meaningful in terms of reducing the rate at which the boric acid concentration increases, or potentially preventing further increase as was observed in the small scale REWET II test.

As was done for the flow through the hot leg gaps, it is helpful to assess the meaningful flow rates and therefore the significance of the conservatism in the Waterford DBA calculation. Considering the decay power to be 1% of the nominal power, i.e. 37.4 MWt, the minimum steaming rate results in the minimum steam velocity through the hot legs. Hence, conservatively assuming the coldest water coming into the downcomer, the steam generation rate is approximately 15 kg/sec and for a condition of 20 psia (1.38 bars), the steam density would be 0.80 kg/m^3 and with a 42 inch hot leg, if the steam flows through a single hot leg to the break location the velocity would be 20.9 m/sec (68.5 ft/sec). This velocity is in excess of that required for entrainment of liquid by the flowing steam for all entrainment correlations. As discussed above, the airborne water droplets could be deposited on downstream surfaces and they could also be potentially re-entrained with flow velocities of this magnitude. Therefore, this could be a very influential physical process in removal of highly concentrated solution at the top of the core and therefore preventing the core region from approaching the boron solubility limit. With velocities of this magnitude, neglecting entrainment is a significant conservatism in the analysis, i.e. one which could prevent the concentration within the core from approaching the solubility limit.

This entrainment process is not included in the Waterford DBA evaluation. The assumption of no entrainment is a conservatism in these analyses.

VI. Conclusions

With the insights gained from the basic experiments regarding the influence of TSP, the solubility limits are increased by nearly 45%. This is applicable for those durations from the onset of recirculation from containment through the remainder of the accident since the water

injected to the RCS will contain both boric acid and TSP. Furthermore, it will be pressurized to 20 psia (1.38 bars). This provides significant additional margin for the onset of precipitation.

The behavior for onset of precipitation appears to be more associated with cooler surfaces than foreign particles such as the magnetic stirrer or the stainless steel thermocouple that was inserted to measure the solution temperature. Therefore, unless the solution is concentrated to the limit, foreign particles such as fibers, etc. from debris in the containment sump should not have a significant influence on the precipitation.

Tests have also been performed to investigate whether a water, boric acid and TSP would foam. These experiments demonstrated no potential for foaming including boiling near the boric acid solubility limit.

Two additional phenomena that would slow the rate of increase of boric acid in the core region, or potentially prevent further increase, are flow through the hot leg gaps and entrainment of small, high boric acid concentration droplets in the exiting steam flow. Neither of these are included in the Waterford-3 DBA analyses. The assumption of no flow through the hog leg gaps and no liquid entrainment flows out of the system are both significant conservatisms in the DBA analyses.

V. References

Brown, W. L. and Fink, D. J., 2004, Personal Communication.

Castellan, G. W., 1964, Physical Chemistry, Addison-Wesley Publishing Company, Reading, MA, pp. 341.

Cohen, P., 1969, Water Coolant Technology of Power Reactors, Chapter 6, "Chemical Shim Control and pH Effect," ANS-USEC Monograph.

FAI, 2005, "Solubility of Boric Acid in Water with TSP Added," FAI/05-13, Revision 0, February.

Tuunanen, J. et al., 1988, "Long Term Emergency Cooling Experiments with Aqueous Boric Acid Solution with the REWET II and VEERA Facilities," NUCSAFE '88 Proceedings, Avignon, France.

Tuunanen, J. et al., 1994, "Experimental and analytical studies of boric acid concentrations in a VVER-440 reactor during the long-term cooling period of loss-of-coolant accidents," Nuclear Engineering and Design, 148, pp. 217-231.

APPENDIX

Fauske & Associates, LLC

DATE: October 1, 2004

TO: Hans K. Fauske

FROM: Charles Askonas

SUBJECT: **Small Scale Laboratory Foaming Tests**

Based on the request of September 30, 2004, the following tests were conducted to investigate the effect of boron (from boric acid, MW 61.83) and TSP (sodium phosphate dodecahydrate) on the potential for exhibiting foamy-like behavior. The typical plant specific values of boron and TSP concentrations were specified as follows:

Boron → 3000 ppm B

TSP → 2.2 kg/m^3; kg of $Na_3PO_4 \cdot 12\ H_2O$

The specified test matrix for the foaming tests to be performed is provided in the table below.

Test No.	Chemical Composition	Test Objective
1	Water only	Baseline (no chemical addition)
2	TSP in water	Determine the potential for foaming
3	TSP and boric acid in water	Determine the potential for foaming
4	Boric acid in water	Determine the potential for foaming
5	1000 ppm detergent in water	Reference known foamer

The potential for foaming was determined by using an air sparger located at the bottom of a 500 ml graduate filled with about 300 ml of water containing the chemicals listed in the above table.

The test results are reported as mass of material charged to the graduated cylinder and photographs showing the graduate during the sparging of air through the cylinder (typically 30 seconds after the air sparging has begun) and then after 10 seconds after halting the flow of air. Typically the height of liquid before sparging air was 307 ml to 313 ml (greater than 300 ml due to the volume occupied by the sparger and tube). The test results indicate only Test 5 demonstrative of foamy-like behavior.

