TMI - IOSRG
R-1121-95-003

HUMAN PERFORMANCE ENHANCEMENT SYSTEM REPORT

INADVERTENT PENETRATION OF THE SAXTON CONTAINMENT VESSEL LINER DURING SITE CHARACTERIZATION ACTIVITIES

June, 1995

Submitted by: Craig C Faust, 6/27/95
C. C. Faust — Date
Tech Analyst SR II NUC

Approved by: C W Smyth, 6/27/95
C. W. Smyth — Date
Manager, Nuclear Safety Assessment, TMI-1

1.0 EVENT DESCRIPTION

1.1 Summary

On May 25, 1995, during Saxton containment vessel (CV) site characterization activity, the CV shell was inadvertently penetrated. The task of obtaining an 18 inch long concrete core bore sample was in progress when the CV was breached at a depth of approximately 16 inches. The location of the core bore drill was in the control rod room pit, at a point beneath the reactor vessel near the center line of the vessel. The root causes of this incident were attributed to the failure to use all available drawings, and the inappropriate interpretation of a sectional drawing. A contributor to the event was less-than-adequate (LTA) implementation of the review methodology per SNEC procedure 6675-ADM-4500.07. Primarily two technical reviews were not performed as intended by the procedure guidance. The reviews conducted did not ensure all the detail of the Saxton site characterization plan (SCP) and an implementing Saxton Work Instruction (SWI) received adequate independent review. The incident was 24 hour reportable to the NRC and required a written follow-up report within 15 days of the occurrence.

1.2 Chronological Narrative

December 8, 1993, TLG Engineering, Inc. (TLG) was contracted to produce a Site Characterization Plan (SCP) for Saxton Nuclear Experimental Corporation (SNEC). Approximately 98 Saxton drawings were provided to TLG to aid in the development of the characterization plan. This included detailed drawings of the facility.

TLG drafted the SCP Rev. A, interfacing with GPUN Saxton project personnel for information and comments during preparation of the draft document.

The following limitation was provided in the draft plan (Ref. TLG GO1-70A-002, Rev. A), "Note: The core sample obtained below Elevation 765' shall not penetrate more than 18 - 24 inches."

Mid to late February 1994, TLG's draft SCP Rev. A is reviewed by Saxton project personnel. The Saxton project engineer raised a question as to the amount of concrete that exists in the area specified for an 18 - 24 inch core sample to be obtained.

TLG's Project Manager's team referred to the concrete sectional drawings D-37792, D-37793, D-37794 and D-37795. Gilbert drawing D-37794 titled, "WESTINGHOUSE ELECTRIC CORPORATION, Saxton Reactor Project, Sections A-A & B-B" was used to determine the depth of the concrete beneath the reactor vessel area. This sectional view of the CV structure depicted the reactor vessel and a pit directly under the vessel in addition to detail of the concrete. TLG concluded from this drawing that approximately 3½ feet of concrete existed between the floor of the control rod pit and the CV steel wall located directly below the reactor vessel.

March 4, 1994, telephone conference was held to discuss sections of the SCP between GPUN Saxton Project personnel and TLG Engineers. GPUN provided thirty three comments. The Saxton Project engineer commented on the need to provide a specific depth for the core sample in the control rod room floor of the plan.

March 11, 1994, the Saxton project engineer received a final draft copy of the proposed final TLG version of the SCP for review and comment by March 16, 1994.

March 17, 1994, the TLG Technical Manager and the Project Manager approved the Site Characterization Plan.

March 18, 1994, TLG conducted a final design review meeting of the plan and incorporated remaining comments into the document. (Note: This review was conducted per TLG memorandum GO1-70A-9406M by personnel involved with the origination of the document. The TLG Project Manager stated that the detail of the 18 inch core was not reviewed during the meeting.)

March 18, 1994, the TLG Quality Assurance Manager approved of the Site Characterization Plan.

March 1994, the GPUN Saxton Project Engineer received the TLG plan document. He initiated an in-house procedure change request (PCR) cover sheet and placed it on copies of the TLG document. He distributed these to several of Saxton project team personnel for review and comment. The intent of the PCR was to convert the document into a GPUN document that would provide SNEC project personnel with the ability to make changes to the plan as needed. Comments from GPUN reviews were incorporated into the PCR to update/modify the original TLG document to prepare the initial draft of the SNEC SCP document.

