REVIEW OF CHEMICAL SAFETY PROGRAMS AT SELECTED NRC LICENSED FACILITIES

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NUCLEAR DIVISION
ENGINEERING AND MANUFACTURING FACILITY
RICHLAND, WASHINGTON

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1.0 INTRODUCTION

1.1 Scope of Site Visit

An information gathering site visit was conducted on the chemical safety program at the Siemens Power Corporation (SPC) facility in Richland, WA from December 13 to December 16, 1993. The information gathering effort was directed at the facility's recognition and management of chemical hazards as they may impact:

a) Onsite and offsite populations directly affected by chemical releases due to incidents associated with licensed nuclear materials,

b) Operators of the plant or the operator's capacity to safely operate the plant due to chemical release, and/or

c) Potential explosions or fires from chemicals which could affect nuclear material containment or handling operations.

The SPC Plant is currently covered under the OSHA Process Safety Management Standard (29 CFR part 1910.119) and will also be covered under EPA Risk Management Program (Proposed Rule 40 CFR Part 68). As part of compliance, the facility is required to establish and maintain a program to identify and manage chemical risks to employees and offsite risk receptors (human health and the environment) at the site. The NRC is specifically concerned with how these hazards will have the potential to impact operations involving licensed materials, which are under the direct mandate of NRC to regulate.

1.2 Date and Conduct of the Site Visit

The site visit was conducted from December 13 to December 16, 1993 by a team of two SAIC engineers and two NRC representatives. This team included the following individuals:

- Mr. Phuoc Le, SAIC - Project Manager
- Mr. Peter McKnight, SAIC - Senior Engineer
- Dr. Richard Milstein, NRC - Project Manager
- Mr. William Troskoski, NRC - Enforcement Officer.

Members of the SPC management team which met with SAIC/NRC team included:

- R.E. Vaughan - Manager, Safety, Security and Licensing
- L.J. Maas - Manager, Regulatory Compliance
- R.K. Burklin - Health Physics
- R.E. Coen - Criticality Safety Specialist
- J.B. Edgar - Staff Engineer, Licensing
- E.L. Foster - Supervisor, Radiological Safety
- S.R. Lockhaven - Environmental Engineer
- C.D. Manning - Criticality Safety Specialist
- T.C. Probasco - Supervisor, Safety
- K.H. Tanaka - Environmental Engineer

2.0 PURPOSE

NRC is currently revising its regulation (10 CFR Part 70) of nuclear fuel cycle facilities. In addition, it is developing a Standard Review Plan (SRP) for evaluating license applications that are submitted pursuant to the new rule. One of the areas addressed in the rule and in the SRP is chemical safety. Consistent with the view expressed in the 1989 draft Branch Technical Position on Chemical Safety, the chemical hazards that NRC is concerned about are:

1. Significant hazard (either clinically observable or irreversible health effect) to onsite operators and the offsite public resulting from the failure of nuclear materials operations. Examples of this would be the HF that would be generated by the release of UF_6, as well as the chemical toxicity of uranium, or the NO_x plume that would be generated by the failure of a U_3O_8 dissolver system.

2. Significant hazard (incapacitation) to a process operator actively involved in the operation of a nuclear material processing or handling operation, or a fire or explosion of flammable materials which could cause an accident involving nuclear materials.

NRC also recognizes that hazardous materials are being regulated by various other Federal and State agencies. At the Federal level, OSHA has promulgated the Process Safety Management (PSM) Standard under 29 CFR 1910.119 and the EPA has recently released its Risk Management Program (RMP) under 40 CFR Part 68.

As a result, NRC would like to develop criteria for requirements of a Chemical Safety Program for the licensed facilities in a way that is both effective and sensitive to the needs of both the

regulatory side and licensee side. NRC's objective is not to overburden the licensee with unnecessary duplication of effort in achieving "chemically safe" operations at the plant.

To this end, NRC and its contractor, SAIC, have set up a series of site visits such as the one at SPC to collect information on how the plant looks at chemical safety and the type of program implemented for maintaining such a safety effort. NRC would like to work with the licensees to establish a chemical safety program that is sensible and achievable by the licensees. Similar cooperative efforts between industry and regulating bodies have led to acceptable regulations development in the past, such as the OSHA PSM standard. Thus, by following a similar approach, NRC expects to establish requirements for the chemical safety program.

In order to evaluate and collect information on the CSP at the SPC plant, SAIC compiled a list of eleven (11) initial topics based on a number of existing Process Safety Management (PSM) programs that include:

- OSHA's PSM (29 CFR 1910.119)
- EPA's upcoming Risk Management Program (RMP) (40 CFR 68)
- New Jersey's Toxic Catastrophe Prevention Act (TCPA)
- California's Risk Management and Prevention Program (RMPP)
- Delaware's Extremely Hazardous Substances Risk Management Act (EHSRMA)

These eleven topics are discussed in each of Sections 4.1 through 4.11.

Using these criteria, the team was able to collect useful information on the CSP at SPC. The information gathering effort entailed extensive discussions with plant management and a site tour of all areas where chemicals are stored and used. An information gathering form was used during the site visit and has been provided as Appendix A. Since this is an information collection trip only, SAIC has refrained from passing any judgement on the adequacy of SPC's CSP. Instead, a summary of observations and comments on each criterion is provided below.

3.0 PROCESS OVERVIEW

The Siemens Power Corporation (SPC) produces low enriched uranium fuel for light water reactors. Plant capacity is nominally 700 metric tons per year.

Enriched uranium (less than or equal to 5 % U-235) is converted to UO_2 by one of the following two conversion processes - Ammonium Diuranate (ADU) process or the Dry process. In the ADU process, UF_6 in Model 30B cylinders is vaporized, hydrolyzed, and then precipitated with ammonia as ADU. The ADU solids are passed through a reduction furnace to form UO_2 powder.

SPC has a pilot plant for the Dry process. However, the Dry conversion process is considered proprietary and no process description was provided by SPC.

The UO_2 powder goes through a blending-milling-slugging-granulating operation in a closed system from where it ent either for pellet pressing or to interim storage.

The pelletizing operations and fuel rod assembly and transportation operations do not involve any significant chemical hazards, and their discussion is thus not included in the Chemical Safety Program report.

4.0 INFORMATION GATHERING RESULTS

4.1 Hazard Identification and Assessment

SPC has not established a formal program to address identification and assessment of chemical hazards. Although the standard Hazard Communication Program and OSHA 1910.120 24-hour training is provided to plant personnel as required, there is no current system to assess plant-wide hazards from chemical handling, storage and use from the perspectives outlined in Section 1 of this report. The licensee does not have a formal method for identifying and assessing chemical hazards at the site. Based on the information collected during the plant visit, the following two chemicals are covered by either the OSHA PSM Standard (29 CFR 1910.119) or/and EPA RMP Rule (40 CFR 68): ammonia, and propane.

The licensee understands that there is a need for conducting chemical hazards assessment in the context of NRC's Chemical Safety Program (CSP). There is currently no schedule or plan to conduct these assessments for the plant.

Although the plant does not have a formal program for hazard identification and assessment (HIA), it has carried out certain aspects of this element in a few plant modifications. The process of reviewing the hazards in a proposed change is documented through the Engineering Change Notice (ECN). The Startup Council, a group consisting of the senior plant management in production, engineering, safety and the Plant Manager, is responsible for ensuring that any plant modifications or operation changes are reviewed prior to implementation of a change. The hazard assessments that were done previously as part of the ECN program are focused on radioactivity and criticality issues. The methodology used for identifying chemical hazards at the plant was a "Failure Mode and Effects Analysis (FMEA)". The plant has conducted this type of chemical hazard analysis for one process modification, but the report for this assessment had not been finalized at the time of the site visit and so was not available for review.

One element related to hazard assessment tracking, recommendation documentation and resolution is being addressed through the facility's Regulatory Commitment Tracking System. This computer-based system is currently used to track recommendations from inspections, audits, appraisals, and incident investigations. It could provide a strong forum for maintaining control of recommendations stemming from hazard analyses, although it is not currently being used for that purpose.

