UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

FEB 2 2002

Information Systems Laboratories, Inc.
ATTN: James Meyer
11140 Rockville Pike, Suite 500
Rockville, MD 20852

SUBJECT: MODIFICATION NO. 2 TO TASK ORDER NO. 1 ENTITLED, "PTS ANALYSIS" UNDER CONTRACT NO. NRC-04-02-054

Dear Mr. Meyer:

This letter definitizes Modification No. 2 to Task Order No. 1 in accordance with the enclosed statement of work. The period of performance for Task Order No. 1 is December 20, 2001 through June 30, 2002. The task order estimated cost and fixed fee is changed as follows:

| | From: | By: | To: |
|---|---|---|---|
| Estimated Costs | $114,968 | $90,085 | $205,053 |
| Fixed Fee | $ 9,197 | 7,207 | $ 16,404 |
| CPFF | $124,165 | $97,292 | $221,457 |

$100,000 in incremental funds are hereby allotted to this task order bringing the total funds to $200,000 of which $185,185 represents the funds for the reimbursable costs and $14,815 represents funds for the fixed fee. Accounting Data for Task Order No. 1 Mod 2 is as follows:

| Commitment No. | APPN# | B&R | JCN | BOC | Amount |
|---|---|---|---|---|---|
| RES-C02-384 | 31X0200 | 26015110191 | Y6598 | 252A | $100,000 |
| Total Obligated Amount - | | | | | $100,000.00 |

A summary of obligations for this task order, from award date through the date of this action is given below:

| | |
|---|---|
| Total FY02 Obligation Amount: | $200,000.00 |
| Cumulative total of NRC obligations: | $200,000.00 |

TEMPLATE-ADM 001

ADM 02

Please indicate your acceptance of Modification No. 2 to Task Order No. 1 by having an official authorized to bind your organization execute three copies of this document, by signing in the space provided, and return two copies to me. You should retain the third copy for your records. All other terms and conditions of this task order remain unchanged.

Should you have any questions, regarding this modification, please contact me on (301) 415-8168.

Sincerely,

Stephen M. Pool, Contracting Officer
Division of Contracts and Property Management
Office of Administration

ACCEPTED:

NAME

V.P.

TITLE

2/27/02

DATE

STATEMENT OF WORK
TASK ORDER NO. 1
MODIFICATION NO. 2
PTS ANALYSIS

## BACKGROUND

There is currently underway a reevaluation of the issue of pressurized thermal shock (PTS). The purpose is to determine if and how the PTS rule, 10 CFR 50.61 can be revised. It is thought that the current rule and analysis methods, which were developed in the mid-1980s, may be conservative to a significant degree.

The potential benefits to revising the current PTS rule lie with life extension. The use of more accurate analysis methods allow the life of more susceptible reactor vessels to be extended from 40 years to 60 years. There is a very substantial economic benefit to doing so, since the capital costs of the plants were based on a 40 year life.

There are three major parts, or divisions, to the PTS analysis program: 1) fracture mechanics, 2) probabilistic risk assessment, and 3) thermal hydraulic transients. This task is part of the latter.

The purpose of this task is to analyze transients in four specific plants: Oconee-1, Beaver Valley-1, Palisades, and Calvert Cliffs-1. Two of these plants, Oconee-1 and Calvert Cliffs-1, were also the subject of the first PTS studies done in the mid-1980s. Beaver Valley was selected to replace the third plant for the original PTS study (H.B. Robinson). Both are Westinghouse 3-loop plants. Palisades was added because it is a limiting plant in terms of vessel fluence.

## OBJECTIVE

Prior work was done to update and develop input decks for the four plants and to analyze a large number of transients: approximately 150 for Oconee and approximately 40 each for Palisades and Beaver Valley. To complete the Palisades PTS analysis, approximately 40 additional Palisades are required. The complete the Beaver Valley PTS analysis, 20 to 40 Beaver Valley transients will be required. The objective of this task order modification is to complete all PTS work, including documentation in NUREG/CR reports.

## WORK REQUIREMENTS

Task 1: Additional Palisades Cases

Approximately 40 additional PTS transients need to be performed for the Palisades plant. These are described in detail in the attached table.

All RELAP5 input and output files that should be retained will be archived on the NRC data bank.

Estimated Level of Effort: 2 staff-months
Estimated Completion Date: 9/30/02

NRC-04-02-054-001

Task 2. Interaction with Palisades Staff

Interact with Palisades staff, as needed, to present the results of our RELAP5 analyses of Palisades and to obtain comments on our work. This will include joint meetings with Palisades staff to discuss and review results. It may be necessary to respond to requests for information from Palisades staff on results of RELAP5 analyses and their interpretation.

Estimated Level of Effort: 0.5 staff-month
Estimated Completion Date: 9/30/02

Task 3: Additional Beaver Valley Calculations

Perform additional calculations of Beaver Valley as requested by NRC PRA staff. It is anticipated that 20 to 40 new cases will be requested. The list of new cases will be forwarded to ISL most probably in February 2002 when it is ready.

Estimated Level of Effort: 1.5 staff-month
Estimated Completion Date: 9/30/02

Task 4: Interaction with Beaver Valley Staff

Interact with Beaver Valley staff, as needed, to present the results of our RELAP analyses of Beaver Valley and to obtain comments on our work. This will include joint meetings with Beaver Valley staff to discuss and review results. It may be necessary to respond to requests for information from Beaver Valley staff on results of RELAP5 analyses and their interpretation.

