

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

September 15, 1992

MEMORANDUM FOR: G. W. Cunningham, Technical Director

COPIES: Board Members

FROM: Paul F. Gubanc
Hanford Site Team LeaderSUBJECT: Trip Report - Review of Hanford Site Operational Readiness
Reviews, August 10 - 13, 1992

1. **Purpose:** This memorandum provides comments and observations made by the Defense Nuclear Facilities Safety Board (DNFSB) Technical Staff during a visit to the Hanford Site to review DOE and contractor operational readiness reviews (ORRs).

2. **Summary:** As evidenced throughout this report, Hanford Site Department of Energy (DOE) field office and contractor management have long held an understanding of the "ORR process" as the overt, formal activities of line management to assure preparations to support a facility restart are completed. Independent verification is obtained through the "assessments" conducted by environmental, safety, and quality assurance oversight organizations. Given this background, it is not surprising that several senior DOE and contractor managers at Hanford expressed concern at having an ORR conducted by *independent* personnel, thus surrendering their (line) responsibilities for facility readiness. Whenever possible, the DNFSB review team explained that: (1) DOE and contractor line managers are *not* being relieved of their line management responsibilities for facility readiness; (2) line management *should* make a formal accounting of its activities prior to issuing a "ready for restart" proclamation; and (3) the ORR is the *independent* review commissioned by the restart approval authority to provide assurance that the facility is indeed ready to restart. This difference in understanding is not easily resolvable utilizing DOE guidance as it currently exists.

Another potential point of confusion involves the term "performance-based" ORR. For purposes of this report, "performance-based" ORR is defined as an ORR that consists of *first-hand* assessments of adequacy and correctness, including: review of test results; oral examination of operators, technicians, and supervisors; walk-down of systems and procedures; and direct observation of both normal and abnormal operations. (This definition is distilled from the various Hanford site ORR plans reviewed.)

a. Department of Energy - Headquarters (DOE-HQ): A centralized and uniform procedure or practice for conducting and implementing the ORR process across the DOE defense nuclear facility complex does not currently exist. While there are a variety of ORR guidance memoranda that have been issued by various DOE Assistant Secretaries (some of them well developed) and several DOE-wide directives, as a whole these documents are not complete regarding ORR requirements, contain conflicting directions, and their promulgation to the field has generally not been formally controlled. As a result, field office attempts to implement the various forms of DOE-HQ guidance are accompanied by confusion, apprehension, frustration, and apathy.

b. Department of Energy - Richland Field Office (DOE-RL): Well in advance of the DNFSB staff review, DOE-RL had recognized that, site-wide, weaknesses existed in both the DOE and contractor ORR processes. Therefore, in late 1991, an independent review was commissioned to evaluate the ORR process. This review was conducted from January 27, 1992 to March 24, 1992, and focused on completed ORRs. A formal report was issued in May 1992; both DOE-RL and the contractors evaluated are developing formal responses to the review findings.

The DNFSB staff review was, by contrast, focused on ORRs that were pending or already underway, and was not explicitly designed to validate the results of the prior review. The DNFSB review team found that a centralized and uniform procedure or practice for conducting and implementing the ORR process at DOE-RL does not currently exist but is planned for development by September 30, 1992. (DOE-RL did not possess an ORR focal point or "champion" who acted to collect, integrate, explain and promulgate ORR guidance within DOE-RL and to the Hanford contractors.) As a result, the quality of DOE-RL ORRs is dependent upon individual DOE-RL managers enforcing a commitment to critical, independent, and performance-based ORRs. ORR quality is also strongly influenced by the individual managers' familiarity with an understanding of ORR lessons-learned and practices derived from other DOE defense nuclear facilities (e.g., Rocky Flats Building 559). This has, understandably, led to wide variability in the quality of DOE ORR Plans at Hanford. To DOE-RL's credit, however, two of the three DOE ORR plans reviewed were found to be of superior quality.

c. Westinghouse Hanford Company (WHC): Prior to 1991, WHC utilized a formal ORR process that was a tool for line management to critically assess its own performance in preparing a facility for restart. This "old practice" was not independent of line management and therefore provided for the possibility of a narrow and unchallenging ORR, and incidentally incorporated significant pressure on line management to find themselves ready. At its best, this old WHC ORR practice was only as good as line management's willingness to be critical of itself.

WHC has made a conscious attempt over the last year to incorporate lessons-learned from across the defense nuclear facility complex and adopt new ORR practices.

However, these changes also represent a significant change in culture, and, as such, have in some cases encountered an inability or unwillingness to understand. This has led to wide variability in the conduct of WHC ORRs. For example, the WHC ORR planned for the 242-A Evaporator includes many of the desired elements for an ORR; whereas the WHC ORR for the KE-Basin encapsulation is strongly based on old practice, containing few of the desired elements of an ORR.

Significantly, even WHC's new ORR process remains heavily documentation-based (supplemented by selected performance-based ORR member reviews). For example, the PFP ORR will require line management to prepare and submit over 2000 affidavits attesting to having satisfied specific ORR acceptance criteria. WHC is requiring this level of detail based on a desire to make the ORR verify satisfactory facility management at all levels. This feature represents a significant administrative burden on facility personnel. Further, the sheer prescriptiveness of 2300 lines of inquiry tempts line management to abandon facility restart responsibilities to the ORR process.

In toto, however, the review team was left with a positive impression of the improvements shown over the last year, although WHC must still be encouraged to continue the evolution of its ORR process.

d. DNFSB Staff Evaluations of Specific ORRs Reviewed:

Facility/Activity	Conclusion
Tank 101-SY Mitigation Pump Installation	The WHC and DOE-RL ORRs are not adequate in scope, however given the extensive amount of external engineering oversight, and current and planned DOE-HQ reviews of the operational aspects of these activities, the intent to have a critical and independent review has been achieved.
KE-Basin Fuel Encapsulation	The WHC ORR is not adequate. The DOE ORR plan is not yet defined. Additional review by the DNFSB staff is required.

Facility/Activity	Conclusion
Uranium Oxide (UO ₃) Plant Stabilization Run	The WHC ORR is marginal but the DOE ORR plan is comprehensive and well developed. Based on (1) the DOE ORR plan, (2) the DNFSB staff's prior review of training, (3) DOE plans to perform a performance-based conduct-of-operations review at the plant in September, (4) the low hazard classification of the facility, and (5) the short duration of the run, the review team does not currently have any concerns that would prevent commencement of the stabilization run upon satisfactory completion of the ORR process.
Plutonium Finishing Plant/Plutonium Reclamation Facility (PFP/PRF) Stabilization Run	The WHC ORR is comprehensive but heavily documentation-based. The DOE ORR will be conducted by DOE-HQ and details are not yet available. Additional DNFSB staff review is planned prior to the stabilization run.
242-A Evaporator Restart	The WHC ORR plan (draft) is comprehensive but heavily documentation-based. The DOE ORR plan (draft) is a superior document, which exhibits fine detail in the areas of acceptance criteria, approaches for criteria satisfaction, criteria bases, and references. Additional DNFSB staff review is planned prior to restart.

3. Background: The DNFSB has issued several recommendations to the Secretary of Energy on the subject of defense nuclear facility ORRs conducted by DOE and its contractors (Re: Recommendations 90-4, 91-3, 91-4, 92-1 and 92-3). (At the time of this review, Recommendation 92-6 on the subject of ORRs had not yet been issued.) Consistent with the Board's continuing interest and anticipated facility ORR schedules at the Hanford Site, the DNFSB staff reviewed DOE and contractor plans for conducting Hanford defense nuclear facility ORRs to ensure that they are being or will be performed in a manner that adequately protects the public health and safety. To perform this evaluation, a team of DNFSB representatives visited the Hanford Site on August 10 - 13, 1992. The review team consisted of Technical Staff members Paul Gubanc, Timothy Dwyer, Timothy Arcano, Davis Hurt, Walter Moore, Matthew Moury, Paul Ret and James Troan; Outside Experts David Boyd, and Edward Dietrich.

