Appendix B

Audit of Fort St. Vrain
Performance Enhancement Program

Volume I

Performed by:

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December 20, 1985

DISCLAIMER

The S. M. Stoller Corporation (SMSC) has exercised its best efforts to meet the objectives of this assignment and to that end has applied to the work professional personnel having the required skills, experience, and competence. SMSC's liability, if any, for any damages, direct or consequential, resulting therefrom are limited to the amount paid for this assignment.

EXECUTIVE SUMMARY

In late October, The S.M. Stoller Corporation (SMSC) was engaged by Public Service Company of Colorado (PSC) to conduct an independent audit of a sweeping program to enhance performance of their nuclear program. That program had been defined and formally committed to the NRC in an Action Plan of February, 1985, and a Program Plan in March, 1985, primarily in response to an assessment of the PSC management of its nuclear operations performed by an outside consultant, and in recognition by PSC that the past performance of the nuclear operations has been less than satisfactory.

The Performance Enhancement Program (PEP) assigned the corrective actions to six specific projects; implementation of each of the more than thirty specific sub-projects was assigned and scheduled. The principal function of the SMSC audit was to measure progress of that implementation process. In addition, and as appropriate, our judgment was sought as to the likely success of the PEP and/or its individual components. The work was to be conducted under PSC procedures governing Quality Assurance audits.

We conclude that the PEP is a well thought out and well structured program. If carried through with a strong sense of management commitment, which appears to be present, its implementation should improve the conduct of the nuclear operations substantially.

We are concerned with slips in the implementation schedule. These, if corrected, do not threaten the objectives of the PEP. However, to the extent they are due to delays in hiring the additional staff required, a problem aggravated by excessively high loss of people from the nuclear organization, that would potentially have a serious impact. PSC is aware of the urgency to act on the human resources issue, and has initiated a number of measures which should improve that particular situation, and should also benefit the effectiveness of the working organization more generally.

1.0 INTRODUCTION AND BACKGROUND

In November 1984, Public Service Company of Colorado (PSC) contracted with a consultant for an independent assessment of Public Service Company's management controls for its nuclear activities. PSC had recognized the need for such an independent assessment as a result of evaluations by NRC, as well as from internal reviews, and had committed to its performance in a PSC/NRC meeting held at the Region IV offices in Arlington, Texas on September 20, 1984. The scope of the assessment was further defined in response to certain areas of concern that were identified in the NRC Report of October 1984 (Reference 1).*

By letter of January 2, 1985, Mr. R. F. Walker informed NRC that PSC would produce an Action Plan addressing the recommendations of the Consultants' Report 30 days after review of the report. The Consultants' Report was in fact received on January 30, 1985 (Reference 2)*, and by letter of February 28, 1985 (Reference 3)*, Public Service delivered the promised Action Plan to NRC. In that Action Plan, which constituted a first-phase response to the Consultants' report, PSC stated its conclusion that existing management controls of its nuclear program would be strengthened by adopting a structured approach, and the Performance Enhancement Program (PEP), was developed for this purpose. That program translates the Consultants' recommendations, some of which were necessarily quite general and subjective, into a series of assigned projects, each with an individual identified as responsible for its implementation, and each with its own schedule.

On March 29, 1985, PSC amplified and extended the preliminary Action Plan, (Reference 3) above, and transmitted to NRC the comprehensive structure and additional detail of the PEP (Reference 4)* to implement those amplified responses. The PEP was divided into six overall projects (and associated subprojects), and a coordinating organization within PSC was set up to monitor the progress of implementation.

The implementation was to be continuously monitored; a system of monthly detailed progress reports from each project manager was established from which the PEP

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*These references are not physically integrated with this report; they are all readily available from PSC records.

Project Coordinator could develop a monthly overall status report. A typical such monthly status report covering the month of September, 1985, is included (Reference 5)*. Further, at roughly quarterly intervals, the status was to be reported to NRC; the second such status report covering the four month period from June 3 through September 30, submitted to the NRC on October 21, 1985 is also included (Reference 6)*. The status was also given NRC verbally by the PSC staff in advance of that report in a meeting with Region IV in Arlington, Texas on October 11, 1985.**

As noted above, the initial six projects of the PEP encompassed those concerns identified by NUS, and the NRC, and defines the corrective actions to address those concerns, some of which were already underway at the time PEP was officially adopted and transmitted to NRC. The six projects and the subprojects included within them are listed on Attachment I. It was intended that during the implementation of these six major projects, and as warranted by the results of that implementation, other projects might be added, or the current six projects would be expanded, to ensure that Fort St. Vrain achieves a consistent standard of excellence. The PEP was thus seen as a "living document," which would need to be adjusted as this comprehensive new system of management controls proceeded.

1.1 Scope of The S.M. Stoller Corporation Assignment

In late October, 1985, PSC requested The S.M. Stoller Corporation (SMSC) to carry out an independent audit of the implementation program. The scope of that assignment defined in a letter, S.M. Stoller to Leroy Singleton of November 1, 1985, is given in Section 3.0.

This report is responsive to that assignment. In all some 36 PSC people were interviewed. SMSC expended some 1000 manhours in the effort.

The report is organized as follows. After this Introduction, Section 1.0, general perspective is offered in the Discussion and Summary, Section 2.0. The next Sections 3.0 through 7.0 in effect represent the formal Audit Report. Section 8.0 documents a special area of concern with human resources which in our view, is

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*ibid.
**Revised 1/9/86

sufficiently important to warrant being singled out for attention. A list of references, two attachments, Appendices 1 and 2 and a Summary Status Report (Table A), complete the Report.

It should perhaps be noted here at the outset that although the audit was carried out in conformance with the PSC procedure for Quality Assurance Audits the nature of the subject matter appears to us to warrant additional comment, as in Section 8.0, which goes beyond the formal structure generally used in such audits.

2.0 DISCUSSION AND SUMMARY

The PEP was specifically designed to enhance the overall conduct of operations at Fort St. Vrain and the overall control of management over those operations. The mission of the PEP was stated to be as follows (Reference 7, page 1)*:

> "To assign and complete activities that will improve the overall quality, management and operation of the Public Service Nuclear Organization in a controlled, timely manner. Progress will be monitored by the PEP Manager/ Master Planning and Scheduling function. The function will provide Senior Management the ability to make proper decisions for allocation of resources and the prioritization of commitments at the appropriate time and in the proper manner."