Test 1: 300.14 gm of tap water

Figure 1 shows the cylinder during the air sparging and Figure 2 after it has been halted.

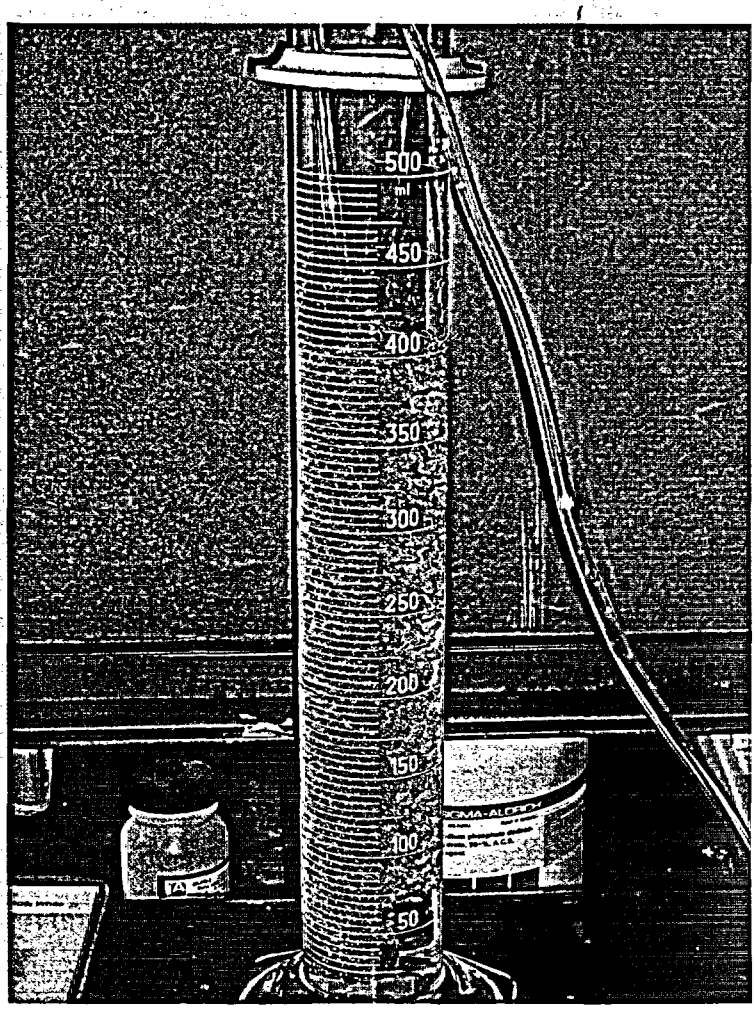


Figure 1: Sparging air through plain water (Test 1).

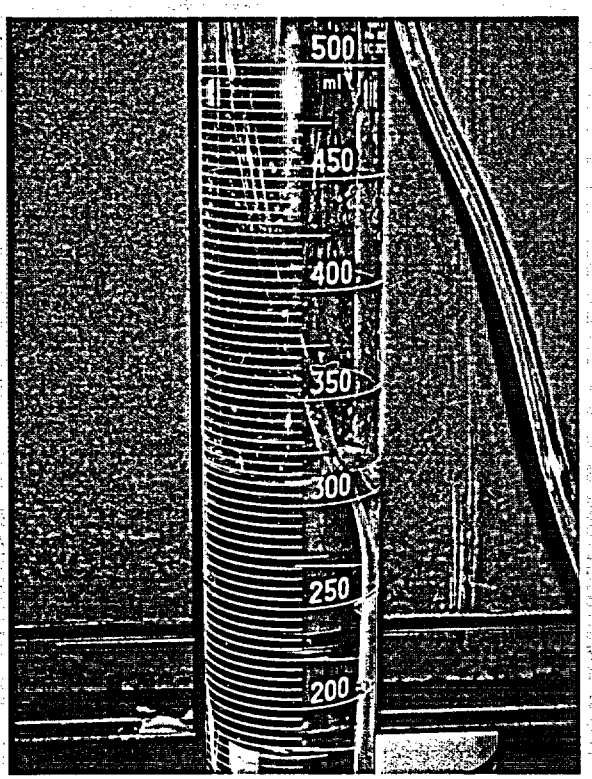


Figure 2: After halting air sparge through water (Test 1).

Test 2: 300.0 gm of tap water containing 2.2 kg/m^3 of TSP.

Figure 3 shows the cylinder during the sparging of air and Figure 4 after the sparge has stopped.