An important part of the hazard assessment is reflected in the way in which the site maintains the storage of hazardous materials onsite. During the plant tour, the team noticed that the chemical storage and segregation of incompatible materials was maintained in a very competent manner. Storage areas for acids, bases and flammable materials were all segregated by using separate storage buildings which were inventory controlled, and it was apparent that great care was taken to avoid storing incompatible materials together. This provided insight into the good general awareness and understanding by plant personnel of chemical hazards, radioactivity, criticality and other hazards present at the site. Under the context of the Chemical Safety Program, the team reviewed "general plant awareness" associated with ammonia, hydrogen and HF. The SAIC team questioned site personnel, both management and operators, to determine whether the chemical hazards were recognized and the Safety Program understood by these employees. In general, all persons interviewed were aware of site hazards.

4.2 Process Safety Information (PSI)

It appears that the plant does not currently have 100% of its engineering information related to process safety and design intents, such as Piping and Instrumentation Diagrams (P&IDs), process descriptions, and equipment specifications (including materials of construction and design limits) up-to-date. The licensee has recognized the need for having up-to-date PSI that conforms to OSHA's PSM regulation. The licensee has a plan to update the required elements of PSI and has contracted a consulting engineering/drafting company to complete the validation of plant drawings and incorporate these into a Computer Aided Design (CAD) system.

Checking the currency of and updating PSI is in the early phase of the validation process (i.e., about 20% of the P&IDs are verified as current, while the remaining are in the process of being validated). The licensee has a goal of completing this element by the beginning of 1995. The establishment of a PSI management program would serve as a strong foundation upon which a successful Chemical Safety Program could be based. The Engineering Maintenance Department is responsible for maintaining PSI, while the process engineer for each area is responsible for maintaining current information on process chemistry and interlock logic and alarms.

The facility's Instrument Repetitive Maintenance (IRM) program maintains lists of critical equipment through the PERMAC automated maintenance management system which currently resides on a mainframe computer. This system supports process safety information for critical equipment by PIN[1] so that equipment information can be readily accessed.

The site has embarked on a program of color coding and labelling all piping. During the site tour the team asked if the color coding was to be checked as part of the "as-built" checks and the team was informed that was not part of the current plans. This lack of verification of color coding of lines is a significant safety concern, because it is possible that fluids other than those the lines have been designed for may be flowing in the lines. This could lead to potential catastrophic scenarios. The plant also does not maintain the original design specifications for relief valves. However, these may be obtained from vendors if required. It was indicated that, when appropriate, changes to relief valve design specifications (i.e. if not a replacement-in-kind) would be included as part of any process modification that requires an ECN. It was also noted that the plant did not keep piping isometric drawings. Although these data (piping isometric drawings and design specifications for relief valves) represent a small portion of the PSI domain, they are still needed to build a strong base for the PSI element of the CSP.

The plant seems to recognize the need to update their PSI, and is implementing actions to meet the proposed 1995 schedule for having PSI current and accessible through automated systems.

4.3 Standard Operating Procedures (SOPs)

SPC appears to have a strong program for generating and maintaining SOPs. Based on a brief review of the written SOPs during the site visit, the SOPs appear to be well written and easy to understand. The process engineer for each area is responsible for developing the SOPs in that particular area. It appears that the operators are also involved in the review of the SOPs, although the SOPs are written by the process engineers. From an interview with an operator, the SOPs appear to be complete, up-to-date, and clearly written. The SOPs reviewed covered initial startup and normal operations, shutdown in emergency situations, normal shutdown, and startup following shutdowns. Conditions requiring shutdown are addressed in the SOPs as fire, natural disaster and criticality points (which are generally covered by double contingency interlocks). Chemical spills and abnormal chemical operations which do not involve criticality issues are not as well protected and are dependent on operator interaction. The plant believes that abnormal events involving chemical hazards will provide more time to react to and control the situation than criticality points, so that interlocks are not necessary to control chemical hazards. However, to lend more

[1] Process Identification Number for as-built drawings

credibility to this point of view, the plant can address this issue as part of a hazard assessment program.

Consequences of deviation from normal conditions are not addressed directly in the procedures although they are an important part of the operator training program. The steps to address abnormal conditions are emphasized in the operator's on-the-job training. The draft SRP for Chemical Safety calls for troubleshooting (i.e. addressing consequences of deviations from normal conditions) to be part of the Operating Procedures. It may be a separate document appended to the Operating Procedures or may be part of the SOP itself.

The operating limits for each batch are dictated by the process engineering department on the parameter sheet that is given to the operators at the beginning of each product cycle. Parameters that are constant for all operations are listed in the SOPs themselves. Personal safety and health considerations during operations are included in the SOPs.

Current versions of the SOPs are maintained in the control rooms. Individuals are not issued personal copies of SOPs. During a review of SOP understanding with operators in the control room it was judged that the operators interviewed were knowledgeable in the SOPs reviewed. The use of logsheets and checklists by the operators to track progress on operations was observed in the control room. Most of these forms are already part of the SOPs but the current program plans for the inclusion of all logsheets and checklists into the official SOPs by March 1994.

Temporary operations are not permitted at the site without the issuance of a Temporary Document Revision (TDR). The TDR is reviewed by management prior to approval and the placement of temporary operations into service.

Although the site has a strong program for maintaining SOPs current, they are not all certified as current presently. The site does not have a set time limit for review of operating procedures for currency on a periodic basis. The goal is to certify all SOPs as current and reviewed by March 1994.

4.4 Site Wide Safety Procedures

The licensee has a strong site wide safety program which is documented in the Site Safety Manual. Review of the hotwork and lockout/tagout procedures showed that they were well thought out and usable procedures. When operations personnel were interviewed they showed knowledge of the site wide safety procedures. The site's confined space entry permit program has been updated to comply with federal OSHA revised rules on confined space, but the site believes that Washington State Safety and Health Administration will have more stringent rules that will apply to confined

space entry in the near future. The site's lockout/tagout program was in evidence throughout the plant in the form of brightly colored lock-boards with color coded locks. This program is newly installed and according to the site has been well received so far. The procedure for opening of process equipment for maintenance was reviewed and appears to be well written and coordinated with the lockout/tagout procedure.

The program covering management of contractors onsite is shared by the Safety Department and Landlord Services. All contractors and visitors are escorted by plant personnel while onsite. General orientation training and plant safety training is provided to contractors and visitors by the Safety Department. Contractors are required to view a 75-minute safety video and receive radiological safety training provided by the Safety Department prior to conducting work in controlled areas onsite. There are no current provisions to conduct reviews of contractor safety records prior to awarding contracts or to maintain safety logs for accident or illness of contractors onsite.

According to the plant, the development of a more formal contractor management program (which would specifically address contractor safety logs and contractor assessment prior to awarding contracts) is in progress, but no schedule for completion was provided.

4.5 Training

Again, the licensee has a strong program for training employees and operators at the plant. All employees receive basic training in the general understanding of how the plant works, the basic safety training including alarms and evacuations, and MSDS training. Operators also receive basic indoctrination training and on-the-job training in process operations. Initial orientation training includes classroom training and general plant safety and Hazard Communications training, followed by job-specific training designated by the Job Description. Tests, both written and on-the-job evaluations, are part of the operator qualification process.

The site maintains a written description of its operator training program, which was very useful in reviewing this element. The program entitled "Chemical Operator Workstation Training and Operator Training (EMF-1528)" provides job description-specific training agendas for operators. The establishment of skills/training requirements for operator certification was conducted in a systematic way; however there is no established procedure which defines the process of determining these requirements. All operators are certified using written tests and on-the-job evaluations. Operators that were "grandfathered" due to experience were not required to go through the skill demonstration test if they passed the written tests. The selection and qualification of training instructors is limited to supervisors or lead technicians who are fully certified.

Tracking of operator qualifications is facilitated by an SPC computerized tracking program. The site training records are available through the computerized SPC Training database and written records are available to support the training certification claims. A review of the training tracking system records indicates that there is an agreement between the hard-copy and software versions. As a result, it appears that process operator training has been sufficiently formalized and is well-documented.