As defined in the mission statement, the PEP addresses itself to the problems of management control and the classic components of such control e.g., organization, personnel resources, planning, scheduling, provision of adequate facilities, communication, and training.

The program seems to us to be very commendable as defined, and the structure is relatively straightforward to monitor. It is very comprehensive in scope, representing a sweeping review and re-arrangement of virtually every aspect of PSC governance of its nuclear activity. It is a very ambitious program, and a costly one. If implemented and followed through diligently and with a strong sense of management commitment, as it appears to be, it should improve the conduct of nuclear operations at PSC substantially.

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*ibid.

Specific comments regarding that progress are given later in this report (see Sections 3.0 through 8.0); a summary of the PEP status is tabulated by project and subproject project in Table A following.

At this stage, when some of the projects are not yet complete, and when this massive change in management and operating procedure has not yet functioned as a whole, such improvement in performance cannot yet be documented. A more explicit judgment could better be made in six months to a year, when a re-audit would be appropriate.

Albeit we find implementation progress encouraging, we are concerned about some of the delays that have occurred, some of which may simply reflect unrealistic optimism in scheduling, but others clearly reflect intrusion of other high priority tasks, such as Environmental Qualification (EQ). Since this is a situation that will continue to occur, it must be controlled. We are also particularly concerned with delays in assembling the expanded staff of properly trained and experienced people as specified by the PEP. At this stage, we do not view the delays as especially serious or threatening to the objectives of the PEP, but the pattern of delays must be stopped and the trend reversed.

3.0 PURPOSE

The purpose of this audit, carried out under PSC procedures for QA audits, was:

> To verify that the Performance Enhancement Program (PEP) has met (or reasonably will meet when completed) the commitments made to the NRC in the PSC ACTION PLAN dated January 30, 1985 (Attachment to P-850566) and in the PEP dated March 29, 1985 (Attachment to P-85107).
>
> To verify that the implementation of the PEP is being performed (or reasonably will be performed when implemented) according to the provisions defined by the PEP.
>
> To verify that implementation of the provisions defined by the PEP has (or reasonably will when implemented) eliminated the deficiences relevant to the PEP identified in: (1) the NUS Management Audit dated January 30, 1985 (Attachment to P-85066), (2) the October 1984 NRC Assessment Report (G-84392), and (3) the NRC Systematic Assessment of Licensee Performance Report for October 1, 1983 through February 28, 1985 (G-85171).

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*ibid.

4.0 SCOPE

A pre-audit investigation has been performed consisting of a review of the following documents:

a) The NUS Management Audit dated January 30, 1985 (Attachment to P-85066) (Reference 2)*.

b) The October, 1984, NRC Assessment Report (G-84392) (Reference 1)*.

c) The NRC Systematic Assessment of Licensee Performance Report for October 1, 1983, through February 28, 1985 (G-85171) (Reference 10)*.

d) The PSC ACTION PLAN dated January 30, 1985 (Attachment to P-85066) (Reference 3)*.

e) The PEP dated March 29, 1985 (Attachment to P-85107) (Reference 4)*.

f) Documentation for the various PEP Sub-projects

The scope excludes projects VII and VIII defined in PSC document CRG-85-008.

For each sub-project, checklists were prepared identifying program commitments, implementation practices and dispositions of observations/recommendations by the implementation of the PEP. Commitments were identified from documents d) and e) above. Implementation practices were identified from the documents of f) above and observations/recommendations were identified from documents a), b), and c) above. Only those observations/recommendations directly related to the PEP were identified from documents b) and c) above.

Interviews were conducted with the individuals responsible for the various PEP sub-projects as well as individuals who are or will be implementing the provisions resulting from the PEP. Based upon these interviews and the review of the documentation, the subproject checklists were completed. In addition, general interview discussions covering the overall scope of the PEP were held with L. Brey, Manager Nuclear Licensing and Fuels and R.F. Walker, President, PSC. The human resources issue was covered in an interview with C. Ewald, Vice President, PSC.

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*ibid.

5.0 METHOD

An Audit Plan - Performance Enhancement Program (NFSC G-85-03), November 1985 (Reference 9)* was prepared describing the purpose, scope, notification, references, schedule and checklists for the audit. Auditors and a Lead Auditor were selected and qualified in accordance with ANSI N45.2.23-1978.

A procedure for conducting the audit of the PSC Performance Enhancement Program was prepared and followed, as described:

- The audit was performed in accordance with NFSC.G 85-03 (Reference 9)* and the PSC Guidelines for Quality Assurance and Nuclear Facility Safety Committee Audits - QAAP-1 (Reference 8)*.
- The auditors completed and maintained informal notes on a pre-audit phase of the program.
- Checklists were then prepared for each sub-project to be audited listing commitments from documents P-85107, P-85066, CFR-85-008 and significant items from G-85171, G-84392 and the Attachment to P-85066 (NUS report). These commitments were related to the PEP program through a series of questions.
- Each "B" checklist covering a specific subproject contained a space for references to the source document(s).
- Space was provided for evidence examined and referenced in the Checklist "B" for each subproject.
- Notes were added to the auditors' checklists evaluating the responses by the interviewees, when called for.
- After completing checklist "B" a summarizing checklist "A" already prepared, was filled in by the auditors comparing the commitments made in P-85107, P-85066, and implementation for each subproject with the accomplishments to date and estimating the likelihood of meeting the commitments as scheduled.
- The Lead Auditor reviewed Checklists "B" and "A" and along with SMSC audit personnel prepared tentative findings, observations and comments for review and discussion with PSC QA management and the auditors in a meeting held before the post-audit conference.

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*ibid.

The audit team members were given orientation and training based on 10CFR Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants" and in accordance with ANSI/ASME 45.2-1977, "Quality Assurance Program Requirements for Nuclear Facilities"

A pre-audit conference was held at Fort St. Vrain on November 21, 1985 (Attachment II). At that time PSC attendees were briefed on the procedure to be followed, given copies of the Checklists "B" and "A" in their specific areas and requested to set up specific dates, times and designate PSC personnel to be present to participate in the interviews. Attachment I lists the Sub-Projects by number and title, the PSC personnel participating and the SMSC auditors.