April 14, 1994, the project engineer signed as originator of PCR SNEC-94-199, procedure 6575-PLN-4520.06, Rev 0, "SNEC Site Characterization Plan".

SNEC Radiation Safety Officer, solicited an environmental controls individual (D), assigned to support the Saxton project, to perform the technical review of the PCR document.

The (D) individual reviewed the plan from within his area of expertise (environmental and radiological technical background). He did not review specifics of the core bore detail with regard to depth and location. He believed that areas outside his area of expertise would be reviewed by other individuals that had expertise in characterization specifics.

July 18, 1994, individual (D) signed off the PCR as Technical Reviewer.

August 8, 1994, the SNEC RSO initialed as approver in the signature block of the PCR, having reviewed the PCR at the request of the Director/VP of SNEC. No comments were provided. (This was not a detailed technical review of the document.)

November 4, 1994, the Project Engineer re-signed the PCR. Changes were made that reflected the current project status since he last signed it. He had reviewed the conversion of the TLG document into a SNEC document only from an administrative perspective. (Note, per the Project Engineer, finalization of the Plan PCR was not a priority due to delays in the NRC issuing the Saxton Technical Specification change necessary to allow characterization activities.)

November 7, 1994, a Technical Functions Engineer (A), assigned to the project early in 1994, originated Saxton Work Instruction (SWI-94-001) for the task of removing concrete core bore samples from Saxton CV building structures. Engineer (A) copied core bore information detail from the draft characterization plan into the SWI. This work instruction detail mirrored that in the Plan regarding core bore location and depth detail.

Engineer (A) distributed the SWI to the SNEC Manager Dismantlement Engineering, SNEC Radiation Safety Officer, Technical Functions engineer (B), and the Saxton Project Consultant for review and comment. Engineer (B) was designated as the Technical Reviewer of the SWI.

On about November 9, 1994, Engineer (B) commented that the SWI should provide positive control of the core bore locations to ensure against drilling in locations that may result in structural defects and to provide a positive means to verify drill depths and a physical means to prevent exceeding the indicated depths. He asked engineer (A), if he should also verify location and depth detail. (Note, drawings in the SWI are not to scale and do not provide the detail to determine this.) Engineer (A) said no per Engineer (B)'s recall, that this would be done later.

Engineer (B) submitted written comments that the Safety Determination form must include a written justification addressing why core boring does not reduce margins to safety due to reduced structural integrity and why it does not potentially open up release pathways.

As a result of Engineer (B) comments, Engineer (A) submitted the SWI to a structural engineer for review (Engineer (C)). On about November 11, 1994, Engineer (C) reviewed the SWI. He recommended requirements to have structural drawings provided to the contractor at the site and to avoid locations of embedded pipe sleeves, steel embedments and water stops. He also recommended a walkdown of the CV by an individual familiar with the drawings and CV, preferably a structural engineer, who could spot specific locations. He also indicated that rebar could be cut without adverse structural effects.

Engineer (A) accepted all the written comments of Engineers (B) and (C) incorporating information to resolve their comments into the SWI.

Engineer (C) agreed to perform consultation with the drilling contractor at the site to help avoid impact on items of structural significance and provide assistance as needed.

November 14, 1994, individual (D) re-signed the Saxton SCP PCR as Technical Reviewer. He concurred with changes made since he last signed it. He did not review the document for technical detail outside of his area of expertise.

November 21, 1994, Engineer (B) signed as technical reviewer for SWI-94-001. He concurred with the conclusion of Engineer (A)'s environmental determination of no environmental or safety hazard potential based on the justification that no environmental impact would result from correctly performing the characterization effort.

November 21, 1994, the SNEC Manager Dismantlement Engineering completed an administrative review and approved SWI-94-001, location and depth detail were not reviewed.

November 30, 1994, the PCR Safety Review was completed by a licensing engineer. He signed the PCR for the Independent Safety Review. This review did not include a review of the adequacy of location and depth detail in the plan.

December 1994, the Saxton Project Engineer position was filled by a Saxton Project Consultant as a full time position. (Note: This individual will be referred to as SPE-2.)