Refresher training is an area where SPC has not yet resolved when an operator will require retraining or recertification on a workstation prior to returning to work in the area. As of now, the training program tracking system allows operations to review which operators are certified for which work stations. Recertification is not required at the present time, so that once an operator is certified for a work station, he is qualified to work there at any time, even if he was certified many years ago and has since been reassigned to another workstation in another area. This situation is currently being considered by management for setting a policy on the time frame of validity of the certification.

The training program includes student evaluation of training through evaluation forms and observation of trainers by their supervisors during training sessions to ensure that training is effective in meeting its goals and objectives.

Emergency response training is provided through the emergency response team exercises and general plant drills. In general, it appears that the licensee has a strong training program, and is committed to continue this program.

4.6 Maintenance

The licensee maintains a good maintenance and inspection program that includes a Preventive Maintenance (PM) program for major equipment. The PM schedule is tracked by PERMAC, a computerized tracking system, that provides planning schedules on critical equipment to ensure each PM task is completed on time. A system of checks-and-balances exists that reinforces the commitment to complete all PM activities. The computerized PERMAC system generates monthly planning schedules and until all maintenance activities on the monthly schedule have been completed and signed off or reassigned by responsible personnel, the next month's activities schedule is not released. In addition, other departments such as the Safety Department review maintenance and inspection activities. If any work remains undone, it shows up in a report to the plant manager. This serves as strong incentive for maintenance personnel to get their schedules completed on time.

The responsible engineer for each area provides the initial schedule for internal and external inspection of equipment to the Maintenance Engineering Department which is responsible for entering the information into PERMAC. The schedules are based on the manufacturer's recommendations and modified if necessary based on operating experience. When a particular piece of equipment requires maintenance, the PERMAC program produces an "Out of Tolerance Form" to provide warning that maintenance is required. The automated maintenance management system is also used to provide breakdown trend reports on equipment which require frequent repairs and inspection in excess of scheduled activities.

Standby emergency equipment is not included in the PERMAC system, but records and maintenance schedules for emergency power generators and fire pumps are the responsibility of the process engineer for each area.

4.7 Management of Change (MOC)

SPC has a mature program to ensure that changes in the plant are managed properly. This system is based on the Engineering Change Notice (ECN) that has been in use (in principle) for more than twenty years at the plant. The program has been modified to remain current and appears to meet most of OSHA's PSM requirements. Once the change requires initiation of an ECN, it will be reviewed by a number of organizations within the plant before it is approved. The written ECN procedure and ECN form provide a framework for review and a method for documenting changes and ensuring that elements that are linked to the change are updated as well. There is a checklist as part of the ECN form which must be filled out to ensure related changes in process safety information and retraining of personnel are completed as part of the ECN. The existing program does not formally require completion of an ECN within any allotted time-frame; however, it was noted that every ECN form is required to be completed prior to a change being approved.

Replacement-in-kind does not require an ECN form. The SAIC team has one concern about this system as to the basis for determining when a change is a change and when it is a replacement-in-kind. It appears that this determination is subject to the opinion of the person who initiates the change. A definition and example list of changes would be very useful in this case.

4.8 Incident Investigation Program

The licensee has a strong program for conducting incident investigation. The licensee has adopted TAPROOT as a methodology for the Incident Investigation Program (IIP). Depending on the severity of the incident, the investigation team may involve management personnel up to the level of plant manager on the Incident Review Board (IRB) that is formed to conduct the investigation of major incidents. Normally, the team includes representatives from the Safety Department,

Licensing Department, Operations, Process Engineering, and Plant Engineering on the Incident Investigation Board (IIB) for an incident involving minor injury or abnormal event. The plant procedure is currently under revision to incorporate new policy under development for this area (Policy No. 10.6) which provides further guidance on how to select incident investigation teams and review of near-miss incidents.

The plant has a written procedure for incident investigation which includes the forms to be completed as part of the documentation requirements for the investigation. The procedure defines what occurrences require investigation and describes the process to be followed. The formation of either the IIB or the IRB is dependent on the severity of the incident and management review of the situation. Incident investigations are required to be started immediately after an incident has occurred.

The records reviewed and forms utilized in tracking incident investigations provided for the recording of the date of the incident, description of the events which occurred, causes (root causes) and resulting recommendations from the investigation. The recommendations are tracked by the plant recommendation tracking system. When the question arose how the recommendations are coordinated with the incident file for closure, the plant personnel interviewed were not sure whether there was an immediate route to that information. This is an area which should be further clarified. The results, findings and lessons learned from incident investigations are reviewed during the monthly eight hour safety meetings with the employees. However, this activity is not a formal part of the incident investigation procedure.

The plant maintains incident investigation files indefinitely and has not set an internal timeframe for disposal of incident investigation files. Safety meeting minutes are retained only for one year.

A major effort has been made to educate incident investigation teams in root cause analysis, as 49 plant personnel have already received training in the TAPROOT methodology. The plant has also made efforts to involve employees in the investigations where appropriate.

4.9 Emergency Response Planning

The licensee has a very strong emergency planning program that conforms to NRC requirements. The visit to the Emergency Operating Center (EOC) indicated that the facility is well equipped and well organized with diversified means of communication to outside organizations. The licensee has two sets of documents addressing Emergencies - the Emergency Plan and the Emergency Procedures, both of which were reviewed. The Emergency Plan reviewed covers pre-emergency planning and information on each area of the plant. The Emergency Procedures address the details of implementing the Emergency Plan. Emergency Procedures provides general

approaches to emergency situations and do not focus on specific responses to specific scenarios, but rather on the preparedness and training to provide a strong basis for field decisions to be made at the time of the incident. Air-dispersion models for chemical release plumes under different weather conditions and at different levels have been acquired by the plant to be used in the event of a release. Materials (for both the Emergency Plan and Procedures) are reviewed and updated on an annual basis. Document control was well maintained and distribution of the plan documents was noted to be effective both on-site and off-site.

One concern with the plant's vapor dispersion models[2] that address HF[3] release scenarios is that they treat the HF plume as a buoyant cloud; on the contrary, the HF cloud should be treated as a heavier-than-air-plume. The hydrolysis of UF_6 results in the formation of HF (denser than air) mixed with UO_2F_2 (heavier than HF), which thus cannot be buoyant. If the HF plume is not defined correctly, the release modeling may lead to erroneous estimation of areas of exposure, and potentially, an incorrect emergency plan.

In addition, the plant does not have a distinct alarm for chemical hazards like fire or criticality emergencies; instead, the general plant PA system, which is considered as a nuisance by some, is used to announce the chemical hazards. The plant recognizes this deficiency and has plans to upgrade the alarm system to address this problem.

The plant has a well established Emergency Plan (EP) and Emergency Response Procedures (ERP) that are written to implement the steps outlined in the EP. The plant has also conducted both planned and unplanned drills and exercises. Either one formalized table top drill or a full field exercise is conducted each year, so that the two types of exercise are repeated every other year. The team visited the EOC and found that it appears to be very well equipped and in an excellent state of readiness. When asked if the EOC was protected from chemical intrusion, it was indicated that in the instance of a toxic release that affected the area surrounding the EOC, the Plant Emergency Response Team (PERT) would have to evacuate the site and set up the command center offsite.

Emergency equipment is inspected on a regular basis, according to plant personnel, but records are not maintained for these activities. A preventive maintenance list is printed on a monthly basis for emergency equipment that is part of the Maintenance Management System, such as emergency

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[2]Complex Hazardous Air Release Model (CHARM), developed by Radian Corporation was used to generate the models.

[3]In fuel cycle facilities a release of UF_6 would result in the formation of HF as it mixes with moist air according to the equation: $UF_6 + 2\ H_2O \rightarrow UO_2F_2 + 4\ HF$

pumps and generators. The licensee should be required to document maintenance and inspection activities related to emergency equipment.

4.10 Detection and Monitoring

The licensee has established a program for detection and monitoring hazardous materials that could affect the operations of the licensed materials. These include monitoring of UF_6 and HF due to an accidental release from the UF_6 vaporization chest room, monitoring for ammonia in the ammonium hydroxide recovery room, and hydrogen monitoring in the UO_2 conversion area (near the sintering process). However, outside areas that are used to store hazardous materials such as ammonia, ammonia cracking process, and propane are not well monitored. The licensee needs to document the reasons as to why these areas do not require monitoring.