The Checklists "B" and "A" which formed the basis for the conclusions, findings and recommendations or included in this report as an Appendices 1 and 2.

6.0 FINDINGS

As noted earlier, the audit findings (See Checklists "B" and "A" in Appendices 1 and 2) indicate that the Performance Enhancement Program (PEP) implementation is proceeding under a strong and sincere mandate from management, but there have been schedule slippages in its implementation.

Apart from the general concern above, the specific Findings are:

- Subproject I.4 (Evaluate Staffing Levels). Staffing needs have been identified, but filling those needs has not yet been completed (Reference 11)*. Certain senior and experienced positions need to be filled urgently. PSC is aware and taking action. The problem is aggravated by loss of key people (see comment on Checklist I.4).

- Subproject IV.1 (Review and Revise Design Change Modification Process). While there has been substantial effort made to simplify the procedures pertaining to Change Notices (CN's) within NED, there has been little progress in coordinating the inter-divisional responsibility for CN's. It is particularly important that coordination between NED and NPD be strengthened. A prioritization system for CN's has been proposed but has not yet been approved or implemented.

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*ibid.

7.0 OBSERVATIONS

The Observations are:

- Subproject I.8 (Evaluate Staff Retention). Sixty-seven of seventy-eight new positions have been filled by transfers and new hires; however, at the same time, forty-two have been lost by transfer out of nuclear or by resignation. The material available for review by the audit team presents data as to the numbers of resignations and transfers, but there is no analytic support data as would be required to provide an adequate picture of the underlying causes; e.g., as might be established from "exit interviews". It would also be useful to do more detailed comparisons with other nuclear utilities; for those utilities which seem to be managing this problem more successfully, information might be solicited as to the means employed, including compensation comparisons.

- Subproject II.3 (Implement Planning and Scheduling Methods and Procedures). The commitments to establish planning and scheduling functions at each division have been met, and all divisions are being coordinated by the Master Planning and Scheduling Function. While progress toward meeting all commitments is moving well, objective measures of success will not be apparent for at least six months to a year, after planning and scheduling has been operating for a period of time. Because this subproject covers a very important function, it is important that planning and scheduling continue to receive management attention and that implementation proceed expeditiously.

- Subproject V.7 (Develop Nuclear Production Division Training for INPO Accreditation). The training programs being developed address job requirements, but are not addressing departmental responsibilities and goals of the nuclear organization as committed to on Page 34 of P-85066. The NPD Training Department is presently leaving training on departmental responsibilities and goals of the nuclear organization to the individual department supervisors.

- Subproject V.9 (Retrain Licensed Personnel). Although the current requirement of 10 CFR 55 and the proposed changes are understood, it is not possible to make sure that the program covers all requirements until they are issued. The lack of a plant simulator may make it difficult to meet all requirements of the proposed changes.

- Schedule slippage. There have been some schedule delays in a number of subprojects. Most of these are already acknowledged in PEP status reports, and the reasons for the delays have been documented. These delays do not appear at present to be serious, and in many cases the task, while delayed from its original schedule, has been completed. In cases where projects are still not complete, schedule does require continued close attention.

  Items of schedule slippage include:

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*ibid.

- Subproject III.3 (Develop PM Engineering Program). The existing preventative maintenance and current maintenance procedures will be rewritten by January 3, 1986, but they will not complete the review cycle and be issued for another month or two.

- Subproject IV.1 (Review/Revise Design Change Modification Process). Target completion dates for subtasks REV-PROCS and TRAINING identified in the Target Schedule of November 20, 1985, have apparently slipped in their schedule.

- Subproject IV.4 (Review Essential Regulatory Documents). The schedule for Task 1 (Review the Essential Regulatory Documents) of this subproject has slipped from a Target completion date of November 1, 1985, to an expected completion date of January 15, 1986. The reason for this schedule slip has been difficulty in resolving some commitments.

- Subproject IV.5 (Review and Revise Nuclear Production Procedures). It is now anticipated that the SOP's and RP's will be revised by March 31, 1986, rather than January 3, 1986. The delay was caused by attention being given the the Environmental Qualification (EQ) program and the resulting unavailability of plant personnel to retype and review the revised SOP's and RP's. It is now anticipated that the EP's will be revised by December, 1986, due to reasons similar to that for SOP's and RP's.

- Subproject IV.6 (Review and Revise Exclusion List and Related Procedures). Some procedure changes have received some inter-divisional review; however, they still require a DCCF review. The schedule originally called for a reissue of these procedures by October 1. This date slipped to November 15 and is currently set at December 20, 1985. The reason for this slip in schedule apparently is the increase in the effort required as the scope of the project increased.

- Subproject V.3 (Enhance 10 CFR 50.59 Training). Training of NED personnel in completing 10CFR 50.59 reviews was scheduled to be completed by October 15, 1985. This date has slipped to December 9, 1985, and is likely to slip further to at least January 1, 1986. The reason for the schedule slip has been the involvement of NED personnel in other tasks (see NLG-85-341).

- Subproject V.7 (Develop Nuclear Production Division Training for INPO Accreditation). Part 1 operator accreditation will not be completed until March 1, 1986, as compared to the January 3, 1986, date in P-85107 (Page 4). The reactor operator lesson plans will be completed by January 3, 1986, but the senior reactor operator and non-licensed operator training will take longer. The delay appears to be produced by the availability of experienced plant personnel to

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*ibid

participate in the training program development effort due to other responsibilities including: control rod drive rework and evaluation, plant operations and maintenance activities, review of revised technical specifications, and the environmental qualification program.

- Subproject V.9 (Retrain Licensed Personnel). As with the development of an INPO accredited training program, the completion of Part 1 Training Program Development for Retraining will be delayed beyond January 3, 1986. Operator retraining will be complete on March 1, 1986, and non-operator training on September 30, 1986, consistent with the Initial Training Program Development**.

- Subproject VI.6 (Improve Parts Management System). Although the Initial Assessment of Part 1 may be completed by December 31, 1985, the revisions to the procedures will most likely not be completed at that date. Draft revisions of Administrative Procedures Q-4, Q-7 and a new draft procedure G-14 are available but not fully finalized. Two versions of the draft procedure G-14 "Procurement System" are available. The most recent draft dated 11/19/85 defines five classifications. "Q" for Safety Related, "CQ" for Commercial Quality which may be used in safety related systems, "NQ" for non-safety related, "NS" for non-safety related but where high quality is desired, and "CI" for commodity items not used in the plant. This classification system has not yet been adopted.