December 28, 1994, the Director & VP of the SNEC project completed a final administrative review of the SNEC document and approved the PCR releasing the document for typing and final sign-off reviews.

March 1995, the Saxton Project engineer (SPE-2) initiated action to complete conversion of PCR SNEC 94-199 into a completed procedure. The Technical specification change request to allow Saxton site characterization activities was soon to be approved and issued by the NRC. Completion of the plan document and SWI were needed to perform the tasks.

The SPE-2 reviewed the PCR. He focused on the radiological aspects of the Plan and recent history of the soil removal, activation concerns to make sure the right samples were taken. During this review he referred to drawings D-37792 through D-37795. He used print D-37794 to confirm his recollection that approximately 3½ feet of concrete existed between the control rod room pit floor area and the CV steel wall. He assumed the pit was located on the plane of the sectional drawing because the outline of the pit intersected with the floor elevation lines in the drawing. (Note, he had been directly involved with the review of the initial TLG SCP materials.)

March 8, 1995, SPE-2 signed as originator for the 6575-PLN-4520.06, Rev. 0, procedure. The SPE asked that individual (D) perform the final technical review of PCR "SNEC-94-199".

Individual (D)'s management rejected the request. It was indicated that individual was not available to support the SNEC project.

SPE-2 assigned Engineer (A) to perform the final technical review of PCR "SNEC-94-199".

March 9, 1995, Engineer (A) reviewed the PCR. He concentrated on how the data collection requirements of the SCP could best be implemented and what techniques might be used. (Note, it is not his intent to review the entire technical content of the plan. He believed engineering aspects would be reviewed by others or it had already been reviewed in the past.) He signed for the final technical review of the plan.

March 12, 1995, the SNEC Radiation Safety Officer, provided review comments on SWI-94-001. He, also, signed as SNEC RSO for his review of plan document. His review of the PCR focused on the radiological characterization process for this document. (Note, he had been directly involved with the initial reviews of the TLG SCP materials.)

March 13, 1995, the Manager, Dismantlement Engineering (MDE) performed a spot check & administrative review of PCR-94-199 and signed-off the procedure cover sheet. (Note, this review did not include review of the detail of the 18 inch core bore location.)

March 14, 1995, the SNEC General Manager & VP, performed an administrative review of the PCR, and approved the SNEC Site Characterization Plan procedure 6575-PLN-4520.06. The effective implementing date was March 24, 1995.

March 29, 1995, the SNEC RSO approved the SWI. No comments were provided.

April 14, 1995, the SPE-2 signed SWI-94-001 as a Project Consultant. No comments were provided.

April 20, 1995, the SNEC Site Manager, reviewed SWI from a support aspect and approved the document. No comments were provided.

(Note, the SWI was not re-issued for technical review. This should have been issued because significant changes to the work instruction had occurred from the SNEC RSO review on March 12, 1995. However, the changes made did not impact the core bore sample location and depth detail.)

TLG and SNEC management personnel decided to increase the core bore sample diameter from two inch to approximately a three inch diameter bore. This would provide a sample size that would aid in the assessment process of the sample. The plan allowed for such a change, however, the SWI specified a two inch bore size. The Manager, Dismantlement Engineering did not believe it necessary to change the SWI detail.

During the week of May 15, 1995, Engineer (C) decided not to perform the SWI consultation role per discussion with the MDE who agreed to perform the task. He did not have the time to support this as a result of his work load.

The SNEC Manager, Dismantlement Engineering accompanied by engineer (A), walked down core bore locations indicated on the SWI. They marked locations on the concrete where core bore samples were to be obtained.

The Manager and Engineer (A) did not enter the control rod room. A key was required, as this is a locked area per technical specifications, and the key was not available without exiting the CV to obtain it.

After exiting the CV, the Manager reviewed structural drawing D-37757 to verify the location of the 18 inch core bore. He determined that within 18 inches of the control rod room pit surface no structural embedments of concern were indicated on the drawing. He recalled that approximately 3½ feet of concrete existed in this area and his interpretation of the structural drawing confirmed this.

Engineer (A), on a subsequent entry into the CV, marked the location of the 18 inch core bore for the control rod room pit. He located the point in reference to the center line of the reactor vessel as discussed with the manager.