In the operations areas, the use of a control room operator and a field operator provides constant monitoring of operations in the field as well as through the distributed control system. The operators also rotate periodically, the field operator watches the board while the control room operator visits the unit, to ensure that one operator is not overlooking a potential problem.

Most chemical detection systems provide alarms but do not automatically shut down the process. This type of hard interlock is generally reserved for criticality emergencies at the site. The exception to this is in the sintering area where hydrogen detection system will shut down the sintering furnaces and in the UF_6 hot box where HF or UF_6 detected will shut down the process as well.

4.11 Audits and Inspections of Chemical Safety Program

The licensee has a strong program for auditing various programs at the plant. When the CSP is established at the plant, it will be covered under this general plant audit program. Recommendations and findings during audits are tracked by a computerized tracking program that ensures completion of resolutions.

The plant performs self audits regularly throughout the year, but receives no oversight audit from corporate staff. The site utilizes audit forms from programs that are regulation based and implements the audits on a formal basis through audit procedures. The plant currently maintains audit results for 30 years.

The site management was asked with what frequency audits should be conducted for the chemical safety program and it was indicated that once every three years (like OSHA 29 CFR 1910.119) would be adequate.

5.0 DISCUSSIONS AND SUMMARY

In general, the licensee has established programs that will address many elements of the proposed NRC's CSP. If these programs are expanded to include considerations for chemical hazard issues, the licensee will conform to the proposed CSP. At present, it appears that the major deficiency in the licensee's program is the lack of a chemical hazard identification and assessment program.

In summary, it appears that some of the elements of the CSP have been covered in detail while others are in various stages of completion, ranging from total lack of formal written information to partial documentation.

Some of the CSP elements that may require major revision or a whole new program include:

Hazard Identification and Assessment

Some elements that could be improved but may not need as extensive a revision as those above include:

Process Safety Information
Site Wide Safety Procedures
Detection and Monitoring
Maintenance
Audits and Inspections of Chemical Safety Programs

Elements that may need only minimal improvement include:

Operating Procedures
Training
Management of Change
Incident Investigation
Emergency Response

APPENDIX - A: INFORMATION GATHERING FORM

CHEMICAL SAFETY PROGRAM

SIEMENS POWER CORPORATION
RICHLAND, WA

DECEMBER 13 - 16, 1993

1. **Hazard Identification & Assessment**			
	Where Maintained:	**By Whom:**	**Notes:**
1. What is considered as a chemical hazard in the context of licensed nuclear material operations?			Hazard communication program using video, handout and overheads. Includes acid, base, dust, etc.. 24-hr TSD RCRA training - handling and storage of chemicals. Recognition of hazards by operators through Hazard Identification Training, and chemical plant industrial hygiene. Engineering Change Notification (MOC) goes through plant industrial hygienist, environmental engineer, safety, security, licensing.
2. What are the methods used to identify a chemical hazard? a. Incident history b. Similar industrial history			Hazard Analysis for engineering program - Fault Tree Analysis (FTA). Takes into account incidents both at the plant and at other plants. Engineering takes into account experience from other industries and incorporates into design at the plant.
3. Is there a formal procedure to assure that the hazard assessment is appropriate to the complexity of the process			A formal procedure used for the calciner - FMEA to look at the different ways in which water can get into the calciner system. A team did the analysis, independent of a similar study done in the past.

1. **Hazard Identification & Assessment** (Continued)

	Where Maintained:	By Whom:	Notes:
4. Hazard Assessment Methodologies:	Engineering Department		Operations + Safety + Licensing Accident scenarios - barrier analysis FMEA - to try to find two barriers.
a. HAZOP			
b. What If?			
c. Checklist			
d. FMEA			
e. Fault Tree Analysis			
f. Others			

1. **Hazard Identification & Assessment** (Continued)			
	Where Maintained:	**By Whom:**	**Notes:**
5. Does the hazard assessment address the following? a. Hazards of the process b. Previous incidents c. Engineering and administrative controls d. Consequence of failure of engineering and administrative controls? e. Human factors f. Facility Siting	Engineering Department		HA - not a formal program yet. The HA for the calciner addressed some matters, but the report is not final yet. The HA may become the technical basis for operating the calciner. A start-up council is setup for new projects, modifications, and SWER.
6. Hazard assessment team make-up:	Engineering Department		Process Engineer + Equipment Engineers. (Process engineers talk to operators to get their input)

1. **Hazard Identification & Assessment** (Continued)			
	Where Maintained:	**By Whom:**	**Notes:**
7. Recommendation documentation and resolution:			Manufacturing Regulatory Commitment Tracking System procedure - audit, generic issue.
a. act in a timely manner		not really	
b. document actions taken		yes	
c. complete actions as soon as possible		questionable	IRM and PERTMAC - used for PM recommendations
d. develop schedule for completion		yes	yes
e. communicate to affected organizations within the plant		yes	engineering change procedure - good system.

2. **Process Safety Information**			
	Where Maintained:	**By Whom:**	**Notes:**
1. Equipment List	Engineering Maintenance		PIN - as-built drawing PIN #s maintained in PERTMAC system. List of chemical storage tanks kept in the drawing room. List will be completed by January 1995. (PERTMAC/IRM run on IBM mainframe - developed by McDonnel Douglas)
2. Instrument List			List by area - could be retrieved by calling up the area on the PERTMAC/IRM system. A list of equipment and instrumentation will be generated.
3. Pipeline List			No isometric drawings available - no intention of acquiring these in the future. Pipes are color-coded - yellow, brown, red, green. Piping standard does exist, but as-built piping has not been verfied against the standard.
4. Process Flow Diagrams			Some PFDs available for chemical area training - but no plans to provide complete set of PFDs in the future. Existing PFDs will be updated by end of 1994.
5. Process Chemistry	Process engineering		The process engineering dept develops a Process specification book, which interprets the product specification for the job.

2. **Process Safety Information** (Continued)

	Where Maintained:	By Whom:	Notes:
6. Piping & Instrumentation Diagrams			CAD drawings are being developed by outside consultants to update as-built drawings. Transcription into CAD drawings expected to be completed by end of 1994. 20% of the as-built drawings have been verified to be current. The remaining drawings are probably up-to-date but have not been verified.
7. Site Plans and Topography	Landlord		Landlord dept - utilities. Site drawings (590) - readily available. Visible piping layout is kept up-to-date only on P&IDs and not in the original piping layouts. Underground piping is kept up-to-date.
8. Equipment Specifications	Engineering		Specifications on equipment included on the equipment drawings themselves.
9. Piping Specifications			Separate specifications for piping systems.
10. Instrument Specifications			Specifications for equipment calibration exist on IRM system.

2. **Process Safety Information** (Continued)			
	Where Maintained:	**By Whom:**	**Notes:**
11. Interlock and Logic Diagrams			No separate logic diagrams available for interlocks. SOPs include description of how the interlocks work. Ladder logic diagrams available. Operations are responsible for maintaining currency of interlock diagrams.
12. Fire Water System	Landlord Department		Available and maintained up-to-date. Fire water supplied by City of Richland. Fire hydrant locations are marked on the site map.
13. Electrical Area Classification	Landlord Service		One-line diagrams available.
14. Protective System Design and Specifications (including relief valves)	Engineering		What about design basis for RVs? Probably documented in ECN. Deluge system in HVAC - PM performed on regular basis.

3. **Operating Procedures Written SOPs**			
	Where Maintained:	**By Whom:**	**Notes:** P-66-820: Process Startup and Shutdown.
1. Initial Startup			Yes
2. Normal Operations			Yes
3. Temporary Operations			Temporary documents issued and reviewed before being put in service.
4. Emergency Shutdown			Yes
5. Conditions Requiring Emergency Shutdown - Responsibility			Yes. Fire conditions, criticality, natural disasters, crucial operatiosn are controlled by interlocks. SOPs list interlock trip points. Criticality has a double-contingency interlock. Chemical spills and alarms are are addressed by operator actions. The plant believes that abnormal events involving chemical hazards give the operators enough time to react and control = > there is no need to have interlocks such as for radioactivity or criticality events.