- Subproject VI.7 (Establish Component Shelf-Life Program). The original schedule for completing the Aging Study has slipped from November 1, 1985, to November 15, 1985, until February 3, 1986 (in the November 20, 1985, Target Schedule). Currently this latter date appears achievable. The reason for the slip has been EQ commitments and the need to reanalyze some of the original study results. As a result of this schedule slip, the installation task has slipped from March 31, 1986, to June 2, 1986.

8.0 A BASIC CONCERN

The reasons for the poor operating history of Fort St. Vrain over the past years are obviously many and complex. There have been serious problems with the unique HTGR technology. This nuclear plant is complex to operate and maintain, and requires constant diligence and dedication by the operating forces, which goes beyond knowing their formal job responsibilities. This has been recognized as a fact of life in all nuclear systems, but certain aspects of the HTGR require extraordinary attention by the operating staff, e.g., avoiding water ingress through the helium circulator seals, where in a matter of minutes, enough water can get into the system to require months

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*ibid
**At the Post-Audit Conference (12/16/85), it was pointed out that this subproject has been readdressed and with the addition of personnel, is now back on schedule.

to remove. Also, the reactor facility is an old one and is very crowded and difficult to work in. Albeit part of the PEP is devoted to general enhancement of the facilities so as to improve working efficiency, the reactor building circumstances, as a practical matter, are very difficult to remedy.

The Consultants' report also made a substantial point that the uniqueness of the HTGR technology has engendered an "isolationist" attitude at Fort St. Vrain. Unfortunately, their recommendation seemed to key on more general participation in industry organizations, which we do not feel is the main point. Actually, we believe (see Checklist V.2 B), that PSC has a reasonable activity level in such affairs, many of which are of little direct value to PSC. In fact, it is too easy for nuclear utilities to become committee "groupies", and with the limits on PSC resources, this must be controlled. However, to the extent that an "isolationist" attitude may have inhibited earlier planning for the EQ problem. PSC clearly needs to be alert to that attitude. A positive example was the analysis of the Davis Besse event (subproject III.4), which was worthwhile and well done; such activities should be encouraged on a selective basis.

Among the numerous analyses and audits of the past performance of Ft. St. Vrain, lack of management control has been identified as an important factor. The PEP is, of course, aimed at that problem and is a responsible approach to it. At the same time, it is equally clear that successful operation must include those aspects which bear on human effectiveness. The prior assesments by NRC, INPO and the Consultant's Report make it clear that the human side of the PSC nuclear enterprise has not been operating effectively.

This is not an unexpected finding given the frustrations in Ft. St. Vrain's operating history over the past several years. However, an environment where employees are likely to have become increasingly defensive and frustrated cannot be allowed to go on without serious efforts to correct that environment. We would expect that a dramatic change can be expected of and by itself when the plant goes back into operation. A successful operating campaign at reasonable power levels, would be the best single morale booster, but it involves matters including regulatory jurisdiction, over which PSC has limited control and it should not diminish the need to pay special and urgent attention to changing the human environment.

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*ibid

One of the clearest and most dramatic manifestations of this can be found in the data on retention of the employees in the nuclear program at PSC (Reference 12)*. It is beyond the scope of this audit to investigate those data in detail and our understanding of them is limited from the data available. However, the statistics on their face demonstrate a serious problem, e.g., such loss in retention on a normalized basis is some 2.6 times that of the average loss in other departments at PSC. The resignations undoubtedly reflect a number of individual and personal considerations, including compensation, which is likely one of the key factors. At the same time, the transfers out of nuclear, many at the same pay grades, clearly underscores the presence of other factors, and appears to bear on the conclusions of low morale and high stress found by Wilson surveys and other analyses by the personnel specialists at PSC. This loss of experienced people, and the corollary pressure on additional training, clearly threatens the timely implementation of the PEP program.

PSC has recognized this and is giving priority attention to human resource programs which extend beyond the defined limits of PEP sub-projects. There is little question that compensation policies and special recognition, at least for selected critical positions in the nuclear divisions, is an area currently under detailed review. PSC has also embarked on an expanded career planning and employee motivation effort including techniques which appear to be representative of the best such techniques in use in U.S. industry today. For example, the excellent results of an abbreviated special motivational training session have encouraged PSC to authorize an extended and quite comprehensive program, using the services of an expert outside consultant organization, to strengthen the sense of responsibility and personal commitment by the employees (Reference 13)*.

The steps noted above are commendable, and clearly are moving in the right direction. Management commitment to solving the human resources issues is so essential that we think a human resources action plan should be formalized and probably structured in the same general form as the PEP. Our concern is that, absent such a structured commitment, putting the proper number and of quality human resources in place, and retaining them, at Fort St. Vrain could take so long as to frustrate the very worthwhile objectives intended by the PEP.

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9.0 ATTACHMENTS [not included]

9.1 Table A Summary Status Report

9.2 Attachment I Audit Participation Summary

9.3 Attachment II PEP Project Description and Audit Personnel

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G. Stern — Date 12/20/85
Lead Auditor

S. M. Stoller — Date 12/20/85
Auditor

K. R. Van Howe — Date 12/20/85
Auditor

M. H. Raudenbush — Date 12/20/85
Auditor

E. A. J. Olson — Date 12/20/85
Auditor

W. A. Franks — Date 12/20/85
Auditor

Reviewed:

M. J. Ferris — Date 12/20/85
QA Operations Manager

P. M. Burck — Date 12-20-85
Supervisor, QA Auditing

Approved:

L. W. Singleton — Date 12-20-85
Manager, Quality Assurance

References*

1. NRC Assessment Report, G-84392, October 1984

2. NUS Management Audit Report, January 30, 1985 (Attachment to P-85066)

3. Letter, February 28, 1985, O. R. Lee to R. D. Martin. - PSC Action Plan dated January 30, 1985 (Attachment to P-85066)

4. PEP dated March 29, 1985 (Attachment to P-85107)

5. Performance Enhancement Program - Status Report as of 9/30/85 (CRG-85-008)

6. Status Report, Performance Enhancement Program, As of September 30, 1985 (CRG-85-006)

7. PEP - Project Manager Binder - current issue.

8. Guidelines For Quality Assurance And Nuclear Facility Safety Committee Audits, (QAAP-1), Issue 2, 12/6/84.

9. Audit Plan Performance Enhancement Program (NFSC-G-85-03), November, 1985

10. NRC Systematic Assessment of Licensee Performance Report for October 1, 1983 through February 28, 1985 (G-85171).

11. Memorandum - Gregory Thielan to Oscar Lee, 11/19/85.

12. Memorandum - Duane Rogers to Oscar Lee, 11/27/85.

13. Proposal from "The Training Company, Inc.", 11/18/85.

*These references are not physically integrated with this report; they are all readily available from PSC records.