To gain an understanding of how ORRs are conducted across the site, the DNFSB review team received presentations from DOE and WHC on the general guidance and practices utilized at Hanford in conducting ORRs. In addition, specific reviews of ORRs

planned or underway were conducted for the following facilities/activities: Tank 101-SY mitigation pump installation, KE-Basin fuel encapsulation, UO₃ Plant stabilization run, PFP/PRF stabilization run, and 242-A Evaporator restart. The review team also met with senior DOE-RL and WHC representatives to review the DNFSB's position on DOE and contractor ORR's as expressed in DNFSB Recommendations.

4. Discussion: Due to the lack of uniform and definitive guidance from DOE-HQ on the composition and conduct of DOE and contractor ORRs (as discussed below), the review team evaluated Hanford ORR activities relative to attributes extracted from DOE-wide directives and DNFSB expectations for ORRs as identified in Recommendations 90-4, 91-3, 91-4, 92-1 and 92-3. These attributes include:

- ORR Team members shall be *technically competent* in areas applicable to the facility's operations. (SEN-16B-91, Recommendations 90-4, 92-3)
- The ORR Chairman and the majority of the ORR Team shall be *independent* of the line organization of the facility being evaluated. (SEN-16B-91, Recommendation 92-3)
- ORRs shall not be commenced until the facility manager (for contractor ORRs) or the contractor (for DOE ORRs) has declared that the facility is *ready for restart*. (SEN-16B-91, Recommendations 91-4, 92-3)
- *Formal procedures* shall be established for the formation and conduct of the ORR. (NE-1 and NE-2 memoranda as concurred with by all DOE Program Secretarial Officers, PSOs)
- *Acceptance criteria* shall be established by the ORR Team to define adequate levels of performance for every line of inquiry evaluated by the ORR Team. (Recommendation 92-3)
- The ORR shall include first-hand ORR Team member evaluations of drills, operator interviews, and facility inspections (i.e., be *performance-based*). (Recommendations 90-4, 92-3)
- *Formal provisions shall exist for dissenting opinions* to be identified and expressed to the facility restart approval authority. (Recommendation 92-3, Implementation Plan to Recommendation 90-4)
- The ORR shall serve to *validate* the facility's readiness to resume operations, not supplant or supplement line management's responsibility for (1) preparing the facility, or (2) maintaining compliance with applicable requirements (e.g., DOE Orders). (DOE Order 5480.5, SEN-16B-91)

Each of these attributes is also in consonance with DNFSB Recommendation 92-6 on the subject of Operational Readiness Reviews, as issued on August 26, 1992. The DNFSB review team investigated the incorporation of these attributes into DOE-HQ, DOE-RL, and WHC guidance, and their use in both DOE-RL and WHC ORRs being conducted at five Hanford facilities. The following Table of Contents is provided to allow rapid location of the results of each area investigation.

Section 4: Discussion - Table of Contents

General ORR Guidance and Practices	7
DOE Headquarters	7
DOE Richland Field Office	8
Westinghouse Hanford Company (WHC)	10
Facility Specific Observations	13
Tank 101-SY Mitigation Pump	14
KE-Basin Fuel Encapsulation	18
Uranium Oxide (UO ₃) Plant	22
Plutonium Finishing Plant (PFP)	31
242-A Evaporator	37

a. General ORR Guidance and Practices:

i. DOE Headquarters: The following DOE-HQ directives and guidance documents have been developed and promulgated by the Secretary of Energy and various DOE Assistant Secretaries (i.e., PSOs) on the subject of facility restarts and ORRs.

1. DOE Order 5480.5, Safety of Nuclear Facilities.
2. DOE Order 5480.6, Safety of Department of Energy-Owned Nuclear Reactors.
3. Secretary of Energy Notice SEN-16B-91, Approval for Restart of Facilities Shut Down for Safety Reasons and for Startup of Major New Facilities.
4. DP-9 (Signatory, Donald F. Knuth) memorandum of May 9, 1991, Conduct of Operational Readiness Evaluation (ORE) Prior to Startup.
5. NE-2 (Tom A. Hendrickson) memorandum of July 31, 1991, Nuclear Facility Restart Procedure.
6. NE-1 (William H. Young) memorandum of February 26, 1992, Department of Energy (DOE) Procedure for Restart of Reactors and Non-Reactor Nuclear Facilities.
7. EM-20 (Leo P. Duffy) memorandum of February 6, 1991, Safety and Health Review for Startup/Restart of Operations.
8. EM-20 (Randal S. Scott) memorandum of February 6, 1992, Draft EM Policy and Guidance for Readiness Determinations.
9. EH Program For Oversight Assessments of Operational Readiness Reviews For Startups and Restarts, Protocol and Procedures (Unsigned Draft), dated May 20, 1992 (includes expectations for what a DOE ORR must entail to be considered adequate by EH).
10. NS-10 AP-001, Conduct of Assessments Revision 1, Version C (Unsigned Draft), dated July 2, 1992.

[DOE acronyms] DP - Office of Defense Programs
 EH - Office of Environment, Safety and Health
 EM - Office of Environmental Restoration and Waste Management
 NE - Office of Nuclear Energy
 NS - Office of Nuclear Safety

Based on a document review by the DNFSB staff, and discussions with DOE-RL and Hanford contractor personnel, the review team finds that:

- The DOE Orders and the Secretary of Energy Notice (items (1) through (3) above) are not sufficient in either scope or detail to explain what constitutes an ORR nor what is required to satisfactorily complete an ORR, irrespective of whether it is a DOE or a contractor ORR.
- The PSO guidance documents (items (4) through (10) above) are neither fully integrated nor consistent with one another.
- Several of the PSO guidance documents have not been systematically promulgated to the field for implementation or exist only in draft form (e.g., NE, via item (6),

was the only PSO found to have formally promulgated item (5), even though all PSOs signed in concurrence).

- There is no formal document control system in place to keep track of the PSO guidance documents.
- DOE-RL, being responsible to several PSO's, is required to implement several sets of ORR guidance, complicated by the fact that they are not entirely consistent with one another.

The resulting situation is one in which DOE-RL and WHC facility managers are either utilizing an incomplete set of PSO guidance, selecting which PSO guidance to comply with out of the available set, or implementing none of the above PSO guidance due to the lack of formal direction.

ii. DOE Richland Field Office: The DOE-HQ directives and correspondence discussed in the previous section form the basis for the ORR actions conducted in the field. However, with regard to the contractor ORR process, DOE-HQ Orders, directives and guidance have not been collected, integrated, explained or promulgated by DOE-RL. The normal mechanism for conveying and enforcing such requirements is the DOE-RL Implementing Procedure (RLIP). No ORR RLIP has been issued. Consequently, Hanford contractors are not formally provided with concise, up-to-date and uniform ORR guidance. The DOE-RL, Assistant Manager for Operations stated that steps are being taken to improve this situation, as he has been tasked to prepare an RLIP for ORRs. A September 30, 1992, deadline to issue a draft for comment has been verbally established.