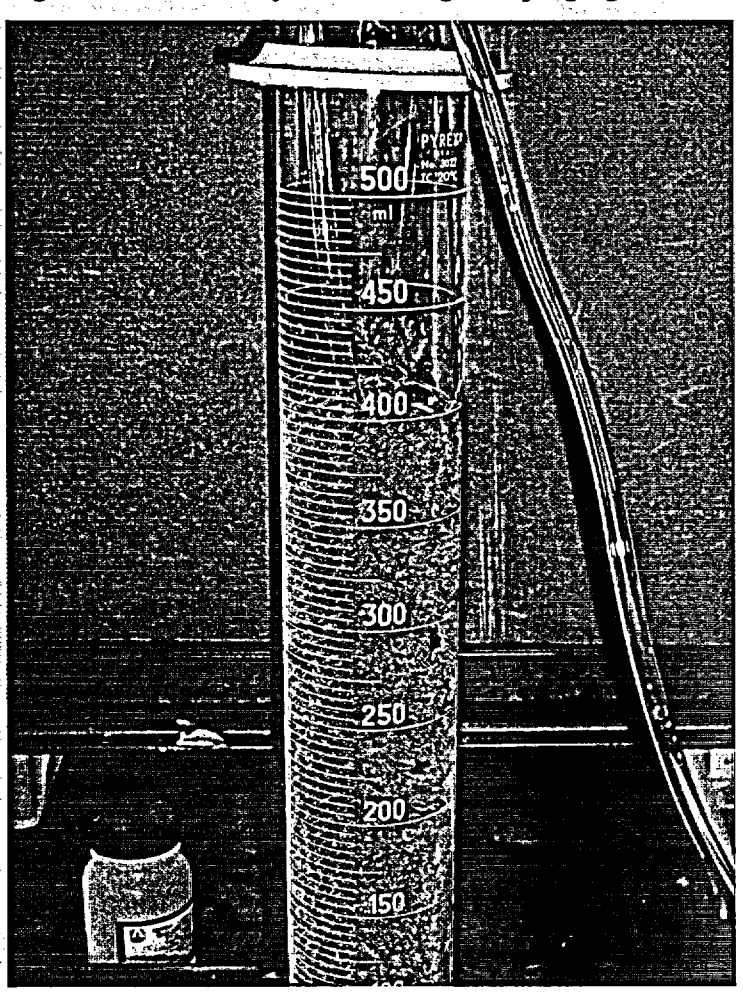


Figure 3: Cylinder during air sparge for Test 2.

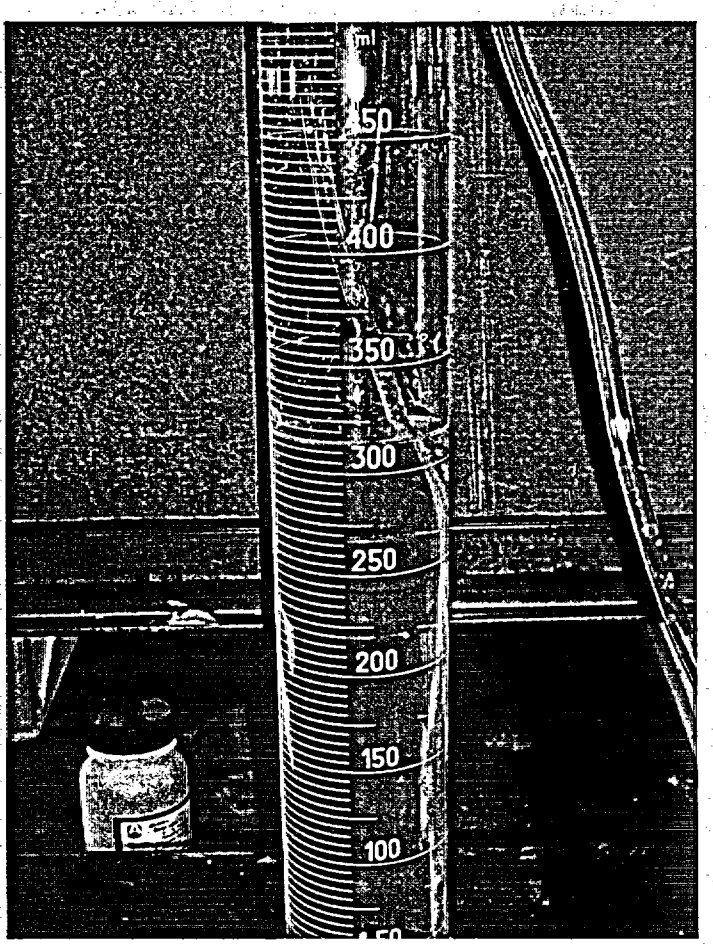


Figure 4: After halting air sparge through water/TSP (Test 2).

Test 3: 303.6 gm of tap water containing 2.2 kg/m^3 of TSP and 2980 PPM Boron.

Figure 5 shows the cylinder during the air sparge and Figure 6 shows the column after the sparging has stopped.