Appendix C

Response to NRC Questions Regarding

Performance Enhancement Program

The purpose of this appendix is to respond to questions that were raised in a letter dated October 3, 1985 to Mr. O. R. Lee from Mr. Dorwin R. Hunter, Chief Reactor Safety Branch, Nuclear Regulatory Commission (NRC), Region IV. The questions are in regard to Public Service Company (PSC) of Colorado's responses to the NRC Assessment Report from October, 1984 and the third-party management review completed in January, 1985 by NUS Operating Services Corporation. The Performance Enhancement Program (PEP) was formulated March 29, 1985 (letter P-85107 from PSC to NRC) to implement recommendations in the two evaluations.

A. Additional Information to Respond to NRC Assessment Report

Finding 4-2 The licensee should provide details of the plant tour program.

Nuclear Policy and Guideline 22 (NP&G-22), Management Tour Policy, was issued by executive management to be effective on August 9, 1985. The policy states the objectives, responsibilities and requirements for the plant tour program. To summarize, the policy includes obtaining information regarding adherence to standards, performing housekeeping, observing material condition, and executing work. Other objectives are to improve communication with performance level personnel and to facilitate management visibility. Responsibilities and requirements are presented in tabular form for the executive level down through the supervisory level.

Implementation of NP&G-22 is accomplished via Station Manager Administrative Procedure 13 (SMAP-13), Procedures for Plant Tours by Management. Of most direct impact is the requirement for plant management to conduct tours of assigned areas at least weekly. Observations concerning material condition and housekeeping are documented and entered into a computer based tracking system that includes the individual responsible for resolution. A weekly report is generated to ensure that problem areas are being promptly addressed. In addition, the Station Manager receives a compiled report on a weekly basis to facilitate proper management attention to identified deficiencies.

Finding 4-9 The licensee should submit a more complete description of procedure ENG-3, for further review by the staff.

Procedure ENG-3, Control of Design Documents, indicates the steps to be taken to insure that the Process and

Instrumentation Diagrams, electrical schematics and electrical logic drawings (P&E, E and E-1203, IB and IC) are revised to show the modified plant prior to the system being returned to service. A new revision to ENG-3, to clarify and strenghten the detail instruction and to efficiently identify responsibilities, was issued and became effective January 8, 1986. The procedure identifies the Supervisor, Nuclear Site Construction as being responsible for maintaining the "special handling location" drawings and that the Drawing Coordinator will implement the requirements. Controlled Work Procedures (CWP's), Deviation Requests (DR's) and Change Notices (CN's) will be utilized to update a sepia of those specific drawings. The sepia is a copy of the latest revision of the controlled design document. Certain controls are to be implemented to record what CWP's and CN's have been incorporated as well as any DR's that were authorized during construction. Documents will be stamped to indicate "as constructed" and dated. For the detailed steps please refer to a copy of section 4.11 of ENG-3, copy attached as Exhibit I.

Finding 4-10 Confirm that the functional acceptability of equipment being returned to service will be checked and/or verified by the Shift Supervisor regardless of the reason for having the equipment removed from service.

The surveillance testing program requires an independent review of test results and the approval of those test results by the responsible department supervisor. Upon completion of these review steps, the Shift Supervisor is required to sign the surveillance test. The Shift Supervisor verifies that he has been informed of the test results (including any deficiencies), that he has taken actions required by the Technical Specifications with respect to such deficiencies, and that such deficiencies have been noted in the Station Log Book and/or the Technical Specification Compliance Log.

Maintenance activities which require the removal of equipment from service are performed under the system clearance program. New procedure SMAP-19, Processing of Equipment Clearances and Operation Deviations, specifically requires the authorization of the Shift Supervisor before the clearance is hung and requires the initials of the Shift Supervisor upon return of the clearance.

Work that is performed under the clearance is either routine maintenance via the Station Service Request program or plant modification via the Controlled Work Procedure program. Each of these work programs has specific post-work testing requirements that must be satisfactorily completed before the clearance is returned and the equipment is placed back in service. Thus, the Shift Supervisor has ultimate control of the functional acceptability of returned equipment, since it

CONTROL OF DESIGN DOCUMENTS

ISSUANCE AUTHORIZED BY	D.W. Warembourg/WEH 12/31/85	[illegible] 1/3/86	
PORC REVIEW			EFFECTIVE DATE 1-8-86

INDEX

FT. ST. VRAIN CONTROLLED DOCUMENT

TITLE

4.11 UPDATING DESIGN DOCUMENTS FOR SPECIAL HANDLING LOCATIONS

4.11.1 The Supervisor, Nuclear Site Construction is responsible for maintaining the marked up sepias for P&Is, E-1203s, IC & IB drawings for the special handling locations as defined by the FSV-DDH, so these documents reflect the latest configuration of the plant.

4.11.2 The Drawing Coordinator (DC) is responsible to the Supervisor, Nuclear Site Construction, for implementing these requirements.

4.11.3 The DC shall utilize completed Controlled Work Procedures (CWP) and Document Update Change Notices (CN) to update a sepia of the affected P&Is, ICs, IBs and E-1203s to the current configuration of the plant.

4.11.4 Prior to revised documents being inserted into special handling locations, the DC shall compare the revised CN Caution Stamp items, and the revision update record to the existing plant configuration sepia. The resultant revised document will reflect current plant configuration at the time of that update.