For the DOE-RL ORR process, the implementation of DOE-HQ Orders, directives and guidance applicable to DOE-RL takes several forms. For example, DOE-RL, Operations Division (OPD) has issued OPD-5480.5, OPD Operational Readiness Evaluation Procedure, dated October 21, 1991, for conducting a DOE-RL OPD Operational Readiness Evaluation (ORE). (The term "ORE" is considered, per the guidance provided in the DP-9 memorandum, synonymous with "ORR.") The DOE-RL Tank Farms Project Office (TFPO) also has an (undated) ORR procedure, TFP-51.05, TFPO Readiness Reviews of Tank Farms Startup Activities. It was not apparent whether the DOE-RL OPD or TFPO procedures are used by the other DOE-RL line organizations. No other ORR procedures for other divisions were identified in the course of the visit.

Examples of where OPD-5480.5 and TFP-51.05 depart from the DOE-wide directives and DNFSB expectations for desired ORR attributes, or are inconsistent, include:

- OPD-5480.5 specifically requires that the DOE ORR be "performed by qualified DOE line management and line management support personnel ..." (Page 2 of

20). TFP-51.05 is silent on the use of line management personnel although current practice is to utilize TFPO personnel predominantly.

- OPD-5480.5 states that the requirement for a DOE ORR is dependent upon the hazard classification of the facility (Page 12 of 20) whereas TFP-51.05 states that "TFPO ORRs are required for the restart of facilities after prolonged shutdown and/or major modifications and for facilities for which special safety concerns exist ..." (Page 1 of 5).
- OPD-5480.5 references three DOE Orders and four DOE-HQ guidance memoranda (circa 1991) and TFP-51.05 references three DOE Orders and one DOE-HQ guidance memorandum (circa 1985-87). Only one reference, DOE Order 5480.5, is common between the two.
- OPD-5480.5 states that the DOE ORR team "shall be responsible for review and concurrence with the contractor ORR plan" (Page 4 of 20) whereas TFP-51.05 makes no reference to reviewing the contractor's ORR plan, although it does state that "the TFPO ORR is an overview of the contractor's readiness review process" (Page 3 of 5).
- Neither OPD-5480.5 nor TFP-51.05 explicitly address when a DOE ORR shall commence (i.e., ready for restart), use of first hand observations (i.e., performance-based), provisions for dissenting opinions, or validation of compliance with DOE directives.

In using these DOE-RL procedures, DOE-RL has realized that they are outdated due to the issuance of more recent DOE-HQ guidance, and ORR lessons-learned and practices developed at other DOE defense nuclear facilities (e.g., Rocky Flats Building 559). In an attempt to meet these new requirements and (perceived) higher expectations, DOE-RL OPD, for example, is applying selected portions of OPD-5480.5, supplemented by verbal direction on an ad hoc basis. However, all divisional line managers are hindered by the lack of a centralized, uniform, and updated procedure for conducting and implementing the ORR process at DOE-RL. DOE-RL line managers are being forced to develop requirements for their ORRs based on individual knowledge levels and experience.

DOE-RL's Office of Compliance previously recognized several of the DOE-RL ORR deficiencies and commissioned an audit of the ORR process. The audit was conducted by an independent contractor with significant industry ORR experience (Stone & Webster, S&W). The S&W review was performed over the period of January 27, 1992 to March 24, 1992, by a team of four S&W employees not affiliated with other DOE-RL contract work, and included an evaluation of six DOE-RL ORRs, which in turn involved activities/facilities reviewed in the course of four WHC

and two PNL ORRs. The scope of the audit included reviews of the DOE-RL, WHC and PNL organizations by: 1) reviewing existing procedures, 2) reviewing completed ORR files and records, and 3) conducting personnel interviews. The results are published in DOE-RL Office of Compliance, Audit Report 92-02, dated May 1992. The DOE-RL Assistant Manager for Operations has been tasked to provide a corrective action plan to the DOE-RL Manager by August 31, 1992, in response to the audit report. Key excerpts from the audit report on the DOE-RL ORRs reviewed are provided in Attachment 1. It should be noted that several DOE-RL line managers strongly disagree with portions of the audit report.

iii. Westinghouse Hanford Company (WHC): The ORR process as utilized by WHC is in transition from what, for convenience, can be called the Old/Existing practice, as embodied by WHC Management Requirements and Procedures (MRP) 5.50, Operational Readiness Reviews, effective March 30, 1990, to the New/Evolving practice which will be embodied in a revision of WHC MRP 5.50 anticipated to be issued in September 1992. (WHC claims the revised MRP will also be consistent with the Westinghouse Corporate Manual on ORRs issued in draft form in July 1992 and expected in final form in October 1992.) Due to the transition in progress, it is important to understand both practices; most of the specific WHC ORRs examined by the review team fell somewhere in-between the two (based largely upon the attitude of line management and the external scrutiny afforded the facility).

(1) Old/Existing practice: The old/existing WHC practice appears to be predicated on the following concepts: (a) the WHC ORR is a formal mechanism that forces facility line managers to demonstrate to superior line managers that the facility, personnel and procedures are ready to restart; (b) the WHC offices for Environmental Assurance, Safety, and Quality Assurance (ES&Q) will provide an independent review for readiness to restart; and (c) due to the uniqueness of defense nuclear facilities, outside participants cannot effectively participate because they do not understand the facility equipment, processes and procedures. Also obvious in discussions with some WHC facility managers was a fear that outside participants would have "their own agenda" or "an ax to grind" and would potentially interfere with attempts to restart the facility.

The old/existing practice departs from the desired attributes extracted from DOE-wide directives and DNFSB expectations for ORRs in the following areas:

- The WHC ORR Team (called the Readiness Review Board, RRB) is comprised predominantly of line managers from the facility. In particular, "the RRB chairman shall be a manager within the program, facility, or project line organization with authority to resolve open actions." (excerpt from MRP 5.50)
- There are no formal requirements as to when the WHC ORR may be started.

- The primary role of the WHC ORR Team is to review "affidavits" from the facility line organizations that document that the specific "lines of inquiry" identified in the ORR plan are satisfactorily addressed. Typically these affidavits, after review by the ORR Team, undergo a formal oral defense by the responsible line manager to the ORR Team. First-hand observations by the ORR Team members are desired but not required.
- Representatives from the WHC ES&Q organizations are invited to sit on the WHC ORR Team as non-voting "Observers," although they are required to prepare an independent assessment (of areas under their purview) for the WHC approval authority regarding the facility's readiness to restart. Thus, the approval authority is presented with four separate restart recommendations: one from the ORR team, and one from each of the three independent organizations.
- Dissenting opinions are not explicitly treated by MRP 5.50 but may be submitted through the Employee Concerns Program.

The review team considers the principal failing of this type of ORR program to be that WHC has largely, and in some cases completely, not availed itself of the benefits of an unbiased, independent, performance-based review that can bring other knowledge and experience to the facility. The possibility of a narrow and unchallenging ORR and the pressure on line management to find themselves ready are considered by the review team to be severe liabilities.

As discussed earlier, DOE-RL's Office of Compliance previously recognized several of the WHC ORR deficiencies and commissioned an audit of the ORR process. The audit was conducted over the period of January 27, 1992 to March 24, 1992, and included an evaluation of four completed WHC ORRs. The results are published in DOE-RL Office of Compliance, Audit Report 92-02, dated May 1992. WHC is due to provide a corrective action plan to DOE-RL in response to the audit report by August 31, 1992. Key excerpts from the audit report on the WHC ORRs reviewed are provided in Attachment 2.

(2) **New/Evolving practice:** MRP 5.50 is actively in the process of being revised and commented upon by WHC management. The review team was not able to review the draft, but has distilled what it believes to be the essence of the new/evolving WHC practice based on reviews of the WHC ORRs underway and several extended discussions with Mr. Tom Halverson, WHC. (Mr. Halverson was brought to WHC approximately six months ago, after participating in the Waste Isolation Pilot Plant ORR, to serve as a "champion" for the new ORR practice. As such, he is the principal author of the revised MRP 5.50.)