May 22, 1995, Cutting Technologies Inc. (the contractor hired to perform core bore task) was briefed on the SWI-94-001 task in preparation to begin core boring activities.

The MDE instructed the contractor that, within the range of the core bore depths, he did not have to stop if metal was encountered. There were no embedments that were of a structural concern at the marked core bore sites.

MDE determined that a physical means to prevent exceeding the indicated bore depths on the drilling rig were not necessary as was stated in the SWI. A tape on the drill bit was considered to be sufficient to ensure the required depths were not exceeded.

SNEC management and supervisory personnel observed the first several core bore drillings, to assure there were no problems with the process and the contractors ability to perform the task. Subsequent contractor activities were over-seen by the Saxton GRCS and the Saxton Site Supervisor.

On May 25, 1995, approximately 25 core bores had been completed. At about 9:00 am during the drilling operation to obtain the 18 inch core bore sample for the control rod room pit, the contractor noted that metal had been encountered at approximately 15 inches. The task was stopped at approximately 16 inches due to water flowing in to the CV from the core bore hole. The contractor notified the Saxton Site Supervisor that the CV had been penetrated.

Water inflow was estimated at approximately one gallon per minute. The leak was plugged using inflatable and mechanical plugs by approximately 1:00 pm. Two hundred gallons of water accumulated in the CV sump.

1.3 Human Performance

1.3.1 Positive Human Performance Recognition

The Saxton site personnel's quick response to seal the breach of containment was effective in minimizing inflow of water to the CV. They also re-established the CV boundary to minimize the potential for a release to the surrounding environment.

NOTE: The following three sections of this report are related. Example: Section 1.3.2 (1) relates to Section 1.3.3 (1) and Section 1.3.4 (1).

1.3.2 Inappropriate actions (Classification)

(1) The TLG Project Manager's team used D-37794 to establish the location of the control rod room pit. (Quantitative Deficiency)

(2) The TLG final SCP design review meeting did not review all of the detail of the plan. (Omission)

(3) Individual (D) was selected to perform the technical review of the plan based on earlier involvement with the Saxton site dismantlement efforts, although he had no experience with what was required of characterization plan. (Omission)

(4) Individual (D) accepted the task of technical reviewer. He did not believe he had the experience and background to perform the review of a plan involving site characterization. (Omission)

(5) Engineer (A) told Engineer (B) he did not have to check the detail of the core bore locations and depth in the SWI, that this would be done later. Engineer (B) did not review this detail. (Omission)

(6) The SPE-2 determined that the 18 inch core bore location was adequate per D-37794. (Quantitative Deficiency)

(7) Engineer (A) performed the final Technical Review of PCR "SNEC-94-199" concentrating on his area of expertise only. (Omission)

(8) The SNEC MDE interpreted drawing D-37757 to indicate that the control rod room pit was located near the center line of the CV. (Quantitative Deficiency)

1.3.3 Summary of Behavioral Factors (Classification)

(1) The TLG individual did not detect from available drawings or drawing D-37794 that the pit could not be located in the cross-section of drawing D-37794. The individual assumed that the drawing depicted the pit along the cross-sectional view of this drawing because the outline of the control rod room pit lines intersecting at the 765'-8" elevation lines. The individual did not detect that the pit lines also intersect with the 768'-3" elevation line, which conflicted with the lower detail of the pit being located in this cross-sectional plain of the drawing. To establish location of the pit detail depicted on drawing D-37794 required the use of D-37792 or another print that provided three dimensional detail.

(2) TLG's review process did not provided for an adequate technical review regarding the Saxton CV. That is, providing an individual who would be sufficiently independent of the document preparation to preform a technical review of all the document detail. Out of approximately 98 drawings four were selected by the TLG team for use. Additionally, it appears that the 18 inch core bore depth was determined by one individual who influenced another on the team, looking at the same print. Per GPUN QA audit report O-COM-94-02 (Audit to qualify TLG) it was recognized that because of its small size it was not practical for TLG to provide for design verifications by a group different than the one which performed the original design or analysis. (Adequate calculation verifications were provided.) **The audit did not find this to be significant since TLG business primarily involved analysis/calculations.** This would appear to be an inappropriate conclusion since plant design is impacted by results of characterization planning. Although, GPUN initiated a review of the TLG SCP under the SNEC review process, there was some indication that this would not have been necessary since TLG was recognized as having an approved QA program and this would normally provide for independent design verification.