Estimated Level of Effort: 0.5 staff-month
Estimated Completion Date: 9/30/02

NRC-04-02-054-001

# Palisades PTS T-H Case Runs

## Suggested Additional RELAP Runs

| Case Number | Case Description | Comments |
|---|---|---|
| case001 | 1.0" surge line break | |
| case002 | 1.414" surge line break | |
| case003 | 2.0" surge line break | Not sure if 2.0" is the best or if one of the other break sizes is better to represent small breaks for cases 3a to 3e. Probably do 3d & 3e first. If P-T plots not much different from just case 003, probably not worth doing 3a thru 3c. |
| 3a | 2.0" surge line break w/stuck open ADVS, isolate AFW to affected SG at 15m | |
| 3b | 2.0" surge line break w/stuck open ADVS, isolate AFW to affected SG at 30m | Show if there is a significant effect from the timing of AFW isolation |
| 3c | 2.0" surge line break w/stuck open ADVS, no AFW isolation | |
| 3d | 2.0" surge line break w/stuck open ADVS, no FW/condensate isolation | |
| 3e | 2.0" surge line break w/stuck open ADVS, failure of MSIV on unaffected SG to close, no AFW isolation | Small LOCA w/ 2SG blowdown |
| case004 | 2.828" surge line break | |
| case005 | 4.0" surge line break | |
| case006 | 5.657" surge line break | Medium LOCA |
| case007 | 8" surge line break | " |
| case010 | Turbine/Reactor Trip w/ one stuck open pressurizer SRV | Bounded by case026 (OTC) or one of the small break cases? Prelim results looks like this case shows a pressurizer SRV is not a PTS event. |

| Case Number | Case Description | Comments |
|---|---|---|
| case013 | Turbine/reactor trip w/ 2 stuck open ADVs on SGA | Case 13c is essentially the original case 013. Need to go back and look at original case012 to see if even need single stuck open ADV versions of these – may not be sufficient cooling… |
| 13a | Turbine/reactor trip w/ 2 stuck open ADVs on SGA, isolate AFW to affected SG at 15m | |
| 13b | Turbine/reactor trip w/ 2 stuck open ADVs on SGA, isolate AFW to affected SG at 30m | Show if there is a significant effect from the timing of AFW isolation |
| 13c | Turbine/reactor trip w/ 2 stuck open ADVs on SGA, no AFW isolation | |
| 13d | Turbine/reactor trip w/ 2 stuck open ADVs on SGA, no FW/condensate isolation | |
| 13e | Turbine/reactor trip w/ 2 stuck open ADVs on SGA, MSIV on unaffected SG fail to close, no AFW isolation | 2 SG blowdown |
| 13f | Same as 13c except with only one ADV and at hot zero power | |
| case016 | SG overfill w/FW. Slight modification of previously defined case016. Instead of stopping feed once feed reaches steamline, run feed for an additional 30 min just to see trend of temps *if* feed could/did continue to run. | This is a MODIFICATION OF PREVIOUS Case016. |
| 16a | As above but for hot zero power | |
| case017 | Loss of FW/AFW. Depressurize through ADVs and feed SGs from condensate pumps | Low Press Feed. May need 2 subcases: (1) Depress and feed done in a "controlled manner" and (2) ADVs left open and condensate allowed to fill "uncontrolled" til feed reaches steamline(s) |
| case018 | Turbine/Reactor Trip w/ stuck open pressurizer SRV that recloses after pressure and temperature drop. | Is this bounded by recovery from OTC (case026c)? |
| case020 | Main steam line break (must be break inside MSIV or do not allow MSIV to close –otherwise, event is over(?) quickly. Versions to do – see below. | Note further description from original case020 so event doesn't simply end quickly upon closure of MSIV |

NRC-04-02-054-001

| Case Number | Case Description | Comments |
|---|---|---|
| 20a | Main steam line break, isolate AFW to affected SG at 15m | |
| 20b | Main steam line break, isolate AFW to affected SG at 30m | Show if there is a significant effect from the timing of AFW isolation |
| 20c | Main steam line break, no AFW isolation | |
| 20d | Main steam line break, no FW/condensate isolation | |
| 20e | Main steam line break, failure of MSIV on unaffected SG to close, no AFW isolation | 2 SG blowdown |
| 20f | Same as 20c except at hot zero power | |
| case023 | 2.0" surge line break from hot zero power | |
| case026 | Once through cooling | b & c are different versions of original case026 |
| 026b | Once through cooling, recovery of AFW 15m after initiation of OTC, PORV closure at SG level reaching 60% | Recovery from OTC |
| 026c | Once through cooling, recovery of AFW 30m after initiation of OTC, PORV closure at SG level reaching 60% | Recovery from OTC. Show if there is a significant effect from the timing of AFW recovery |
| case021 | SGTR | To show this is not a PTS event |
| 21a | SGTR HFP trip all RCPs | To show this is not a PTS event |
| 21b | SGTR HZP trip all RCPs | |
| New case | SGTR failure of pressurizer spray, cycle a PORV to maintain elevated reactor pressure but below SG pressure | Change to EOPs since '91 analysis |