The new/evolving WHC practice is a (by necessity, long) documentation-based review, which verifies that the management systems and procedures are in place at the facility to assure that an adequate level of performance is maintained. This type of review is used because WHC concluded that the time delay associated with DOE's ORR and restart approval would detract from the value of a "snapshot-in-time" type of ORR.

Mr. Halverson stated his belief that this new/evolving practice is but an interim step in the evolution of WHC ORRs. As the desired standards in personnel, procedure, and equipment performance become an ingrained part of the WHC culture, WHC ORRs will begin to lean more toward the snapshot-in-time form. WHC also believes the DOE ORRs are currently more of this form.

The new/evolving practice (as it now stands) departs from the desired attributes extracted from DOE-wide directives and DNFSB expectations for ORRs in the following areas:

- The primary role of the WHC ORR Team will continue to be the review of affidavits from the facility line organizations that document that the specific lines of inquiry identified in the ORR plan are satisfactorily addressed. First-hand, performance-based observations by the ORR Team members are required to validate only a portion of the affidavits. (Exactly how many should be field verified is not defined.)
- There are no formal requirements as to when the WHC ORR may be started.
- Representatives from the WHC ES&Q organizations are invited to sit on the WHC ORR Team as non-voting "Observers," although they are required to prepare an independent assessment (of areas under their purview) for the WHC approval authority regarding the facility's readiness to restart. Mr. Halverson, however, indicated that WHC is still considering the possibility of incorporating the ES&Q functions into the ORR.
- Based on past DOE performance, and the desire to minimize cost and schedule impacts, WHC expects that their ORRs will most likely proceed in parallel with DOE approval of the WHC ORR plan. (DOE approval of the contractor ORR plans is required by several of the PSO guidance documents.) The value of DOE approval is therefore suspect, since the approval may occur *after* the WHC ORR is well underway (or even complete) and DOE will conduct a separate ORR, anyway, which is intended to validate the adequacy of the WHC ORR.

The review team considers the principal deficiency of the new/evolving WHC ORR practice to be that it still depends heavily on the affidavit system. This diverts line management from implementing programs and monitoring performance to preparing extensive documentation justifying why the existing facility programs are adequate. Additionally, the WHC ORR Team spends the majority of its time reviewing affidavits as opposed to conducting performance-based observations.

(3) Current Situation: As indicated above, WHC is in transition to new ORR practices and as such the ORRs examined represent a spectrum of practices. Based on comments from Mr. Halverson, WHC and the review team's own observations, the specific WHC ORRs can be classified as follows:

Facility/Activity	WHC ORR Practice in Use
Tank 101-SY Mitigation Pump Installation	Old, but with <i>extensive</i> independent oversight
KE-Basin Fuel Encapsulation	Old
UO ₃ Plant Stabilization Run	Part old, part new
PFP/PRF Stabilization Run	New
242-A Evaporator Restart	New

b. Facility Specific Observations: The review team conducted reviews of five separate activities at the Hanford Site that were in the midst of, or would soon be involved in, ORRs from both WHC and DOE-RL. These activities were: Tank 101-SY mitigation pump installation, KE-Basin fuel encapsulation, UO₃ Plant stabilization run, PFP/PRF stabilization run, and 242-A Evaporator restart. Each activity review consisted of a tour of the facility, discussions with WHC and DOE-RL line managers and ORR team personnel, and a review of relevant WHC and DOE ORR documentation. Each of the activities reviewed is discussed individually in the following pages, and each is broken into sections entitled Background, Facility Observations, WHC ORR, and DOE ORR.

i. Tank 101-SY Mitigation Pump:

(1) Background: Tank 241-101-SY is a double-shelled high level radioactive waste storage tank that releases a large "burp" of potentially explosive hydrogen and nitrous oxide gases approximately every 100 days. In response to this situation, WHC has developed a mitigation test plan which requires installing a waste mixing pump into the tank, along with an elaborate configuration of instruments to monitor fluid temperature, pressure, and density and to sample the vapor space above the waste. The actual test operation will be conducted in a continuous manner over several months. Operation of the mitigation and gas sampling equipment will be performed by engineers on a shift-work schedule. The installation of the mitigation pump and instrumentation is scheduled for "Window G," a time frame beginning after the next tank burp (expected in early September 1992) and lasting approximately 20 days.

Three members of the DNFSB review team spent one-half day reviewing the DOE and WHC ORRs on the Window G activities, specifically the pump installation. The review included a tour of the pump test setup, a briefing from the WHC ORR Chairman about the WHC ORR, a briefing from a WHC Tank Farm manager about the pump design, and a review of applicable DOE and WHC ORR documents. A representative from the DOE-RL Tank Farms Project Office was present for the briefings.

(2) Facility Observations: Because not all test equipment had been received, the mitigation test system had not been fully assembled at the time of this review. However, the pump and associated instrumentation were assembled in a test facility for final test runs prior to installation. In general, the system appeared well-engineered. For example, instrumentation is included to measure pump shaft deflection and vibration as well as discharge pressure. The discharge nozzles are equipped with flush lines for 3000 psi air to disperse any blockage and aid in decontamination during pump removal. Gasket and seal material were tested for compatibility with the working fluid. Also, the pump system engineering process included technical reviews from numerous independent groups including Los Alamos National Laboratory, Hanford Tank Advisory Panel, WHC Safety & Environmental Advisory Committee, and DOE-HQ representatives from the offices of Environment, Safety and Health (EH), Environmental Restoration and Waste Management (EM) and Nuclear Safety (NS).

The review team had the following observations relative to the pump design and test plan:

- As designed, the unlined concrete pump pit at the tank summit serves as the containment for wash water used to clean the pump if it must be removed.

The installation of a liner into the pump pit would facilitate decontamination of the pump pit following pump removal.

- The 42-inch diameter pump port cover on the tank will be removed for over 24 hours during the pump installation process, and there is a possibility that workers will be required to enter this area to anchor the pump mounting assembly. WHC indicated that they had not yet assessed the potential for vapor and radiological exposure to workers working in the pump pit area, nor had possible exposure reduction mechanisms yet been explored.
- The draft mitigation test management plan does not assign overall responsibility for safety of personnel and equipment to the operations shift manager. The plan states that the cognizant test engineer has the authority to terminate testing and perform an emergency shutdown of the equipment, but this authority is not extended to the operations shift manager. The plan also does not address support to be provided to the test personnel by tank farm operations personnel.

(3) **WHC ORR:** The requirement of an ORR for window activities on Tank 101-SY is mandated by DOE Order 5480.5 Section 7.e.(6) due to the presence of an unreviewed safety question (USQ), specifically the potentially explosive gaseous atmosphere in the vapor space of the tank dome. The Level 2 (moderate hazard) ORRs for these activities are a hybrid developed from WHC MRP 5.50 (existing version), Management Oversight and Risk Tree analysis (MORT)-based checklists, and previous tank farm ORRs. Areas examined include hardware, personnel, and management controls. An independent assessment by the WHC ES&Q organizations is also mandated.

Based on the desire to maximize the amount of work performed in the Tank 101-SY windows, the actual ORR is completed in phases. Each phase is concerned with a specific window activity. The review of each phase results in the development of a checklist of unresolved items. Those activities not complete in their review prior to their allotted operational time slot are delayed to the next window. Following each individual phase readiness assessment by the WHC Tank Farm ORR team (Readiness Review Board, RRB) and the independent review by WHC ES&Q, DOE-RL performs an ORR to confirm the readiness to proceed with window activities.