(3) It was assumed by the SNEC RSO that the individuals association with prior Saxton site dismantlement activity and his radiological/environmental background qualified him to conduct a technical review (RT) of a characterization plan document.

(4) Individual (D) realized he did not have any expertise regarding characterization and assumed others would or had reviewed the document in detail.

(5) Engineer (A) understood that engineer (B)'s question regarding the review of the core bore detail was related to a concern with determining if any structural impact existed due to possible items embedded in the concrete and to ensure

locations were adequately determined from the SWI. He intended to have a walk down of the locations performed prior to the start of the task and stated it would be done later. Engineer (B) assumed that Engineer (A)'s response meant that core bore detail of the SWI would be reviewed separately, possibly under another SWI and that this work instruction was not intended to control the activity associated with physically locating the drill sites.

(6) The SPE-2 selected D-37794 because it provided a clear depiction of the reactor vessel with the pit indicated beneath it. He determined that the pit was in the plane of this cross-sectional drawing since the pit outline intersected with the 765'-8" floor elevation lines. This confirmed his recollection of TLG's conclusion that 3½ feet of concrete existed under this area. He did not detect that the outline of the pit also intersects with the floor elevation lines at 768'-3" above, which conflicted with the bottom part of the pit detail depicting that the pit was located at the cross-section of this drawing.

(7) Same as (4) above.

(8) The MDE inappropriately assumed a relationship between the detail of the structural drawing which placed the control rod pit along the center line of the CV. It appears he had a mindset from prior TLG findings that 3½ feet of concrete existed beneath the pit. He did not detect that the drawing depicted the pit at the outer perimeter of the CV.

1.3.4 Summary of Causal Factors (Classification)

(1) The TLG team did not use available drawings that were required to appropriately interpret drawing D-37794. (LTA work practice exhibited using drawings.)

(2) The TLG practices did not require an independent review of all of the plan detail. GPUN's Management methods did not recognize the difference between the TLG and traditional GPUN review processes. (LTA vendor qualification audit followup.)

(3) No specific management direction existed to ensured appropriate personnel were selected to perform technical reviews. (Managerial Methods did not define an appropriate job standard to ensure proper selection of a responsible reviewer.)

(4) Individual (D) did not implement the requirements of a responsible technical reviewer per his training and per written administrative guidance. (LTA work practice performing technical Review.)

(5) Engineer (B) did not ensure he understood why the SWI under his review would not be the controlling document that would locate drill sites. (LTA verbal communication, pertinent information was assumed to have been transmitted.)

(6) The Project Engineer did not use available drawings that were necessary to establish the location of items depicted on drawing D-37794. (LTA work practice exhibited using drawings.)

(7) Same as (4) above.

(8) The MDE did not use all available detail of drawing D-37757 to ensure a proper interpretation. (LTA work practice exhibited during review of drawing detail to ensure appropriate interpretation was reached.)

1.4 Department/Work Groups Involved

TLG Engineering Inc. (Contractor) and various SNEC project personnel.

1.5 Applicable Procedure(s)

SNEC Procedure Development, Change, Requests, and Safety Reviews, 6675-ADM-4500.07, Rev. 0.

SNEC Site Characterization Plan, 6575-PLN-4520.06, Rev. 0.
Work Instructions, 6575-ADM-4500.41, Rev. 0.

2.0 FOLLOW-UP ACTIONS

The TMI Nuclear Safety Assessment department (NSA) was asked to perform root cause determination for this Saxton incident. Corrective actions that address the performance problems identified are to be determined by Saxton Management. NSA will review the corrective actions for their adequacy.