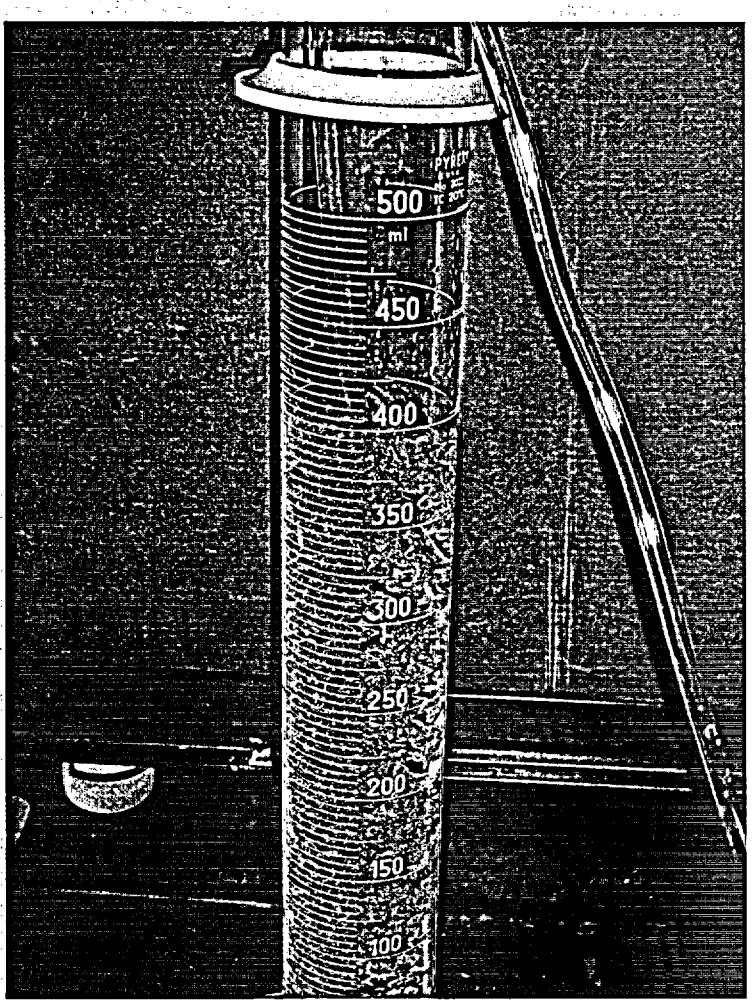


Figure 5: Cylinder during air sparging through water with TSP/Boron (Test 3).

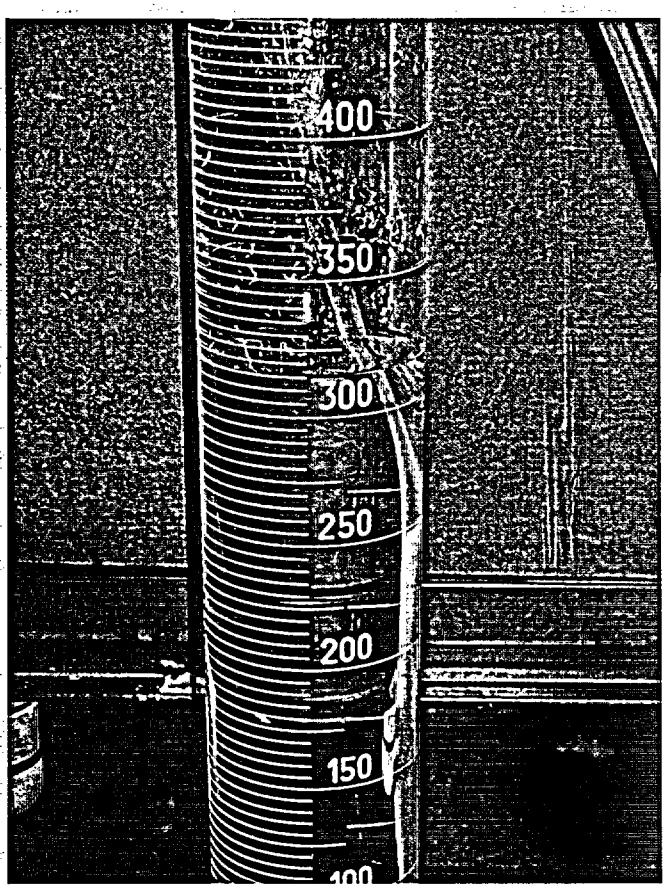


Figure 6: Cylinder after halting air sparge in Test 3.

Test 4: 304.54 gm of tap water containing 3000 PPM Boron.

Figure 7 shows the cylinder during the air sparging and Figure 8 after the sparge has stopped.