3. **Operating Procedures Written SOPs** (Continued)			
	Where Maintained:	**By Whom:**	**Notes:**
6. Emergency Operations			Yes - training provided.
7. Normal Shutdown			Yes - more detailed than the normal step-by-step procedure. Revisions to SOPs are reviewed by operators to ensure that a sufficient level of detail has been included.
8. Startup Following Turnaround or Emergency Shutdown			Yes
9. Operating Limits			Process engineer determines operating limits on Parameter sheet. Parameter sheets maintain design intent (mainly from quality, specification point of view). Any parameters that remain constant are included in the SOP.
10. Consequences of Deviation			Process engineer reviews SOPs on the field to ensure efficiency and revise as necessary. Consequences are not part of the SOPs but operators know what to do in the event of deviations - part of skill demonstration and on-the-job training.

3. **Operating Procedures Written SOPs** (Continued)			
	Where Maintained:	**By Whom:**	**Notes:**
11. Corrective Actions for Deviations or to Avoid Deviations			Not addressed in SOPs but covered as part of skill demonstrations and on-the-job training.
12. Personal Safety and Health Considerations a. Properties and hazards of materials. b. Personal Protective Equipment Required, Engineering Controls and Administrative Controls to Prevent Exposure c. Control Measures if Physical Contact Occurs d. Quality Control and Inventory Control e. Special or Unique Hazards			Yes

3. **Operating Procedures Written SOPs** (Continued)			
	Where Maintained:	**By Whom:**	Notes:
13. Safety Systems and their Functions			Yes. For example, details on how interlocks function are included in the SOPs. Another example - PM for RVs is included in the SOPs.
14. Accessibility of SOPs to Employees			Yes. All SOPs are available in the control room. Operators do not have their own copies of the SOPs. Conversations with operators showed the level of understanding of the SOPs to be adequate.
15. Review Frequency of SOPs and Certification of Currency			No review frequency set for the SOPs. However, all SOPs are updated as changes and modifications occur. Presently, the plant's goal is to complete revision of all SOPs by March 1994.
16. Preparation of Equipment for Maintenance			A brand new procedure has been developed for lockout and tagout. It has been included in the SOPs.

3. **Operating Procedures Written SOPs** (Continued)			
	Where Maintained:	**By Whom:**	**Notes:**
17. Inspection of Maintenance Work Prior to Restart			Operators depend on maintenance personnel to perform their duties correctly. Also, recognition of problems with maintenance work (if they exist) depends on the skills of the individual operator. No procedures have been specified.
18. Sampling Procedures			Yes. Formalized procedures in document number P66-328.
19. Logsheets and Checklists			Some are part of the SOPs. The plant is in the process of incorporating these into the SOPs, and intends to complete the process of incorporation by March 1994.

4. Site Wide Safety Procedures

	Where Maintained:	By Whom:	Notes:
1. Hotwork Procedures	Safety department		
2. Confined Space Entry Permits	Safety departme		Yes - ANF-P65,516. In compliance with existing federal confined space entry permitting requirements. Plan to be in compliance with Washington State requirements when the state legislation is passed.
3. Lock Out, Tagout Procedures	Safety department		Yes - ANF-P65,513. Good arrangement with a board for lockout and tagout with keys.
4. Opening Process Equipment	Safety department		Yes - ANF-P65,527. Covers opening procedures for process equipment. Appears to be adequate.
5. Contractor Program Management	Landlord Service		Safety training for the contractor is done by the safety dept. Landlord service manage the contractor.

4. **Site Wide Safety Procedures** (Continued)			
	Where Maintained:	**By Whom:**	**Notes:**
6. Contractor Safety Training and Documentation			Landlord service department is responsible for handling contractor affairs.
7. Contractor Safety Performance Reviews			Landlord service department is responsible for handling contractor affairs.
8. Contractor Safety Logs			Landlord service department is responsible for handling contractor affairs.

5. Training			
	Where Maintained:	**By Whom:**	**Notes:** EMF 1528
1. Operator Training Program in Place?	SPC Training Database		The SPC training database keeps track of all training.
2. Skills and Training Requirements Identified for Each Job Classification /Assignment?			Job description and skills demonstration results for each employee recorded in the training database. Everybody has to take a written test. Some old employees were "grandfathered" into the system and these employees did not take the skills demonstration test, only the written test. An operator who does not qualify is not allowed to work alone or train other operators.
3. Selection and Qualifications of Training Instructors?			Supervisors and/or lead technicians are qualified trainers.
4. Initial Training - Basic Skills - Job Specific - Safety Procedures - Process Overview			Initial training - general information on the plant. Indoctrination form. Chemical safety - Hazard Communication (ANF-30) MSDS training is included in the Haz Comm training which is provided to every person. Contractor training is handled by the safety dept but administration and management of the contractor personnel is handled by landlord service department.

5. **Training** (Continued)			
	Where Maintained:	**By Whom:**	**Notes:**
5.1 Refresher Training 5.2 Employee Input on Frequency of Refresher Training			Tracked by SPC training database. training provided for new changes in SOPs, but retraining when operator is assigned to a different workstation is not provided. Also, recertification procedures have not been established yet. At the present time, no recertification is required. The plant is in the process of upgrading this element by incorporating retraining and recertification in the training policy. Determination of recertification requirement will be determined by management.
6. Emergency Response Training	Safety department		Training provided by the safety department and records tracked by computer.
7. Procedure for Establishing Skills/Training Requirements			Done in a systematic manner - but no formal procedure exists to establish the process. There is a procedure for topics to be trained in for each element.

5. **Training** (Continued)

	Where Maintained:	By Whom:	Notes:
8.1 Classroom Training			Yes
8.2 Field Training			Yes
8.3 Hands-on Training by Student			Yes
8.4 Training on SOP			Yes
9.1 Effectiveness of Training Program			Off-shift training provided for safety, criticality, etc. have a student evaluation form. Also, trainers are observed by their supervisors and management.
9.2 Feedback for Program Improvement			Yes - on the student evaluation form.

5. Training: (Continued)			
	Where Maintained:	By Whom:	Notes:
10. Qualification Testing			Yes - document is maintained on file. Now the information is also maintain in the training database. Skills and qualifications for each operator are tracked on the computer.
11. Specified Time Periods of Training? Each Job Classification/Assignment?			Assigned by workstation and job description.

6. Maintenance			
	Where Maintained:	**By Whom:**	**Notes:**
1. All equipment for PM identified?			Yes
2. How is the internal/external inspection frequency determined?			Determined by responsible engineer - based on manufacturers' recommendations and modified as necessary based on operating experience. Maintenance fills out an Out-of-Tolerance form which provides feedback to the plant operation personnel.
3. How is the frequency of inspection and testing of safety devices (i.e., interlocks, alarms, PSVs, etc.) determined?			Determined by the responsible engineer, based on design specs and manufacturers' recommendations.
4. Commissioning/ decommissioning procedures for all equipment			Radiological work procedures have been established. Procedures have been established for pipe-breaking activities. Routine maintenance - covered by lockout and tagout procedures. Equipment removal or decommissioning covered by ECN.

6. Maintenance (Continued)

	Where Maintained:	By Whom:	Notes:
5. Standby emergency equipment testing (i.e., power generators, fire pumps, etc.)		Electrical manager	PM program covered by responsible engineer.
6. Training on codes and practices associated with any extraordinarily hazardous substances: a. Materials of construction b. MSDS c. Accident reports			Anual training provided on radioactive materials, HazCom. The plant relies on the operators in a particular area to communicate chemical hazards present in that area to maintenance personnel. Also, this is part of the lockout and tagout procedure. In addition, the operators are notified of precautions to be taken through a bulletin.
7. Accurate record maintenance for inspections, breakdowns, repairs			Yes - the PERTMAC system provides detailed records.