The WHC ORR of Tank 101-SY Window G activities departs from the desired attributes extracted from DOE-wide directives and DNFSB expectations for ORRs in the following areas:

- Consistent with the current version of WHC MRP 5.50, line management dominates the ORR process. For example, the RRB chairman is the Administration Manager for the Hanford tank farms. In addition, half of the discipline-specific RRB members have direct responsibility for particular Window G activities. Thus the majority of the RRB members are not independent of facility line management and the ORR is a tool for activity preparation by line management.
- The phased approach used for the Window G ORR, while being responsive to the desire to maximize window activity, places tremendous schedule pressure on line managers participating in the ORR to find themselves ready. As discussed previously, the possibility of a narrow and unchallenging ORR, the potential for loss of objectivity, and the inherent schedule pressure are severe liabilities.
- The ORR checklist and acceptance criteria lack the specificity necessary to confirm system readiness. For example, the checklist item for mock-up training states that "the operating personnel, procedures and special equipment are adequate for planned tank 241-SY-101 Window G activities." However, there are no specific mock-up training exercises or personnel qualifications identified for completion. The use of terms such as "adequate" or "acceptable" in acceptance criteria, without qualification, is insufficient to define the objective evidence requirements.

(4) **DOE ORR:** Following the WHC ORR, DOE-RL performs an ORR to confirm readiness to proceed with the activity. In particular, the DOE ORR is performed by the Tank Farm Project Office (TFPO) in accordance with DOE-RL procedure TFP-51.05, which requires the development of a specific plan for each TFPO activity requiring an ORR.

The DOE-RL ORR of Tank 101-SY Window G activities departs from the desired attributes extracted from DOE-wide directives and DNFSB expectations for ORRs in the following areas:

- The DOE-RL TFPO ORR is not independent of line management. Five of eight members of the ORR team, including the chairman, are TFPO personnel with some direct responsibility for portions of the mitigation plan.
- The TFPO ORR plan (Flammable Gas Program - Tank 214-SY-101, Window G and Mitigation By Mixing Test, Revision 1; July 1992) is essentially a matrix consisting of eight lines of inquiry against six Window G activities. Each line of inquiry is assigned to an ORR team member and he is responsible for evaluating that line of inquiry for each of the six activities, as applicable. No

equipment walk-downs, emergency preparedness demonstrations, or mock-up training drills are specified for observation. The lines of inquiry entail no specific acceptance criteria beyond their individual definitions. For example, "Personnel Readiness - This refers to the verification of training, pre-work briefing preparations, and physical qualifications. The training of the test engineers is also included."

The review team concludes that the DOE-RL TFPO ORR of the Window G activity is an ORR in name only and serves as little more than a preparation checklist for DOE-RL line management. However, given the extensive amount of external oversight applied to Tank 101-SY Window activities, the intent to have a critical and independent engineering review has been achieved. In addition, subsequent to this review, DOE-HQ (and its technical support contractors) has performed and is continuing to perform reviews of the operational aspects of these activities. Further examination of these activities is also intended by the DNFSB staff.

ii. KE-Basin Fuel Encapsulation:

(1) Background: The K-Basins are located in the 100 Area at the Hanford Site. The facility consists of the K-East (KE) and K-West (KW) Basins, which are used for the storage of irradiated fuel. KE-Basin contains fuel elements that are in direct contact with the water in the pool. The cladding of some fuel elements in this basin has been breached and, as a result, the fuel material is slowly being oxidized by the surrounding water with a corresponding release of fission products. In contrast, the KW-Basin houses fuel in sealed containers. Due to the low enrichment of the fuel in both basins, the possibility of an inadvertent criticality is considered extremely low. Operations at the K-Basins presently include surveillance, maintenance and fuel monitoring.

Preparations are underway to encapsulate the KE-Basin fuel in sealed containers, such as are used in the KW-Basin. This will essentially eliminate the oxidation of fuel and release of fission products into the pool and consequently eliminate a source of radiological contamination and worker dose. The K-Basins are classified as a High Hazard facility, although the Fuel Encapsulation effort is classified as a Low Hazard operation.

Two members of the DNFSB review team spent one day reviewing the KE-Basin ORR. The review included a tour of the KE-Basin, a briefing from WHC N-Reactor management (who are also responsible for the KE-Basin) about the WHC ORR, and a review of applicable WHC KE-Basin ORR documents. The DOE-RL KE-Basin Program Manager was present for the entire review. No action has yet been taken by DOE-RL relative to performing an ORR for this activity.

(2) Facility Observations: As discussed above, the KE-Basin contains irradiated fuel, some of it with damaged cladding, which is stored in open-topped canisters. As a result, the bottom of the water pool is covered with a thin layer (piles in some areas) of oxidized fuel and fission products, which is referred to as "sludge." Also present are small pieces of debris such as gloves, tools and assembly clips from damaged fuel elements. As a prerequisite to encapsulation, a large sludge pile (covering an area of approximately 8 feet by 30 feet to a depth of up to 14 inches) must be removed from the "chute area" of the pool to permit the installation of encapsulation equipment.

During the KE-Basin tour, the review team made the following observations, which were discussed with the WHC and DOE-RL representatives.

- In discussing removal of the sludge pile from the chute area, WHC stated that an attempt to scoop the sludge into empty canisters for storage had failed due

to the highly dispersible nature of the sludge. Any operation disturbing the sludge resulted in the generation of an opaque underwater cloud. WHC's fallback option is to hydrovac the pile and redeposit the sludge in an alcove off of the main body of the pool. WHC acknowledged that this will require dealing with the same sludge again at a later date, but WHC believes that disadvantage is outweighed by the need to eliminate the further release of fission products into the pool by corroding unencapsulated fuel.

WHC and DOE-RL acknowledged that they had not performed, or obtained from independent sources, formal engineering assessments of: (a) alternatives for sludge relocation and packaging, (b) anticipated effects of redistributing the sludge pile, or (c) risk-benefit analysis of how best to sequence dealing with the sludge pile versus encapsulation. WHC acknowledged that such assessments would be desirable but were not available at this time due to resource constraints.

- Conduct of operations at the KE-Basin is poor as evidenced by: (a) extensive debris (e.g., scrap pipe) and empty fuel storage canisters randomly scattered throughout the pool, including above stored fuel, (b) utilization of "instruction" tags to identify out-of-commission equipment, local instruments that are inoperable, and as operator aids, and (c) a water filter differential pressure limit (70 psid) that is beyond the scale of the control room indicator (60 psid maximum), and which does not reflect actual practice (30 psid nominal due to radiological concerns during filter replacement).
- WHC management advised that the DOE-RL N-Reactor/K-Basins Facility Representative spends a significant portion of his time at the KE-Basin. The KE-Basin Program Manager stated that she tours the pool area on the average of once every six months.

Based on the above, it appears that the KE-Basin WHC and DOE-RL line management have rationalized the acceptance of substandard facility performance and the lack of an engineered approach to the encapsulation project.

(3) WHC ORR: The WHC ORR of the KE-Basin encapsulation is a clear example of an ORR conducted in accordance with the old/existing practice as described above in section 4.a.iii.(1). The WHC ORR departs from the desired attributes extracted from DOE-wide directives and DNFSB expectations for ORRs in the following areas:

- The WHC ORR Team is composed of the N-Reactor Manager (Chairman and startup approval authority), the N-Reactor Deputy Manager, the N-Reactor Engineering Manager and the N-Reactor Operations Assurance Manager.

Each of these managers has significant line management responsibility for the KE-Basin and is therefore not independent. For example, one member of the KE-Basin WHC ORR Team accepted (as the lead reviewer) an affidavit *he had signed* as the responsible line manager.