Attachment 3
C301-95-2019

GPU Nuclear

Memorandum

Subject: CRITIQUE/QUESTIONS AND ANSWER SESSION, PERFORATION OF SAXTON CONTAINMENT VESSEL (CV) STEEL SHELL VIA CORE BORE

Date: June 6, 1995

From: J. J. Byrne
Manager, Dismantlement Engineering

Location: TMI-NO32
5830-95-044
6575-951-391

To: Distribution

On May 31, 1995 (-09:00 hrs), J. J. Byrne of GPUNC Technical Functions Division held a critique concerning the perforation of the Saxton Nuclear Energy Facility (SNEF) CV steel liner during core bore sample collection. The attendees at the meeting were:

GPUNC Personnel
Mr. D. Baldwin - Saxton GRCS
Mr. B. H. Brosey - Technical Analyst
Mr. J. J. Byrne - Manager, Dismantlement Engineering
Mr. P. G. Carmel - Saxton Site Supervisor
Mr. P. Donnachie - Environmental Radiological Lab Manager
Mr. C. C. Faust - Technical Analyst
Mr. W. Heysek - Engineer, Licensing
Mr. R. D. Holmes - Saxton SC Consultant
Mr. G. A. Kuehn - Program Director, SNEF
Mr. A. F. Paynter - Saxton RSO
Mr. L. H. Porter - Project Engineer
Mr. J. A. Thomas - Engineer, Dismantlement Engineering

TLG Representatives (via phone connection)
Mr. J. Griffiths
Mr. T. LaGuardia
Mr. A. Levin
Ms. C. Palmer

The meeting opened with a general description by J.J. Byrne of the core bore perforation of the SNEF CV steel shell directly below the reactor vessel in the control rod drive room.

Questions were asked of personnel from TLG inc., concerning which drawings they used to specify the collection of the 18" deep core bore directly below the reactor vessel, as presented in the SNEC Site Characterization Plan (SCP).

TLG indicated that they used Saxton structural drawings D-37792, D-37793, D-37794, & D-37795.

TLG noted that an earlier draft of the Site Characterization Plan (SCP), had no depths specified, and it was at GPU's request that core bore depths were later added. TLG stated that they first proposed the core bore depth to be in the range from 18-24 inches deep, but then made the requirement more specific to be 18 inches. L. Porter of GPU noted that he remembered the original request to TLG to specify core bore depths to avoid penetrating the containment vessel shell.

TLG stated the depth was based on vertical Section A-A shown on drawing D-37794. This section incorrectly shows the shallow sump (6" deep_ under the reactor vessel to be in the plane of the Section, as indicated by it being drawn with solid lines. The shallow sump is actually beyond the plane of the section , so it should have been shown by dotted lines. TLG did not realize this error, which indicates that approximately 3.7 feet of concrete exists under the center of the shallow sump. TLG indicated that (based on a cursory review of the drawing) if the drawing was correctly drawn and interpreted (by determining the radial distance of the shallow sump from the containment vessel centerline), this drawing would have indicated that the concrete thickness under the sump was about 2 feet. Detailed evaluation of the drawing by L. Porter after the meeting indicates the thickness would have been determined to be about 18 inches.

L. Porter then discussed the history of the Saxton SCP production with C. Faust along with a review of the drawings and general layout of locations in the CV.

L. Porter then noted that GPUN had provided a large number of drawings of the Saxton facility to TLG, including D-37757, which depicts construction details for the shallow sump without making the drafting error of D-37794. L. Porter asked if that drawing had been consulted, and TLG stated it had not.

Mr. J. J. Byrne asked TLG about their review process prior to issuing the SCP. TLG described that design reviews were carried on at TLG. However, Mr. Griffiths of TLG said they did not do a design check based on drawing D-37757.

It was mentioned that in early 1994 the plan was developed, and by March of 1994 the depths of the core bores were specified. Modifications to the plan were made by GPUNC and by March 14th of 1995 the final plan was issued. After receiving the final draft of the SCP, the plan was reviewed internally by GPUNC. The plan was pretty much intact.

J. J. Byrne asked L. Porter if he had reviewed the specific depths of the core bores. L. Porter said he had not. L. Porter explained his roll as project coordinator. He depended on other members of the project team for detailed review of the plan.

Mr. R. Holmes signed as originator after he relieved L. Porter from responsibility. Mr. Byrne asked Mr. R. Holmes what he looked for when he reviewed the SCP. Mr. Holmes said his review centered on the radiological aspects of the plan and recent history of the soil removal, activation concerns, making sure the right samples were taken, etc. Mr. Holmes noted that he did not review drawing number D-37757. Mr. Holmes said that he asked the question about how deep the concrete was below the vessel and was told that the concrete was about three and one-half feet thick at the specified location of the 18" core bore.