7. Management of Change

	Where Maintained:	By Whom:	Notes:
1. Description of Technical Basis for Change			Engineering Change Notice (ECN). Longform and shortform. Criteria included in ECN procedures. Work order (lower safety implications) Change is judged by responsible engineer to determine when ECN is needed.
2. Impact of Change on Health and Safety			Addressed in ECN under justification section. Supervisor of safety reviews the impact of the change on safety and health.
3. Operating Procedures Modifications			Yes - on the form.
4. Designation of What Constitutes a Process Charge or what is replacement-in-kind			In the ECN procedure (1.13), there is a mention of replacement in kind. For example, change of a gasket to a higher temperature specification is considered replacement-in-kind.

7. **Management of Change** (Continued)			
	Where Maintained:	**By Whom:**	:
5. Time Required to Complete Change			No - not addressed.
6. Contractor Safety Training and Documentation			Actual safety training is done by the safety department, but their administration and management is done by the landlord service department. 75-minute training film, radiological training (if required) included as part of contractor training. Contractors also attend plant safety meetings.
7. Training Required to Complete Change			Yes - the ECN form identifies the operations that will be affected by the change and training is required for personnel involved in those operations.
8. Updating of Process Safety Information			Yes - documented in the ECN. The ECN also includes a checklist of process safety items to be updated.

8. Incident Investigation Program			
	Where Maintained:	**By Whom:**	**Notes:**
1. Is there a written procedure for incident investigation which includes: a. Which types of incidents and near-misses are investigated? b. What is the timeframe for initiating investigation? c. Are incident investigation teams established?		IRB	IRB (Incident Review Board)[1] - Line management involved in IIP. Trained investigators in most departments. IRB headed by QA manager for big events. Normally it starts with an injury which might (if necessary) lead to a full-fledged incident investigation involving the IIB. TAPROOT is used to carry out the incident investigation. Recommendations out of the IIB are tracked by the tracking system. a. Abnormal event reporting procedures are in place and seem to be well designed. Reports on most incidents are made to plant management. b. Incident investigation is initiated immediately after the incident. c. Depends on nature of incident. The II team has at least 3 members - safety, operations, ...

[1]Incident investigation is a decision making process rather than a formalized procedure. There are 2 levels of investigation - IIB (which is department level) and IRB (which involves higher management level). Indication of operator participation in IIB discussions. The record tracking system is maintained by the Manager of Safety.

8. Incident Investigation Program			
	Where Maintained:	**By Whom:**	**Notes:**
2. Preparation of incident investigation file and report which includes:		Safety Dept.	ANF-P65,503 for industrial health, accident, injury (Near-misses are recorded in abnormal event log)
a. Date of incident			Yes
b. Description of incident			Yes
c. Contributing factors, initiating events and root cause analysis			Yes - stated as cause on the form but root cause analysis is done. TAPROOT, a formal process, is used for incident investigation. 49 persons have been trained at the plant in TAPROOT methods. (This is an indication of employee involvement and participation).
d. Recommendations and finding			Yes

8. **Incident Investigation Program** (Continued)

	Where Maintained:	By Whom:	Notes:
3. Is there a mechanism for tracking recommendations to completion?			Tracking system seems to be working. NOTE: Need to have some understandinig on how the recommendations are tracked, e.g. by Record number, etc.
4. Is there a standard review cycle and training program for incident investigation?			Recommendations from the Incident Investigation Board (IIB) given to operations as "lessons learnt". Operators are brought in for 8 hours every month for training and information on findings of IIB. Safety meetings not formalized.
5. How long are records maintained?			Records are maintained for the life of the plant. There are no NRC requirements , but the plant has kept all records. WSHA requires that the records be kept for 5 years. Safety meeting minutes are kept for one year.

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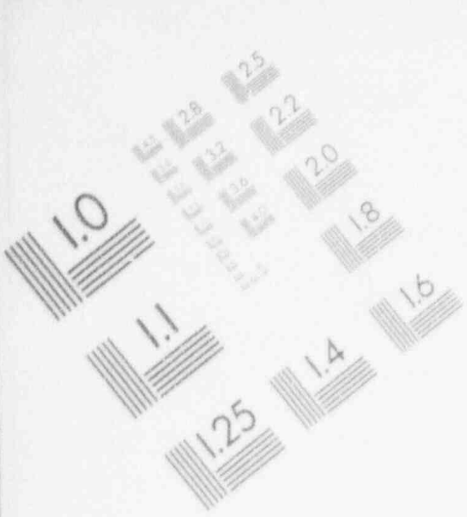
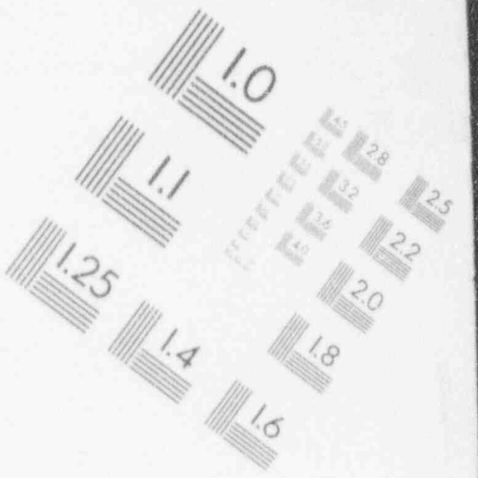
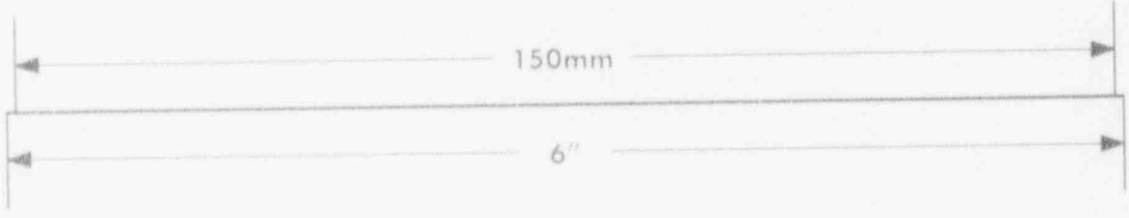
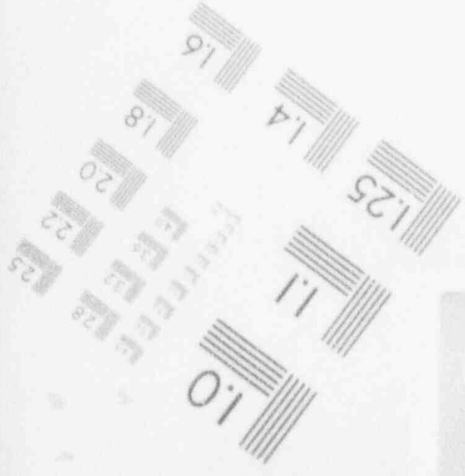
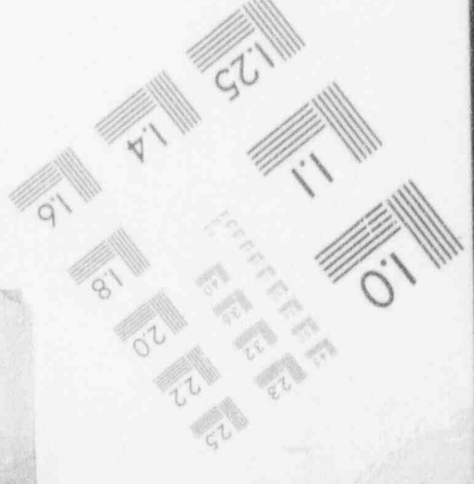
IMAGE EVALUATION
TEST TARGET (MT-3)











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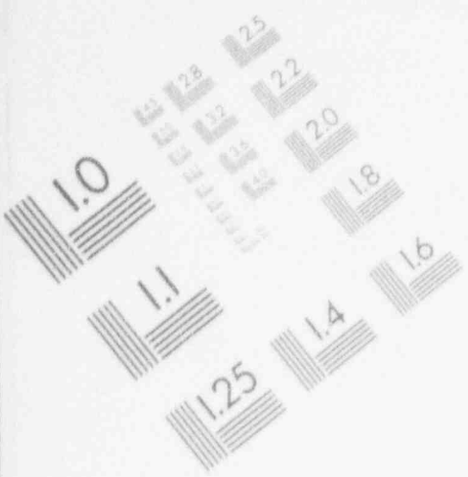