4.11.5 Upon receipt of the completed CWP or the Document Update CN, DC shall review the CWP, or Document Update CN, to determine those P&Is, ICs, IBs or E-1203s that are affected.

a) If drawing update is required, update appropriate document using DC copy as master, stamp drawing with Control Room Document Update Status stamp (Attach. ENG-3M) and have checked by the Supervisor, Nuclear Site Construction. A Control Room Document Update Record (Attachment ENG-3L) is also completed.

b) The DC forwards the marked up sepia to Site Document Control.

c) Site Document Control shall prepare the necessary number of copies and place them in the locations specified by the FSV-DDH.

d) Site Document Control will return the marked up sepia to the DC.

4.11.6 Upon receipt of a revised sepia from Site Document Control, the DC shall compare the document to DC file sepia as follows:

a) If revised sepia incorporated all outstanding changes then this sepia will become new DC master and distribution made per Paragraph 4.11.5(c).

b) Highlight incorporated changes on the Control Room Document Update Record.

c) If revised sepia incorporates a change not implemented into the plant, the DC shall remove that change from the sepia, stamp sepia with the Control Room Document Update Status stamp and complete the Control Room Document Update Record sheet.

d) If revised sepia does not incorporate all outstanding changes, use newly received sepia and incorporate outstanding changes. If the outstanding change requires extensive redrawing then the revision block may be changed to show current revision.

e) Make distribution per paragraphs 4.11.5(b) and 4.11.5(c).

4.11.7 Upon receipt of a completed Deviation Request (DR) the DC shall determine those P&Is, ICs, IBs or E-1203s that are affected. The DC shall then update the Control Room and Shift Supervisor's Office documents and place a copy of the completed DR in binders that are maintained by the DC in the document update locations and in the DC file.

a) The affected Control Room and Shift Supervisor's Office documents shall be stamped by the DC with a completed "As Constructed Document Update" stamp or label (Attachment ENG-3P).

b) If there is no room on the face of the document for the above stamp (or label), place the completed stamp (or label) on the back of the document and annotate the face of the document with "See back of document for As Constructed Update Stamp."

c) The DC shall maintain a list of unincorporated "As Constructed" changes.

d) When a document which is held by the Control Room and Shift Supervisor's Office is revised, the DC shall replace the superseded document. When necessary, the DC shall transfer all "As Constructed Document Update" stamps or labels to the revised document. The DC shall also update the list of unincorporated "As Constructed" changes by deleting all "As Constructed" changes that have been incorporated into the revised document.

4.11.8 Upon receipt of documents that are released for test, either the DC or Site Document Control may make insertions to the Control Room, Shift Supervisor's Office and the Results Shop.

4.11.9 The DC shall maintain a separate drawing record sheet for each document. The drawing record shall show the status of each document including the document number, CN affecting it, drawing revision, update information, and applicable date and initials.

4.12 STAMPING DESIGN DOCUMENTS TO SHOW UNINCORPORATED CHANGE NOTICES

4.12.1 See ENG-1 for procedural information on stamping design documents to show unincorporated Change Notices.

4.12.2 Denver Document Control and Site Document Control shall process controlled design documents affected by unincorporated Change Notices as follows:

a) Review the Document Update List (DUL) page(s) in the CN and/or CN reissue packages to determine which CN issues and reissues affect which documents, and update the document stamping status of documents listed on the CN DUL's accordingly.

NOTE: The Design Document Status Index may also be used to determine document stamping status in conjunction with the DUL.

cannot be returned until the required testing is satisfactorily completed.

Finding 4-13 The licensee should commit to develop a Shift Turnover Procedure.

Procedure SMAP-8, Plant Operations Shift Turnover Procedure, has been in place since October 9, 1984. This shift turnover procedure is modelled after INPO Good Practice OP-201, Shift Relief and Turnover.

To summarize, specific responsibilities have been developed for the Shift Supervisor, the Senior Reactor Operator, the Reactor Operators, the Equipment Operators, and the Auxiliary Tenders which are directed at their particular job functions and the interface of their functions with other operators. Salient points are the requirements for:

* reviewing and understanding the Shift Turnover checklist applicable to the position before assuming the shift,

* assuring that the on-coming relief is fully aware of existing conditions,

* requiring that the on-coming relief is mentally and physically fit to competently assume the duties, and

* turning over equipment that is in a stable condition.

Finding 4-14 The licensee should commit to develop a procedural requirement for licensed operators to read and review operating logs upon return from an extended absence.

The requirement to review operating logs has been included in the Shift Turnover Procedure described above. In general, the requirement for narrative log review is to be performed since the last time the individual stood the shift or for ten days previous. In addition, there are specific requirements for reviewing clearances, Operations Deviation Reports, Temporary Configurations, the Start-up Book, etc.

Finding 4-15 Supply details of the plant tour program.

Please refer to the response for Finding 4-2.

Finding 4-16 The licensee should submit a more complete description of procedure ENG-3 for further review by the staff (the same information is needed to close out Finding 4-9).

Please refer to response for Finding 4-9.

Finding 4-17 The licensee should commit to improve the control of system operating procedures in use at local control panels.

A program to improve the control of system operating procedures at local control panels has been developed and is in place. The program is maintained via the existing controlled distribution program. To summarize the program, the following has been accomplished:

* a complete walk-down of the plant was performed to identify areas where controlled System Operating Procedures should be placed,

* special metal receptacles were manufactured and installed,

* appropriate procedure locations were appended to the governing Document Distribution Handbook,

* and controlled distribution procedures were placed, and non-controlled procedures were removed.

Finding 4-19 The licensee should take steps to improve access to the Control Room from the Shift Supervisor's office, or provide additional explanation of why their current arrangement is acceptable.

A formal mechanism for Operations department control of the access to vital areas has been developed and implemented. This program is defined by new procedure SMAP-12, Control of Vital Access Door Key. In general the procedure requires that the Shift Supervisor retain the key to Vital areas in his personal possession at all times, unless there is a card reader failure concurrent with a plant emergency. Control of the key under the Shift Supervisor is specifically logged in the Shift Turnover procedure for the Shift Supervisor.

Concurrent with the implementation of the above program we have evaluated the feasibility of making design modifications to the Control Room. Although not ruled out at the present time, we have concluded that such a change could involve significant changes to the Control Room, electrical cabling, ventilation ductwork, fire protection systems, and the Security system. In addition, modifications to the control room could adversely impact the implementation of Control Room Design Review considerations required by NUREG-0737.