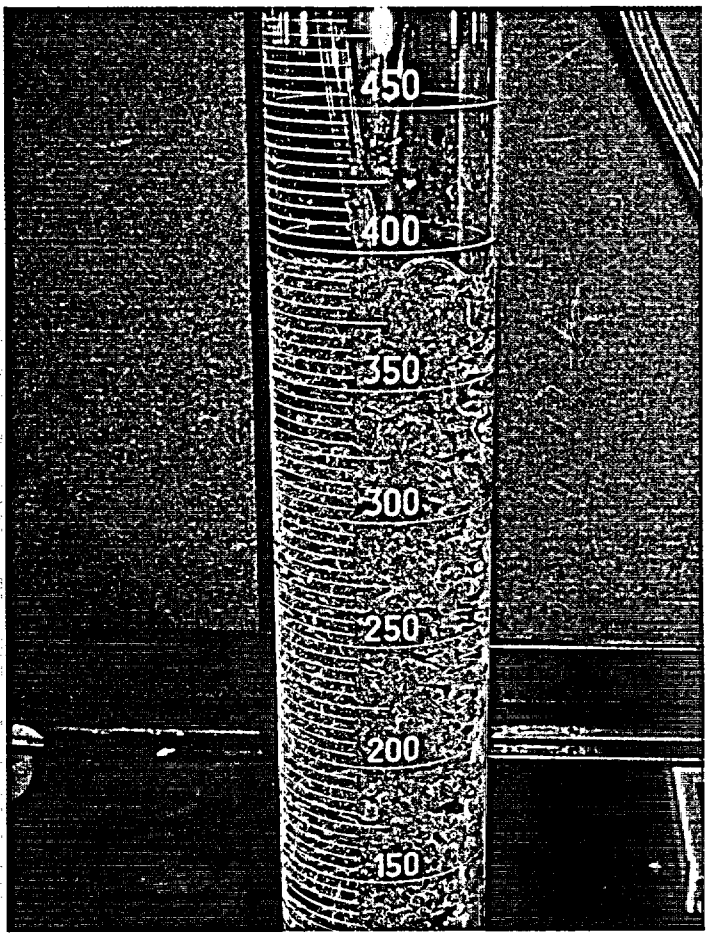


Figure 7: Cylinder during sparging air through tap water with 3000 PPM boron (Test 4).

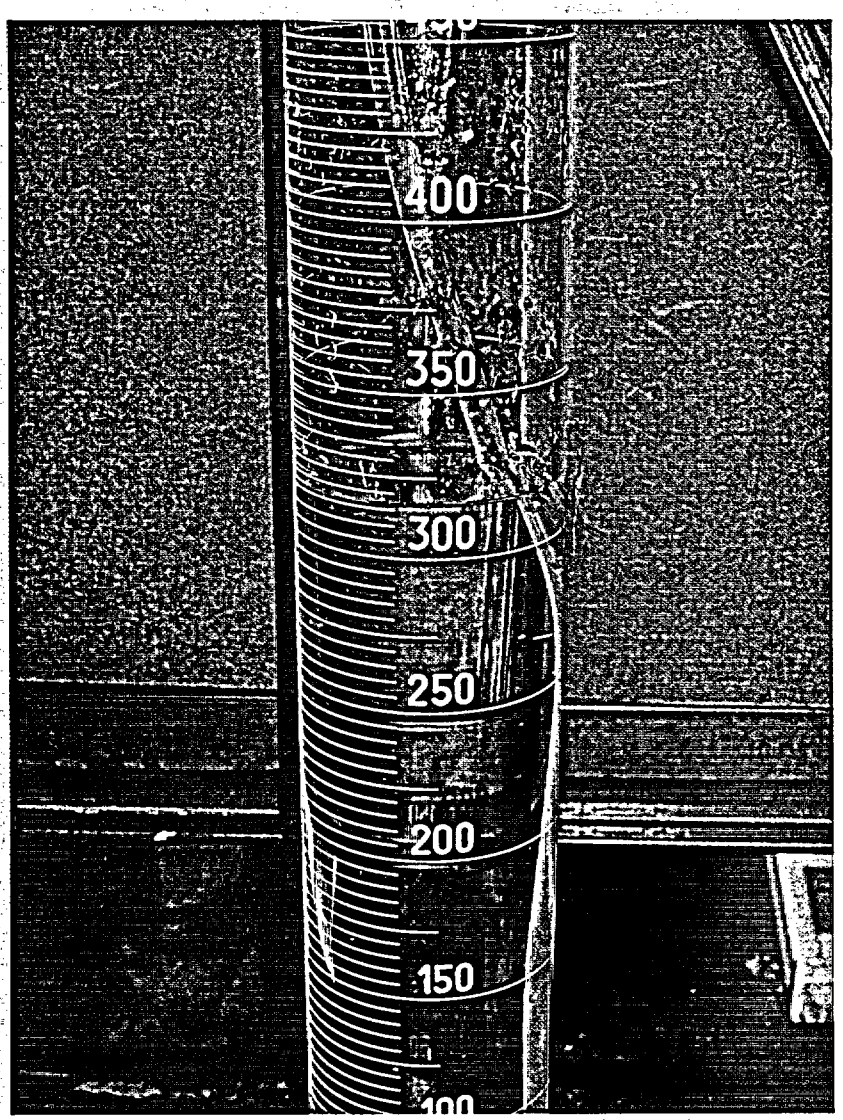


Figure 8: Cylinder after halting air sparging in Test 4.

Test 5: 299.9 gm of tap water containing 966 PPM Detergent.

Figure 9 shows the cylinder before sparging has begun (note small foamy layer on top due to the filling operation).