- Based on a WHC timeline provided during the review, the WHC ORR has been in progress since June 1992. Preparation of the encapsulation area and installation of the encapsulation equipment has not yet been completed. The encapsulation activity was therefore not ready for startup prior to initiation of the ORR.
- During the briefing, WHC N-Reactor management claimed to have incorporated the requirements of WHC MRP 5.50, SEN-16B-91, and PSO guidance memoranda from DP, EM and NE (as discussed above in section 4.a.i). However, none of the management personnel present could agree on the identity of the requisite DOE approval authority to commence encapsulation. Proposed contenders ranged from John Ford, DP-63 to Leo Duffy, EM-1 (per NE and EM guidance) to John Wagoner, DOE-RL (per DP guidance) to "no DOE approval required" (per existing WHC MRP 5.50). This confusion is directly attributable to the inconsistencies in the PSO guidance memoranda and the lack of a single DOE-RL formal procedure for conducting ORRs.
- There are 55 individual acceptance criteria in the WHC ORR plan, each of which is one sentence long. Most of these criteria are qualitative in nature and require an affidavit to certify equipment "functional operability," actions as "completed acceptably," "issues resolved," et cetera. These acceptance criteria do not adequately define an objective, acceptable level of performance (e.g., for demonstrating reliability).
- The primary role of the WHC ORR Team is to review affidavits from the facility line organizations, each documenting that the specific lines of inquiry identified in the ORR plan are satisfactorily addressed. First-hand observations by the ORR Team members may be made but are not required. The ORR is therefore not designed to be performance-based.
- Representatives from the WHC ES&Q organizations sit on the WHC ORR Team as non-voting "Observers," although they are required to provide an independent assessment (of areas under their purview) to the WHC approval authority (N-Reactor Manager) regarding readiness to start encapsulation.
- Dissenting opinions are not explicitly treated in the KE-Basin Fuel Encapsulation ORR plan.

The above practices are consistent with WHC-CM-5-13, N/K Operations Control Manual, Section 01-23, Operational Readiness Reviews, effective July 17, 1992. (This is the local N-Reactor/K-Basins implementing instruction for MRP-5.50.) WHC letter 9250234 dated January 15, 1992, acknowledges to DOE-RL that there are differences between this WHC ORR and the new/evolving WHC ORR practices but concludes that "the plan simply reflects our judgement versus other possible judgements." The WHC letter did not specifically request nor did WHC claim to have received a response from DOE-RL on this matter.

At this time 13 of the 55 acceptance criteria in the WHC ORR have been closed. The timeline presented by WHC indicated encapsulation would commence in September 1992, although WHC acknowledged that the start date had moved out numerous times in the past and that permitting issues and the DOE ORR would probably delay it again. In this context, and without a formal risk-benefit analysis that demonstrates that delaying the encapsulation further would be disadvantageous, there is sufficient basis for WHC to take the time to reconstitute the KE-Basin ORR utilizing new/evolving practices.

(4) DOE ORR: The DOE-RL KE-Basin Program Manager stated that a formal plan to conduct a DOE ORR for KE-Basin encapsulation did not exist. Therefore, there were no ORR Team personnel or documents available for review. The Program Manager's Division Director, in a prior meeting with the review team, stated that a DOE ORR for this activity would be conducted.

iii. Uranium Oxide (UO₃) Plant:

(1) **Background:** The UO₃ Plant is designed to convert (i.e., calcine) uranyl nitrate hexahydrate (UNH) liquid into a more stable uranium trioxide (UO₃) powder and recover nitric acid (HNO₃). This facility was last operated in May 1989. Operation of the UO₃ Plant is required to convert approximately 200,000 gallons of low enriched (less than 1 wt% ²³⁵U) UNH, currently stored at the PUREX plant, to 200 metric tons of UO₃ powder. (This powder also has some limited commercial value.) After completion of this operation, the facility will be laid up and eventually decommissioned. Initial schedules called for startup in September 1992, but recent delays have pushed startup back into November 1992.

Initiation and completion of the UO₃ plant stabilization run, which is expected to take approximately 4 to 6 weeks, is currently constrained by the following:

- DOE-HQ approvals of the WHC ORR plan and the DOE-RL ORE plan are still pending. DOE-HQ expectations regarding demonstration of the operational readiness of facility equipment, personnel and procedures before startup are still evolving.
- The UNH feed tanks, TK-X1 and TK-X2, currently contain approximately 284,000 gallons of contaminated storm water run-off, which must be processed and discharged before UNH feed can be accepted from the PUREX plant. Total processing time is estimated at 12 weeks; permission to begin was received August 10, 1992, and processing was initiated August 13, 1992.
- The Hanford Tri-Party Agreement (TPA) specifies that discharges to the U-17 crib shall be limited to 10 gpm (monthly average) until January 1, 1993, at which time the limit shall be 2 gpm. The normal flowrate to the U-17 crib during UNH calcination is 7.5 gpm.
- Classification as a "Low Hazard Facility," which requires the following:
 - the amount of HNO₃ in the plant must be limited to less than 123,000 gallons. (This will require shipping approximately 50,000 gallons of HNO₃ to PUREX during the course of the stabilization run.)
 - office personnel in the adjacent 271-U building must be included in the UO₃ Plant Emergency Plan and receive appropriate hazards training.

Other factors that affect the restart program and its schedule include:

- The facility was reclassified as a Nuclear Facility in 1990, which requires the submission of a Safety Analysis Report (SAR) to DOE-HQ for approval. The SAR is still undergoing review and is not yet approved.
- 90,000 gallons of the UNH to be processed is below the 60% design concentration. The implications of this underconcentration interfering with the identification of organics in the UNH solution must be addressed in the SAR, operating procedures, and operator training, once a process reanalysis is completed.

Four members of the DNFSB review team spent 2.5 days reviewing the UO₃ Plant ORR process. The review included an in-depth tour of the plant, a briefing from WHC's ORR Board Chairman and UO₃ Plant management about the WHC ORR, a meeting with the WHC ORR team, and a review of applicable WHC ORR documents. A meeting was also held with the DOE UO₃ ORE team, and the draft DOE UO₃ ORE plan was examined.

(2) **Facility Observations:** The review team conducted a detailed, one day, tour of the UO₃ Plant, compiling the following observations:

- A review of plant configuration and procedure assumptions/changes called for in the Safety Evaluation to Support UO₃ Plant Stabilization [WHC-SD-CP-TA-005], which incorporates the UO₃ Processing Plant Restart Stabilization Campaign Hazard and Operating Study and Preliminary Hazards Assessment and the UO₃ Plant OSR Review for Compliance with the Intent of DOE Order 5480.5, was conducted. Of 27 (physical) configuration assumptions/changes, eight were found not to be completed. For five of the eight, formal documentation annotating the decision not to comply was being drafted; no decision had been made as to disposition of the remaining three. All physical assumptions/changes appeared to be well-tracked. Of 23 procedure assumptions/changes called for, five could not be located in available procedures. However, procedural revisions are currently in progress, with 45 to 50 of 55 total procedures ready for release upon final approval of the FSAR.
- The UO₃ Plant exhibited a major improvement in facility housekeeping in most areas, since the last DNFSB staff visit. It is apparent that a concerted effort is being effected room-by-room; dedication to this continuous effort was stated several times by plant management. Some minor deficiencies were noted:
 - an uncontrolled "goldenrod" procedure (UO-040-010, Rev B-1, February 8, 1989) was posted at the Breathing Air Tank System for Building 224UA.