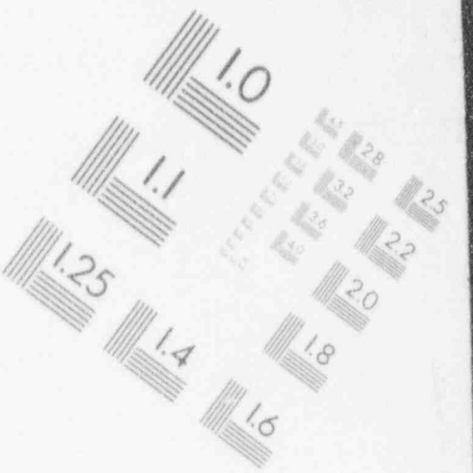

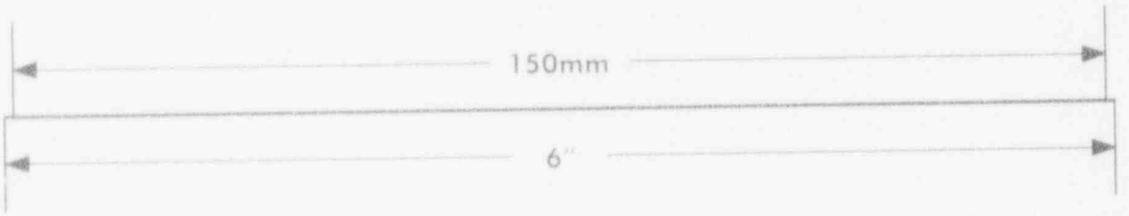

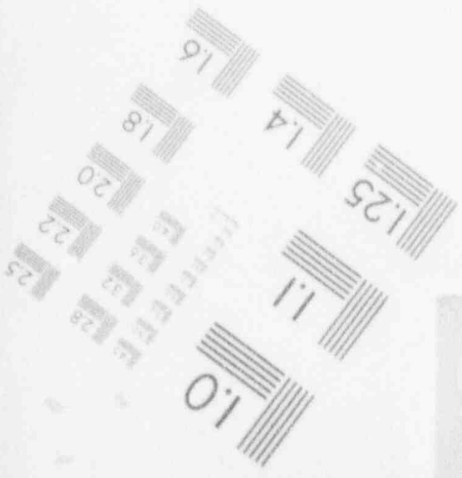

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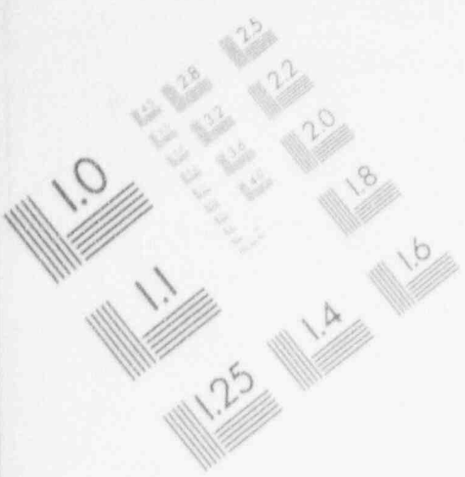

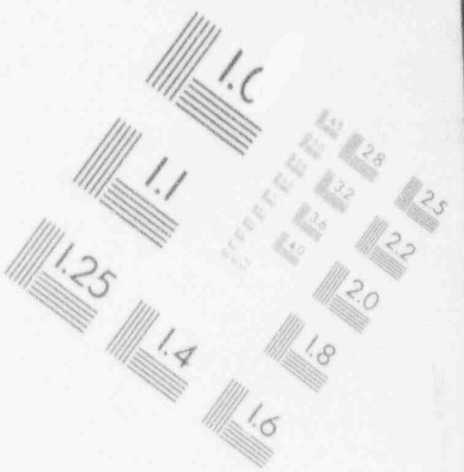

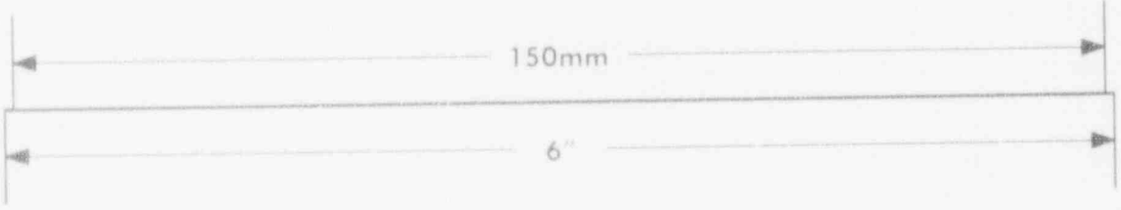

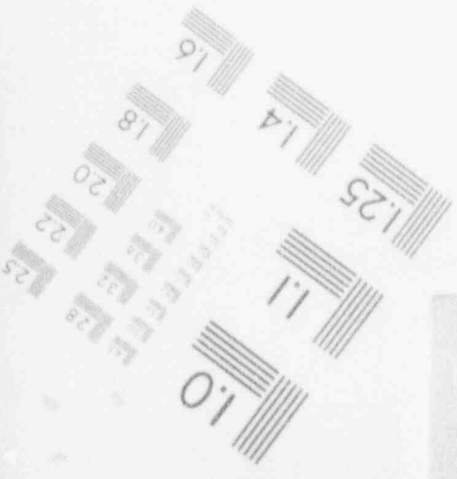

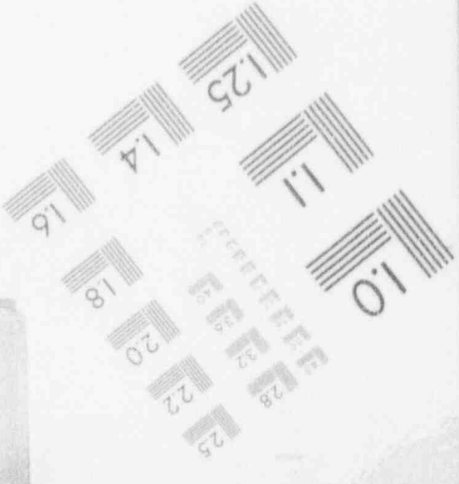

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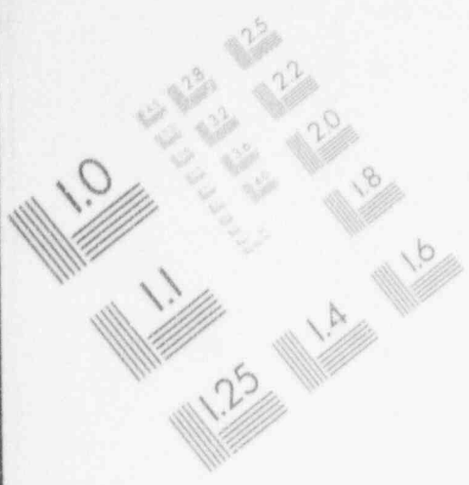