Finding 4-20 The licensee should verify that PEP subproject VI.2, Revise Conduct of Operations, will encompass the verification of the correct performance of operating activities.

PEP subproject VI.2,Revise Conduct of Operations, does encompass the cited requirement. To date, we have

completed and implemented a number of items directed at ensuring the verification of operating activities. Examples follow.

The clearance (tagging) program now requires the independent verification of the hanging of tags and the pulling of tags on equipment returned to service.

The governing document for the conduct of operations (Administrative Procedure P-1, Plant Operations) has been completely rewritten, based on INPO Good Practices and Regulatory Guide 1.114. Specifically addressed are the line of responsibility, operation of reactor controls, operational communications, personnel responsibilities, general operating practices, and control room practices.

All Temporary Configurations (not just safety-related) now require the development of a Safety Evaluation by an independent organization (Licensing).

All setpoint changes now require the development of a Safety Evaluation by an independent organization (Licensing).

All changes to the Alarm Index now require an independent review by a cognizant engineer.

All maintenance-related procedures are independently reviewed by the Quality Control organization.

Under the direction of the Superintendent of Operations, valve lineups are performed independently by two members of the Operations staff.

We are also in the process of rewriting all Results Procedures (RPs). As part of this rewrite effort, we are incorporating independent verification of appropriate steps.

Effective January, 1986, the Quality Control department will be monitoring the performance of selected surveillance tests. This will supplement the independent review of test results that presently is in place.

Selected maintenance activities (at the discretion of QC) are now independently monitored for correct performance by Quality Control.

Finding 4-24 The licensee should describe how the "safety-related" designation is used in their parts management system.

The term Safety-Related is applied to systems, structures, equipment and components which are identified in the FSAR and as detailed and supplemented by applicable P&I, IB and IC diagrams, E and E-1203

schematics and the SR6-2 and SR6-8 lists. The parts management system utilizes these drawings and lists to determine what equipment must be purchased to specific requirements applicable to that device (i.e. Environmental and/or seismic requirements, vender qualification, etc.).

The term "quality-related" as used at Fort St. Vrain does introduce confusion. For this reason it is to be evaluated to determine whether it will be maintained. The evaluation is considering using only the terms "safety-related" and "non-safety related."

B. Additional Information to Respond to Third-Party Management Review

Recommendation A.4 The licensee should describe how their Master Planning and Scheduling System will address surveillance testing in general and "surveillances requiring shutdown" in particular.

These two items are a part of the planning and scheduling functions being implemented. Surveillances have always been scheduled based upon defined frequencies and plant conditions. A scheduler in Scheduling and Planning (Nuclear Production Division) releases the surveillances to either Results or Operations in much the same way that equipment maintenance will be released to Maintenance. The surveillance package which includes step-by-step procedures (presently being revised) is assigned to the appropriate organization to complete. In the future, surveillance scheduling will be enhanced and include detailed manloading of the surveillance against available resources.

Surveillances requiring shut-down are scheduled into a planned outage specifically for this purpose. These outages are shown on our Master Schedule in much the same way as a refueling outage but with a shorter duration - usually one month. Two shutdown surveillance outages are scheduled between refuelings.

Recommendation A.6 The licensee should clarify how they plan to analyze for the root cause of procedural compliance failures experienced at Fort St. Vrain.

We have determined that there are four primary contributors for the procedural compliance failures experienced at Fort St. Vrain and are taking the appropriate actions:

1. Ease of use of the procedures:

Procedures in use at Fort St. Vrain had not been specifically evaluated for "user friendliness." We have undertaken a major rewrite effort of all System Operating Procedures, Results Procedures, and

Maintenance Procedures to be completed under PEP projects. In each case we are using professional assistance with one of the specific goals being to incorporate human factors considerations.

2. Availability of Controlled Procedures at Work Stations:

   As described in the response to Finding 4-17, controlled procedures are now available at local work stations. This action has substantially reduced the need to paraphrase operational steps or the tendency to use non-controlled information.

3. Personnel unfamiliarity with the process for changing procedures:

   Personnel have been informed that they will either follow the procedure as written or revise the procedure so it can be followed. In some cases, personnel were not familiar with the process of how to initiate procedural revisions. This has been corrected by increasing the attention to this process and by holding supervisory personnel responsible for following up on employee suggested changes.

4. Personnel Commitment:

   In some cases personnel have not followed procedures because of lack of commitment to do so. All personnel have been informed that management views such lack of commitment as unacceptable work performance and that failure to follow procedures as a result of inattentiveness or negligence will result in formal disciplinary action, including termination.

C. Additional Information on Scope of PEP.

The licensee should supply additional information on the scope of each PEP subproject to show that adequate staff has been assigned to supervise and implement the PEP concurrent with normal duties.

The schedules for each project were established by the project managers based upon an assessment of project objectives and scope and available resources. The project managers are responsible for coordinating the completion of all project tasks - not necessarily completing the tasks. Indeed, a number (11) of project managers have two or more projects that must be supervised in addition to their normal duties. These are shown in Exhibit II with brief comments on how the work is being completed. Various approaches have been taken to insure adequate resources are available to the projects. Some are:

* approval and hiring of additional permanent staff,

* delegation of project responsibilities to different supervisors, (e.g., System Operating Procedures to Operations and I&C calibration procedures to Results),

* use of contract and/or consulting personnel to supplement PSC staff,

* delegation of tasks to project team members,

* staggering start and complete dates of tasks and projects to minimize overlap,

* "stretching" project completion to accommodate availability of resources, and

* deferring projects where adequate resources are not available.

We have been primarily concerned with completing project objectives in a quality manner rather than completing projects as scheduled. Consequently, some projects have slipped past their original scheduled completion.