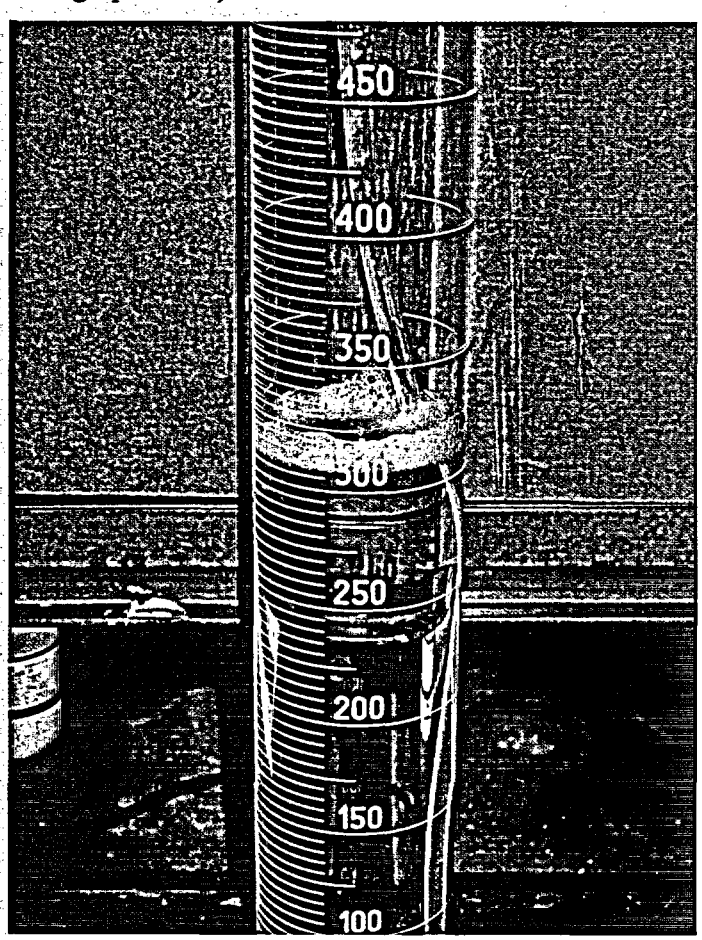


Figure 9: Cylinder before starting sparge in Test 5.

Figure 10 shows the cylinder less than 30 seconds after starting the sparge. Note the foamy characteristic of the flow.

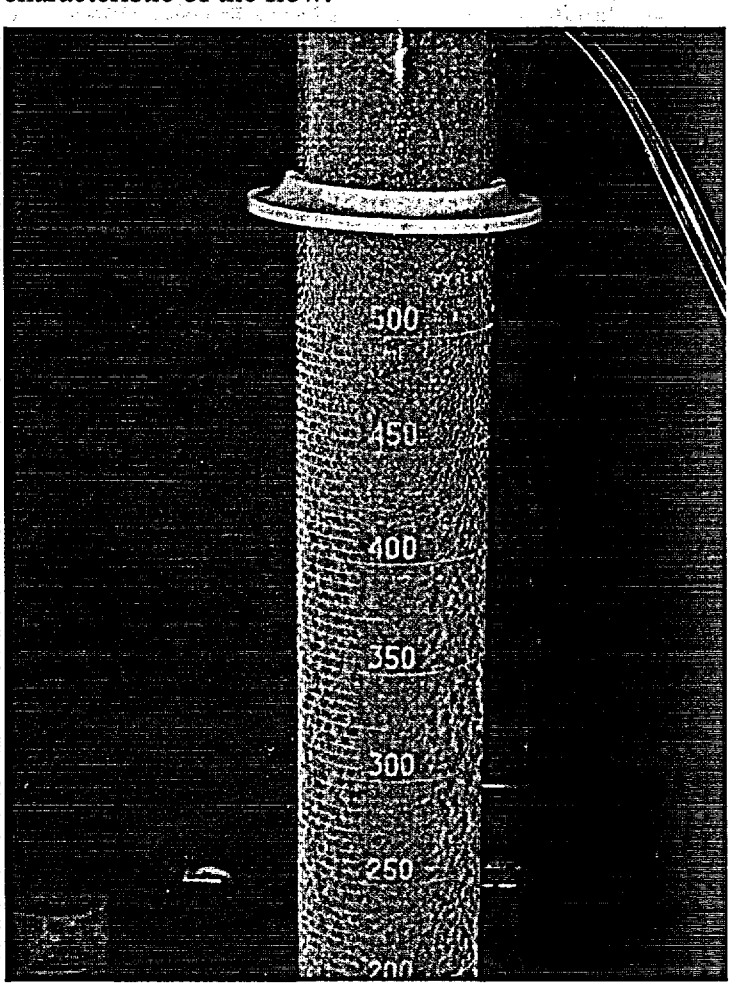


Figure 10: Cylinder right after starting sparge of air in Test 5.

Figure 11 shows the cylinder more than 30 seconds after sparging has begun.