- at least six steam valves exhibited stem leakage; the shift supervisor stated that all had been identified for work-package submittal.
 - building roof walkways were generally poorly policed; extraneous gloves, trash, insulation, and scaffolding were observed.
- UO₃ Plant management has established a program to have operators (on a rotating basis, accompanied by a line management representative) escort visiting inspection teams/tours through the facility. This is a conscious decision designed to increase operator exposure to questions (improve boardsmanship), instill a feeling of ownership in the facility, promote an upgrade in general facility knowledge, and allow operators to gain an understanding of those areas important to inspecting/touring personnel.
- E-Cell is an "on-mask" area which requires those entering to wear forced-air respirators due to past thorium process contamination (gaseous contamination). E-Cell is ventilated through the roof via an *unfiltered* ventilation fan to atmosphere; each shift, the power operator is required to log readings taken while standing on the roof near fan. Further, D-Cell, the adjacent cell in the same building, is not considered an on-mask area, even if the E-Cell ventilation fan fails, though the two cells are only separated by a half-wall partition. WHC facility management indicated that they would pursue this matter with the Health Physics organization.
- Formal alarm response procedures do not exist for the control room. During the stabilization run, the control room operators (two operators and one supervisor) will be supported by an engineer, with whom they can consult for technical advice. During the tour of the control room, the operator on duty responded promptly to several alarms (HPT testing of CAMS was in progress), including the completion of Alarm Tracking Sheets.
- Operator aids are posted at several control/alarm panels. All aids observed had an approval signature and date, and were recorded in a formal Operator Aid Log. One discrepancy was noted: "Digistrip Alarm Set-Points and Alarm Response, Table 1," had been signed by the cognizant engineer every six months from January 25, 1989 through January 23, 1992, but the expected July 1992 signature was missing.
- Calibration of instrumentation throughout the facility was generally up-to-date. However, two specific gravity indicators (for tanks TK-X-1 and TK-C-2) were overdue for calibration, by one and two months, respectively.
- The log sheet at the air compressor station was not consistent with current procedures; it was one revision out of date. This resulted in confusion over

what constituted an Out-of-Specification (OOS) reading. Two readings were circled in red ink as being OOS, but by the new procedure they were within limits. The Power Operator Supervisor Log contained numerous comments and corrections written on yellow "post-it" notes that were stuck to various pages.

- Shift Supervisor Log entries do not include all information required by the WHC Conduct of Operations Manual. The Facility Manager is not reviewing and initialing the log on a daily basis.
- The Required Reading Folder in the Shift Supervisor's Office appeared to be up-to-date with regard to topical reading requirements. However, the Occurrence Report reading requirements section indicated that two (of a total of four) supervisors had not read the last 5 and 14 assignments, respectively.

(3) WHC ORR: The WHC ORR is currently in progress, although the WHC ORR plan has only been approved through DOE-RL; DOE-HQ approval is still pending. There was some initial confusion in response to review team questions as to the approval authority for the ORR plan; per OPD-5480.5, PSO approval is required, and will be provided by DP-63 (signature authority granted). The ORR plan has been revised twice, with WHC making a conscious attempt to incorporate lessons-learned at other facilities across the complex (e.g., Savannah River Site K-Reactor, the Waste Isolation Pilot Plant, WIPP, and Rocky Flats Building 559).

There are currently 85 acceptance criteria in the ORR plan, although it is possible that changes will be made by DOE-HQ before the plan is finally approved. In addition, the reviews to be conducted by the independent ES&Q organizations are called out via single acceptance criteria - these three criteria will therefore entail considerably more lines of inquiry internal to their closure.

The acceptance criteria each consist of one or two sentences requiring an affidavit to show "evidence that ___ has been completed" or "evidence that ___ is in place." These criteria do not specify whether a term such as "in place" is to be proven through documentation, process observation, or an adequacy assessment.

Acceptance criteria are included regarding DOE Order Compliance and closure of internal open items. The former will be satisfied using the DOE-RL-approved UO₃ Plant DOE Order Compliance Evaluation Plan, while the latter will be satisfied using the WHC QUEST system (action item tracking system).

Corrective actions for the deficiencies identified in DOE-RL Office of Compliance, Audit Report 92-02, have not been incorporated into the ORR Plan.

Although RRB meeting minutes of April 13, 1992, establish a requirement for all RRB members to complete training course 254700, UO₃ Facility Orientation, both the RRB Chairman and the RRB members voiced the opinion that training for the ORR was not necessary. The RRB Chairman did state, however, that he intended to circulate copies (to all RRB members) of the handouts from DOE-HQ Executive Course Fundamentals for DOE Operations, "Pulling the String" Module.

The WHC ORR team is composed of seven regular members with over 200 man-years of nuclear experience. The RRB Chairman was selected by the UO₃ restart approval authority for WHC, the PUREX/UO₃ Plant Manager, who is responsible for both the PUREX and UO₃ facilities. All RRB members were then selected by the PUREX/UO₃ Plant Manager with input from the Chairman. None of the voting RRB members have responsibility at the UO₃ Plant, although some of them are within the reporting chain of the restart approval authority (from the PUREX side).

The primary role of the WHC ORR Team will be the review of affidavits prepared by the facility line organizations to document that the specific acceptance criteria identified in the ORR plan are satisfactorily addressed. A member of the facility management (non-voting RRB member) is tasked with assigning affidavit preparation to specific line organizations. A subject matter expert from within the organization must prepare the affidavit to satisfy the assigned line of inquiry, presenting and defending it to the RRB. Once it is accepted by the RRB, closure (or transfer of open items to the punchlist) is documented by signature of the RRB Chairman and the subject matter expert's supervisor on the affidavit, which is then filed with the ORR records.

Representatives from the WHC ES&Q organizations are invited to sit on the WHC ORR Team as non-voting "Observers," although they are required to prepare an independent assessment (of areas under their purview) for the WHC approval authority regarding UO₃ Plant readiness to restart. Each of the three Observers was nominated by their individual organization management, and approved by the restart authority. In discussions with the RRB Chairman, it became apparent that the RRB is able to exert considerable influence over the acceptance criteria (as a minimum) to be included in the ES&Q assessments: RRB input was used as the basis for at least one revision to each of the three independent plans. However, several flaws were identified in this system:

- The independence of the three ES&Q assessments was not clear with respect to their normal organizational operations. The assessments performed are the required ES&Q reviews that these respective organizations would perform regardless of the presence of the ORR process.

- Reviews of several ES&Q assessment "checklists" revealed uniformly inadequate documentation of reviews and surveillances, especially with regard to dates of walkthroughs, reference procedures or criteria, and reliance on regularly scheduled (periodic) inspections - for which the validity period may have expired by the time of the restart.

The current incarnation of the WHC ORR was initiated February 24, 1992, when all previous affidavits were rejected pending development of new ORR criteria. Affidavits from the original ORR process can be revalidated via submittal of a letter evaluating the original affidavit against the new acceptance criteria. Examination of documents undergoing this revalidation process left the DNFSB staff with several questions. For example, criteria 1.4.d, involving hydrostatic testing of the Tank C-2 Coil, was accepted for revalidation. The DNFSB staff discovered, however, that the original affidavit was based upon completion of an *annual* hydrostatic test requirement conducted March 29, 1991. Therefore, at the time of the revalidation for the current ORR (June 23, 1992), the test in question was apparently more than one year old. However, discussions with the RRB Chairman revealed that the ORR RRB closed criterion 1.4.d because it constituted an acceptable post-installation test of the coil. *Annual* testing requirements are dealt with separately under criterion 1.1.a, preventative maintenance.