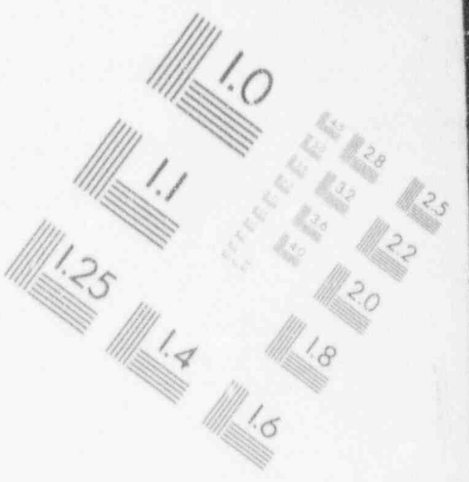

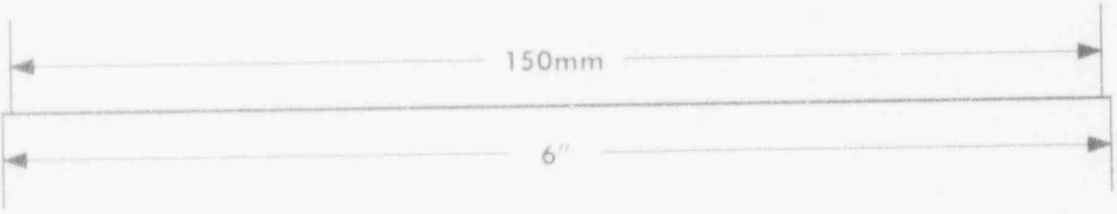

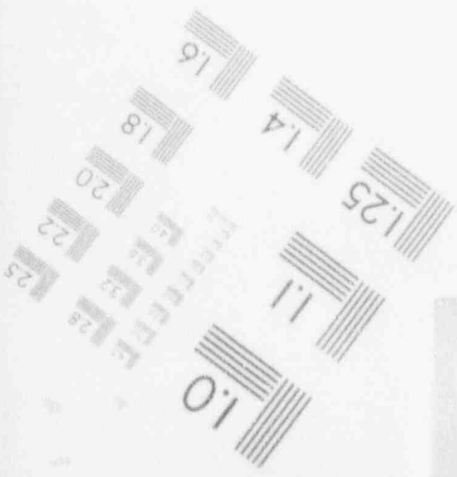

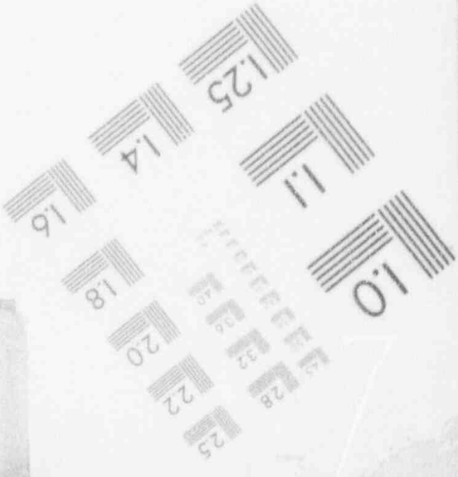

9. Emergency Planning

		Where Maintained:	By Whom:	Notes:
1.	Is the Written Emergency Response Plan current - How frequently is it updated?			Yes - one more revision of the ERP is planned to comply with Regulatory Guide. Minor changes expected as part of incorporation of NRC, State, County and City comments.
2.	Are all copies on site the same version - What is mechanism to maintain all ERP's current?			Document control - distributed new version. Old copies are not collected by the distributor. Instead, the plant expects employees to throw away the old version. A whole new version is distributed only for a major change in the EP. For minor changes, only the revised pages are distributed for the employees to insert in the old version. QC initiates this process of updating the EP.
3.	Does the ERP detail steps to be taken to mitigate accidental releases, fires or explosions?			Not procedurailzed for PERT team. Training is provided to the PERT team on 6 techniques including SCBA (self contained breathing apparatus), communication, etc. PERT commanders know the steps to be taken and decide what action to take - this gives the commanders flexibility in deciding the details of the response action to the incident. training is given in general basis, skills for reponse to incident.

9. **Emergency Planning**			
	Where Maintained:	**By Whom:**	**Notes:**
4. Does the plan include: a. evacuation routes or protective actions b. procedures for response to releases including personal protective equipment use c. descriptions of mitigation equipment and systems available d. procedures for informing employees, agencies, and the public			a. Yes - evacuation planned for most incidents but not chemical alarms. Fire drills are held every 2 months. At present, there are no chemical alarms except for the PA system, which is considered a nuisance by most plant personnel. b. Yes - PPE provided depends on the situation. c. Yes d. Yes
5. Are written procedures available for the use, maintenance, and inspection of Emergency Response equipment			Part of PM. ANF-30 (Safety Manual). PM on emergency response equipment is provided as part of general plant wide preventive maintenance. A PM list is issued every month. The next list is not issued unless the every item on the current list has been completed.

9. Emergency Planning			
	Where Maintained:	**By Whom:**	**Notes:**
6. Is the inspection and maintenance of emergency equipment documented and are records maintained? for how long?			PM program - written records are not kept but the PM list is issued on a monthly basis.
7. Are first aid and emergency medical procedures addressed in the plan for chemicals			Yes - first aid is taught. Local help has been arranged for medical emergencies.
8. What current Emergency Response Training is provided to employees?			PERT members and permit members are provide detailed EMT. All other employees are provided training in criticality, fire and fire extinguisher practice. PERT management team has a formal Table Top exercise one year and a full field exercise the following year.

9. Emergency Planning			
	Where Maintained:	**By Whom:**	**Notes:**
9. Are there scheduled drills or emergency exercises? How often? How is this documented?			Once every year. Critiques and follow-ups are done on the drills. Critiques are made by team members and by evaluators.
10. Are recommendations and findings from the critiques of drills or exercises documented and is the plan or procedures revised in response to these?			Yes - lessons learnt from the different critique sources including independent evaluators (Batelle, City, County observers) and participants. Recommendations are tracked through to completion.
11. How is plan coordinated with local emergency planning committees?			County and state review the EP. The NRC site emergency system is implemented, as well as the Washington State Level I, Level II and Level III emergency.
12. Have release scenarios been analyzed and modeled for preparations in case of off-site release? How is this infor-mation coordinated with ERP?			The CHARM model is used. This is done by the management team for its analysis purpose only.
13. What on-site communication system(s) are used for emergency notification?			5 direct lines in EOC on the ROHM system. If the ROHM system is down then there is an independent back up system - GTE line. Other means of communication used are radio telephone, cellular phone, radio to fire department and local police.

9. Emergency Planning

	Where Maintained:	By Whom:	Notes:
14. Is there an alarm which provides distinctive warning for each type of incident on site?			Fire and radio alarm. Chemicals are on the PA system only.
15. What type of monitoring and detection devices are available to determine airborne concentrations around a release? Who is trained to use these?			Presently, onsite they have stationary detectors for hydrogen, HF and ammonia. The portable monitors include hydrocarbon and ammonia detectors. Safety personnel are trained to use them.
16. How is the Incident Command Center and procedures for managing incidents addressed?			Yes

10. Detection and Monitoring

	Where Maintained:	By Whom:	Notes:
1. Is there a site diagram showing all leak detection devices on site?			There are no monitors outside for NH_3 and propane. The conversion process has some monitoring. a monitor and smoke detector - in UF_6 vaporizer area. Industrial Health and Safety (IH&S) Dept monitors for HF in dry conversion pilot plant. NH_3 in the NH_3 recovery plant is monitored in the stack as well as by IH&S.
2. What types of detection and monitoring are provided for? a. toxic releases b. explosivity c. fires, smoke, and excessive heat			Some stationary and some portable detectors/monitors. a. Ammonia, HF, NO_2 b. Mercaptan (propane), hydrogen detection in the sintering room. c. Yes - UF_6 room and other areas.

10. Detection and Monitoring (Continued)

	Where Maintained:	By Whom:	Notes:
3. What is the frequency of personal monitoring of process equipment as opposed to control room monitoring?	Operations		Control room operator and floor operators on every shift. Operators are qualified for both board and field. Rotation of operators is done so that board operators can do their own checking while the floor operators take care of the board.
4. What is the logic in deciding which monitors sound alarms versus which activate automatic active mitigation system (i.e., water curtains, deluge, foam, etc.)?			Up to the judgement of the responsible engineer. Would prefer to have interlocks to shutdown the system.

11. Audits and Inspections of Chemical Safety Program (CSP)			
	Where Maintained:	**By Whom:**	**Notes:**
1. Is there a periodic examination of the management systems and safety management program?	Safety Dept		There are several different audits and reviews. Some of these are lock and tag procedures, Haz Comm, etc.. At present there is no corporate audit, only self-audits.
2. How often are audits conducted?			Once the PSM program is implemented, they intend to adopt a 3 year cycle for audits.
3. How are they documented?			There is an audit form for regulatory programs. Audit plans are available.
4. Are recommendations from the audits tracked to completion? How?			Recommendations/findings are tracked. Tracking system is available.
5. How long are audits reports maintained?			Audits reports retained for the life of the process.