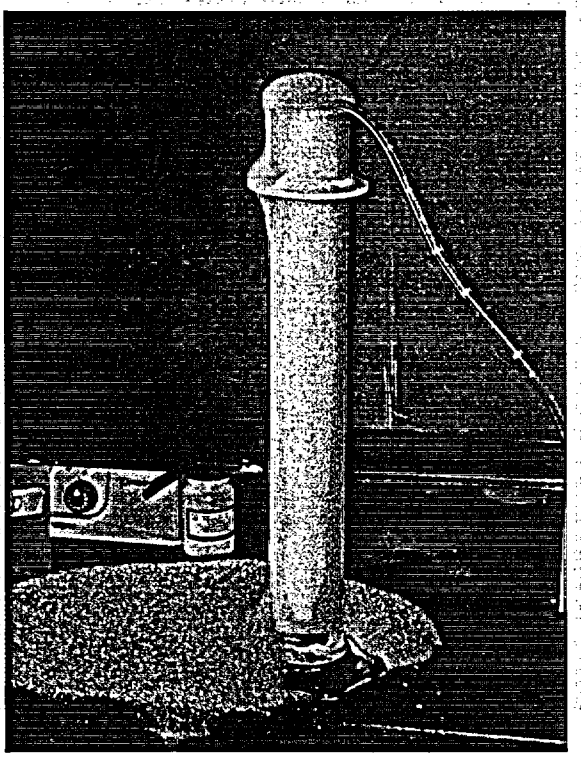


Figure 11: Cylinder well after sparging has begun in Test 5.

Figure 12 shows the cylinder when the liquid height has reached steady state after halting the sparge. Notice the liquid height has declined from 307 cc initially to a final value of 179 cc.

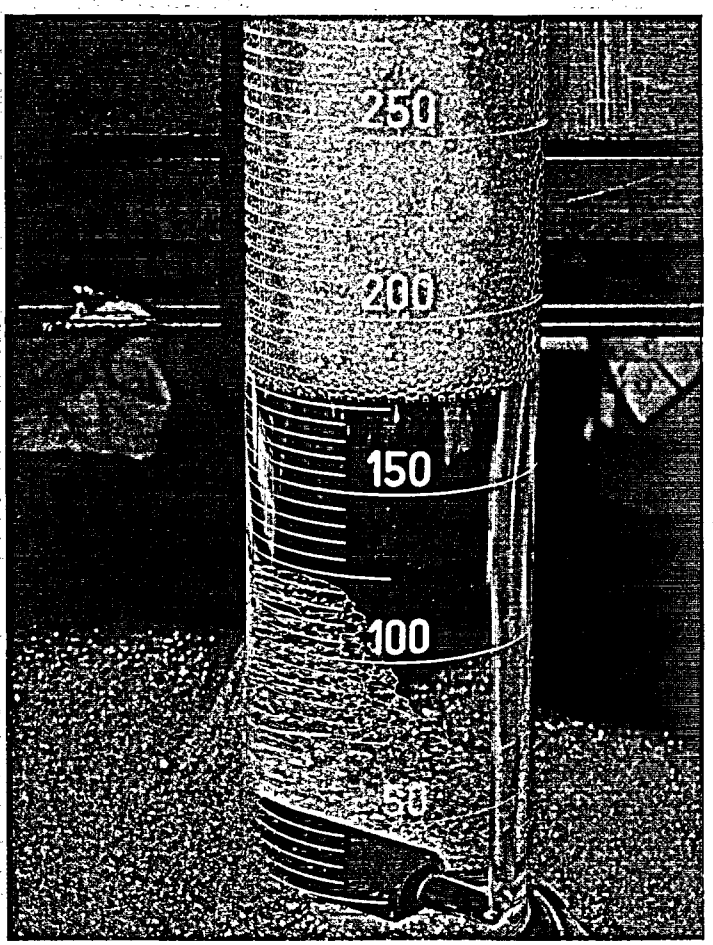


Figure 12: Cylinder after liquid height has reached steady state following cessation of the sparge in Test 5.

cc: R. E. Henry
R. J. Hammersley
K. Fauske

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Our ref: CAW-05-1948
February 4, 2005

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: Waterford 3 EPU – Supporting Information for Boric Acid Precipitation Evaluation

This Application for Withholding is submitted by Westinghouse Electric Company LLC (Westinghouse) pursuant to the provisions of 10 CFR 2.390(b)(1), as amended, of the Commission's regulations. It pertains to proprietary information that supports the boric acid precipitation evaluation performed for the Waterford 3 extended power uprate. The information is contained in Enclosure 1 to Entergy Letter W3F1-2005-0007.

In conformance with 10 CFR Section 2.390, Affidavit CAW-05-1948 accompanies this Application for Withholding and sets forth the basis on which the identified proprietary information may be withheld from public disclosure. The justification for claiming this information as proprietary is identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit. Accordingly, Westinghouse respectfully requests that the proprietary information contained in this transmittal be withheld from public disclosure.

Correspondence with respect to the proprietary aspects of the Application for Withholding or the Westinghouse affidavit should reference this letter, CAW-05-1948, and should be addressed to the undersigned.

Very truly yours,

for J. A. Gresham, Manager
Regulatory Compliance and Plant Licensing

Enclosure

bcc: J. A. Gresham (ECE 4-7A)
C. B. Brinkman, (Rockville, MD 20852)
I. C. Rickard (Windsor)
RCPL Administrative Aide (ECE 4-7A)

CAW-05-1948

AFFIDAVIT

STATE OF CONNECTICUT)

ss:

COUNTY OF HARTFORD)

Before me, the undersigned authority, personally appeared Ian C. Rickard, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC ("Westinghouse"), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

Ian. C. Rickard,
Licensing Project Manager
Westinghouse Nuclear Services

Sworn to and subscribed before me
this 4th day of February 2005.