Appendix C
Exhibit II

PSC PEP RESPONSIBILITIES

(For Project Managers with Two or More Projects)

Project Manager	Projects		Current Status	Comments
D.M. Picard, PEP Manager	I.1	Formalize Action Plan, Reorganization and Performance Enhancement Program	Complete	Scope was sufficiently small to complete in desired timetable.
	I.2	Document Charters, Missions, and Function Statements	Complete	Responsibility for completion was distributed throughout nuclear organization. Project Manager responsibility was primarily coordination of all involved.
	I.7	Complete Organization Decision Grids	Partly Complete	Responsibility for incomplete part has been distributed to all divisions.
	II.1	Establish Nuclear Master Planning and Scheduling Function	Complete	
	II.3	Implement Planning and Scheduling Methods & Procedures Part 1, Initial Definition	Complete	Part 1 was completed by original project manager but Part 2's scope was large and the implementation was split into projects by division.
	III.4	Evaluate Davis-Besse Event	Partly Complete	Work responsibility has been distributed among project team members.
C. Fuller, Station Manager	II.2	Develop Annual and Long-Range Schedules	Partly Complete	Contract staff was utilized to complete Part 1. Part 2 is contingent on another project.
	IV.5	Review and Revise Nuclear Production Procedures Part 1, Initial Definition Part 2, Nuclear Production Procedures Development Part 3, Review and Revise Emergency Procedures	Partly Complete	Mr. Fuller is coordinating this effort. The scope is very large and contractors are being used to supplement plant staff.
	IV.9	Review and Revise Level I Plant Procedures (P & G) Part 1, Revise 'P' Procedure	In process	Mr. Fuller is coordinating this effort. The work has been distributed throughout the site organization. No one individual has an excessive workload.
	VI.1	Formalize Plant Tour Procedures and Reporting	Complete	Scope was sufficiently small to complete. Much of the work was delegated to plant staff.
	VI.2	Revise Conduct of Operations	Complete	Scope was sufficiently small to complete. Much of the work was delegated to plant staff.

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PSC PEP RESPONSIBILITIES

(For Project Managers with Two or More Projects)

Project Manager	Projects	Current Status	Comments
	VI.3 Document Supervisor Responsibilities	Complete	
	VI.4 Implement Plant Signage Program	Hold	Sufficient resources are not available, therefore project is on hold.
	IV.7 Revise Technical Specifications Part 2, Implement and Train at Plant	Not Started	
D. Miller, NPD Planning & Scheduling	II.3 Implement Planning and Scheduling Methods & Procedures Part 5, NPD Implementation	In Process	Additional staff were approved for this function and are being hired. Outside consultant's are being utilized.
	III.1 Establish Maintenance Planning Group	In Process	Project delays are a result of not hiring the staff; not adequate resources to dedicate to hiring.
	III.2 Define Maintenance Planning and Scheduling Function Part 1, Initial Definition Part 2, Implementation	Partly Complete	Additional personnel are needed for this project and these personnel were approved in the PEP. Delays are a result of the approved positions not being filled.
F. Novachek, Technical/ Administrative Services Manager	III.3 Develop Preventive Maintenance Engineering Program Part 1, Initial Definition	Complete	
	Part 2, PM Development, Existing Critical Significant Components	In Process	Scope is quite large and outside consultants are being utilized in addition to plant staff
	Part 3, PM Development, Remainder of Critical Significant Components	Not Started	
	Part 4, Post Maintenance Testing Procedure	Complete	Scope was sufficiently small to complete

Appendix C
Exhibit II

PSC PEP RESPONSIBILITIES

(For Project Managers with Two or More Projects)

Project Manager	Projects		Current Status	Comments
	IV.9	Review and Revise Level I Plant Procedures (P & G) Part 2, Revise 'G' Procedures	In Process	Project is being coordinated by Mr. Novachek. Most of the work has been delegated within the plant organization.
	VI.5	Complete Facilities Planning Study	Complete	Outside consultants were utilized in addition to PSC's staff.
J. Reesy, Staff Assistant/Special Projects	IV.1	Review and Revise Design Change Modification Process	In Process	A task force was formed headed by Mr. Reesy who is coordinating the project.
	VI.6	Improve Parts Management System	In Process	Outside consultants are being utilized.
	VI.7	Establish Component Shelf-Life Program Part 2, Install Component Shelf-Life Program	Not Started	Staggered start of implementation of project.
M. Ferris, QA Operations Manager	IV.10	Review and Revise Level I QA Procedures (Q)	In Process	Mr. Ferris is coordinating this effort. Each procedure has been assigned to individuals in the QA organization.
	V.4	Improve QA Division Training	In Process	The scope is very large and outside consultants are being used in addition to QA staff.
	II.3	Implement Planning and Scheduling Methods and Procedures	In Process	Scope is sufficiently small to complete with QA staff concurrent with other duties.
M. Daum, NED Training & Procedures Coordinator	IV.8	Review and Revise NED Procedures	Nearly Complete	Two individuals have worked on this project and it is nearly complete.
	V.5	Improve NED Training	In Process	Scope of this project is quite large. Two persons are dedicated to the project full time. Time frame reflects the amount of effort.

Appendix C
Exhibit II

PSC PFP RESPONSIBILITIES

(For Project Managers with Two or More Projects)

Project Manager	Projects		Current Status	Comments
D. Goss, NRC Licensing Coordinator	IV.2	Implement NRC Commitment Control Program	Complete	Scope was sufficiently small to implement.
	IV.3	Document Procedures for Regulatory Correspondence Review	Complete	Scope was sufficiently small to implement.
	IV.4	Review Essential Regulatory Documents Part 1, Review Essential Regulatory Documents Part 2, Define Additional Ongoing Obligations	In Process	Outside consultants are supplementing PSC's staff on the projects. Staggered start after completion of Part 1.
	V.3	Enhance 10CFR50.59 Training Part 2, Update Text Data Base	In Progress	Project is being supplemented with temporary clerical personnel.
J. Johns, Supervisor Engineering/Licensing	V.3	Enhance 10CFR50.59 Training Part 1, Conduct Training	Complete	Scope is sufficiently small to implement with PSC staff.
		Part 3, Train NED Personnel	In Process	
R. Husted, Nuclear Fuels Supervisor	V.6	Improve NLFD Training	In Process	Outside consultants are assisting. The scope is very large.
	II.3	Implement Planning & Scheduling Methods & Procedures Part 3, NLF Implementation	In Process	Additional PSC staff has been hired for this function.
T. Borst, Support Services Manager	V.7	Develop NPD Training for INPO Accreditation	In Process	Scope is quite large. The Nuclear Production training organization is dedicated to this project & is being supplemented by outside consultants. Also, several permanent staff were added.
	V.8	Consolidate Site Training	Complete	Scope was sufficiently small.
	V.9	Retrain Licensed Personnel	Partly Complete	Similar response to Project V.7.