Mr. Byrne asked Mr. Paynter what R. Rolph had looked at during his review of the SCP. Mr. Paynter said Mr. Rolph looked mainly at the radiological characterization process and not at the concrete depths specified in the SCP.

Mr. Byrne asked B. Brosey what he looked for in the SCP during the review process. Mr. Brosey said that he looked at the radiological aspects of the plan primarily. He noted that his review was concerned with how the data collection requirements of the SCP could best be implemented and what techniques might be used.

Mr. Byrne discussed his review of the SCP and that he did not look at the depth of the core bore in question during the review process of the SCP.

Mr. R. Holmes described how B. Good's review was for concurrence and he could not speak to what level her review was conducted.

J. J. Byrne-work instructions were written based on Saxton work instruction procedure. The Saxton Work instruction (SWI), for core boring, specified locations based on the SCP locations. One section of the work instruction specified making sure that lengths of core bores did not exceed the lengths listed in the core bore location tabulation. He did not look at drawings rather he looked at the SWI to verify that it implemented the SCP.

A. Paynter mentioned that R. Rolph was under the impression that Technical Functions would walk down core bore sites and looked at SWI from radiological perspective.

P. Carmel reviewed the SWI from a site support point of view and not the core bore depths.

J. Thomas said that the characterization plan was not approved at the time of his review. He looked at techniques and commented on drill control, and structural engineer concurrence in location. These comments required a positive depth control on the drilling and a walk-down by a structural engineer. Specific locations were not specified. He did not look at 18" core bore location.

Mr. R. Holmes questioned the depth of concrete for neutron activation, but looked at D-37794 drawing and saw that there appeared to be enough concrete under sump and an 18" core bore would not seem to challenge this depth. This drawing gave him comfort that there was plenty of concrete.

Prior to starting to take core bores, Mr. J. Byrne and B. Brosey identified the specific core bore locations. Mr. Byrne reviewed the structural drawings and specifically reviewed drawing D-37757 to ensure the core bores would not affect CV integrity. Mr. Byrne admitted misreading drawing D-37757 when he determined there was sufficient concrete to take an 18" deep concrete core sample from beneath the reactor vessel. This was the final review performed prior to starting the core bore operation. Core bore operations commenced May 22, 1995. By Thursday, May 25, 1995, 25 core bores had been taken by Cutting Technologies Incorporated.

About 0900 hrs. Thursday, May 25, 1995, Mr. D. Baldwin called P. Carmel to tell him we had penetrated containment vessel. Estimated a water flow of about one gallon per minute. This leak was plugged with a 3 inch mechanical plug at approximately 1300 hrs. By this time two hundred gallons of water had accumulated.

L. Porter asked if we had verified that we had in fact penetrated the liner.

Mr. R. Holmes replied that we had not, and that water samples taken showed some activity levels. Monitoring wells on site have not indicated any contamination in ground water. This could indicate that at least some the water was <u>not</u> coming directly from the ground but instead via some other path through the shell and then between the shell and interior concrete structure.

T. Laguardia from TLG asked if the core bore crew had noticed a change in core boring machine performance when steel (rebar or liner) was being cut.

P. Carmel replied that they had noticed steel frequently while drilling and that the crew thought they were cutting rebar when they were drilling into the CV shell. R. Holmes noted that drilling locations were generally selected to avoid rebar, using a rebar finder.

Mr. P. Donnachie questioned TLG concerning the reason for the depth of the 18" concrete core bore. He was told that peak activity due to neutron activation in concrete was usually between 3 to 9 inches. In this instance it may be deeper directly below the RV because of the likelihood of neutron streaming along the control rods. TLG mentioned they have seen some activation out to four feet into concrete at other projects like Cintichem.

P. Donnachie noted that all ten groundwater monitoring wells have been sampled to date and that the seven tested (three were not completed as of this date/time), showed no increased levels of activity.

End of critique at 10:50 hrs.

J. J. Byrne
Extension 8461

/lls

<u>Distribution</u>
D. Baldwin - Saxton GRCS
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