Notary Public

My commission expires May 31, 2008.

(1) I, Ian C. Rickard, depose and say that I am the Licensing Project Manager, Westinghouse Electric Company LLC ("Westinghouse"), and as such I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of the Westinghouse Electric Company LLC.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse application for withholding accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by the Westinghouse Electric Company LLC in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitute Westinghouse policy and provide the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

(iii) There are sound policy reasons behind the Westinghouse system for classification of proprietary information, which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iv) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.

(v) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(vi) The proprietary information sought to be withheld in this submittal is that which is contained in Enclosure 1 to Entergy letter W3F1-2005-0007.

This information consists of descriptions of a test facility to study boric acid concentration, description of individual test runs, and presentation of test data.

(vii) Further this information has substantial commercial value as follows:

(a) It supports analytical methodology that Westinghouse can employ in support of its customers' regulatory activities.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide technical and licensing services without incurring commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing analyses without purchasing the right to use the information.

Obtaining the information required considerable Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, a significant testing effort, employing the requisite talent, experience, and knowledge of Westinghouse plant characteristics would have to be expended.

Further the deponent sayeth not.

Enclosure 3

To

W3F1-2005-0007

List of Regulatory Commitments

List of Regulatory Commitments

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE (If Required)
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
Entergy Operations, Inc (Entergy) is currently an active participant in the Electric Power Research Institute (EPRI) Materials Reliability Program (MRP) research initiatives on aging related degradation of reactor vessel internal components. Entergy commits to: a. continue its active participation in the MRP initiative to determine appropriate reactor vessel internals degradation management programs, b. evaluate the recommendations resulting from this initiative and implement a reactor vessel internals degradation management program applicable to Waterford 3, c. incorporate the resulting reactor vessel internals inspections into the Waterford 3 augmented inspection plan as appropriate. In addition, as requested by the NRC, a description of the program, including the inspection plan, will be submitted to the NRC for review and approval. The submittal date will be within 24 months after the final EPRI MRP recommendations are issued or within five years from the date of issuance of the uprated license, whichever comes first.	X		Within 24 months after the final EPRI MRP recommend-ations are issued or within five years from the date of issuance of the uprated license, whichever comes first.
Prior to exceeding 3441 MWt, Entergy will submit, for NRC review and approval, a description of how Entergy accounts for instrument uncertainty for each Technical Specification parameter impacted by the Waterford 3 Extended Power Uprate.	X		Prior to exceeding 3441 MWt

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE (If Required)
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
The notification of the grid conditions between Entergy Transmission and Waterford 3, regarding grid conditions that could adversely impact Waterford 3 post-trip off-site voltage, will be formalized by 15 June 2005. The agreement will contain/address the following elements:	X		June 15, 2005
a. Daily Model Load Flow studies (using off-line software such as PTI/PSSE (Power System Simulator for Engineering)) will be performed for the next day using daily cases representing that day of the month. If any transmission contingencies with respect to an element directly interconnected with the Waterford 230 kV switchyard occur during the day, the analyses will be updated.		X (Until real time monitor is implemented)	
b. Upon becoming aware that grid analyses (i.e., Load Flow analysis or real time contingency monitoring program when instituted) indicates unacceptable post-trip voltages for Waterford 3, Waterford 3 will be made aware of the postulated condition(s).		X	
c. Subsequent to any Waterford 3 reactor trip, the resultant switchyard voltages will be verified to be bounded by the same voltages predicted by the Load Flow analysis program (or the real time contingency monitoring program when implemented) under the same conditions.		X	
d. If a real time contingency monitoring program is used to perform post-trip analysis considering specific voltage requirements of Waterford 3, the Transmission Operator will notify Waterford 3 when the program is unavailable or Waterford 3 will verify the that the program is available (at least weekly).		X (Once real time monitor is implemented)	

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE (If Required)
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
Entergy is currently pursuing programming changes to the real-time contingency analysis software to perform post-trip analysis considering specific voltage requirements of Waterford 3. Entergy will update the NRC staff regarding the status/capabilities of the real time contingency monitoring program by 30 September 2005 following testing planned for the Summer of 2005.	X		September 30, 2005
If the real time contingency monitoring program cannot be used to perform post-trip analysis considering specific voltage requirements of Waterford 3: a. Entergy will obtain a motor manufacturer's endorsement or industry (e.g., industry expert) endorsement of Entergy's analysis results regarding proper operation of the Waterford 3 safety related motors (relied upon during the steam generator tube rupture event) subject to degraded voltage / double sequencing conditions. The scenario shall be initiated at the setpoint of the degraded voltage relays. b. This will be completed by October 20, 2006.	X		October 20, 2006
If the real time contingency monitoring program is used to perform post-trip analysis considering specific voltage requirements of Waterford 3, upon becoming aware that the program is unavailable, Waterford 3 will perform an operability assessment of the offsite power sources.		X (Once real time monitor is implemented)	