The subject of procedural changes due to the UNH concentration problems was discussed. The implications of the UNH underconcentration are currently being reviewed and analyzed. This review could result in required procedural and training revisions. UO₃ Plant management intends to update training on procedures through the required reading program. The effect of UNH underconcentration on the possibility of a 'red-oil' explosion is not yet fully analyzed, but acceptance criteria 3.21.a, "Documentation that demonstrates a current formal training program is in place that addresses both normal and emergency conditions," has never-the-less been closed out by the RRB and transferred (as an open item) to the punchlist.

In summary, the DNFSB review team evaluated the WHC ORR against the desired attributes extracted from DOE-wide directives and DNFSB expectations for ORRs. The following deviations were identified:

- Formal procedures controlling the ORR process do not exist. For example, there is no guidance as to when (with regard to state of facility readiness) the acceptance criteria will be assigned to line management subject matter experts for affidavit preparation, and who is qualified to determine this readiness. Further, the criteria/reporting process is not time-limited. Under such

conditions, the criteria could be used to *direct* plant preparedness rather than *validate* plant readiness.

- The ORR plan does not include a provision allowing members to voice dissenting opinions to an independent party separate from the ORR Team or line management. It was the opinion of the RRB Chairman that all issues would be resolved satisfactorily without this option; he would not consider closure of criteria until unanimity was achieved among all voting members.
- The extent to which the WHC ORR is performance-based is questionable. The ORR RRB "performance-based" evaluation only relates to 38 of the 85 acceptance criteria. The remaining 47 (and unrelated portions of the 38) acceptance criteria are satisfied by review of the facility line management's affidavits, not first hand observation. The validation (or revalidation) process is not necessarily rigorous.
- The ORR has been initiated well before the facility is ready to restart.

(4) DOE ORR: The DOE ORE plan has been forwarded to DOE-HQ (DP-63) for approval. The team leader and ten DOE-RL personnel have been identified to participate in the ORE. DOE-HQ Office of Nuclear Safety (NS) has stated in writing that they will not participate in the review, although they will review the ORE report. DOE-HQ Office of Environment, Safety and Health (EH) has not yet responded to written inquiries regarding their participation in the review.

A formal Conduct of Operations Assessment is scheduled for the UO₃ Plant from September 14 to 24, 1992. This will be conducted by DOE-HQ (EM-25).

As of August 13, the ORE team had yet to convene as a group. Discussions with available ORE team members and review of the (draft) ORE plan resulted in the following observations:

- The DOE-RL ORE will not be a validation of the final Westinghouse ORR; rather, it will be an extensive, separate review. The extent to which the ORE plan overlaps the WHC ORR was described as being intentional. By review of the UO₃ Plant without knowledge of WHC ORR actions, the ORE is intended to both determine the readiness of the Plant and to allow critique of the WHC ORR's findings.
- The ORE Chairman was selected by the Director, Operations Division. In accordance with stated (but unwritten) DOE-RL policy, for this low hazard facility startup, he was chosen from the line organization (normally, he is a direct report to the Director), and relieved of outside responsibilities for the

duration of the ORE. The chairman and the Director then selected personnel with appropriate experience and independence to be ORE board members. Nine of ten members are independent of the responsible line organization; the tenth had no direct UO₃ responsibilities.

- The ORE is to be conducted under the procedure outlined in OPD-5480.5; however, some modifications have been (orally) implemented to attempt to incorporate recent DOE-HQ guidance. Requirements governing ORE initiation and duration limits have not been addressed formally, although informal DOE-RL policy (as stated by the Director, Operations Division) requires that the WHC ORR be completed and a letter be received from WHC stating that the facility is ready for startup *before* the DOE ORE can commence. It is the expectation of most members that, once started, the ORE will require two to three weeks to complete.
- Corrective actions for the deficiencies identified in DOE-RL Office of Compliance, Audit Report 92-02, have not been incorporated into the ORE Plan. With the exception of the ORE Chairman, none of the ORE team members were aware of the contents of the report. No training for ORE team members has been identified.
- The (draft) ORE plan contains no provision to ensure closure of deficiencies identified *outside* of the ORE process (i.e., Occurrence Report corrective actions, external agency findings). ORE team members expressed an intent to use the CICS database (DOE-RL deficiency tracking system) to accomplish this. However, the current configuration of CICS does not track external findings; procedures to begin incorporating such findings are just being implemented.
- The ORE team members indicated that they had not reviewed the completed (draft) ORE plan before it was forwarded to DOE-HQ. This was evident when questions arose regarding dissenting opinion provisions; no team member was sure that there were or were not such provisions in their plan. (There are.) Selected team members were only involved with drafting acceptance criteria in their respective areas of expertise, as scoped and assigned by the ORE Chairman. The ORE plan is heavily based on WIPP/Rocky Flats Building 559 ORR plans, using a graded approach to lessen some criteria due to the low hazard classification of the UO₃ facility.
- The ORE Team did not review and concur with WHC's ORR plan as is required in OPD-5480.5. Rather, the Director, Operations Division, reviewed and approved the document, forwarding it to DOE-HQ. (The ORE Chairman and one other member stated that they had read the WHC ORR Plan.) This

was described as not being done in order to keep an "independent view" of the startup process. A noted discrepancy caused by lack of this review is the use of punchlist items. OPD-5480.5 requires that the ORE team ensure that WHC ORR punchlist items are "restricted to long lead hardware deficiencies only." The WHC ORR plan states that transfer of items to a punchlist is allowed when the remaining issues are "acceptably low in risk." This statement is not hardware limited.

- ORE Team members stated that they will use performance-based evaluation of all acceptance criteria. (The WHC affidavit method was criticized by all team members as being administrative in nature.) They will use hands-on interface, interviews, and drills to determine if each criteria is individually met. DOE Order compliance sampling will be performed with regard to 10-20% of applicable DOE Orders, independent of WHC ORR (specifically order compliance assessment) results. Outstanding compliance deficiencies will also be examined by the ORE team.

In summary, with the exception of the deficiencies noted above, the DOE-RL ORE plan embodies most of the desired attributes extracted from DOE-wide directives and DNFSB expectations for ORRs. The only consideration identified by the review team involves a DOE-RL policy decision: determining the roles (with respect to each other) of the potentially redundant WHC ORR and DOE-RL ORE.

iv. Plutonium Finishing Plant (PFP):

(1) Background: The Plutonium Finishing Plant (PFP) is located in the 200W Area at the Hanford Site. The following process lines and locations will be operational during upcoming remediation campaigns: Plutonium Reclamation Facility (PRF), used to concentrate plutonium nitrate solutions and convert plutonium bearing materials and scrap to plutonium nitrate; the Remote Mechanical "C" (RMC) Line, used to convert the plutonium nitrate to plutonium oxide; and miscellaneous handling and storage operations.

Restart of the PRF is required to volume-reduce plutonium nitrate solutions by concentration and stabilize plutonium scrap and recycle material left over from previous campaigns. Plutonium Finishing Plant (PFP) operations have generated significant quantities of chemically reactive scrap (corrosive, continuously offgasing) and recyclable material in the form of liquid, sludge, fluoride powder and rags. Total number of items to be processed is 650-700 with a total bulk weight of approximately 6000 kilograms. These campaign materials are considered unsuitable for vault storage. The processing campaign is required to improve the safety posture of the facility, allow an accurate inventory of special nuclear material, and allow progress on remediation activities to reduce the radioactive material source term. Once the PRF converts the scrap to concentrated plutonium nitrate, approximately a 40-week operation, the RMC line will be operated an additional 40 weeks to convert the solution to plutonium oxide powder for storage at PFP. (There are 2000 items currently in vault storage, many of which will also eventually require some form of treatment to assure safe long-term storage.)

The WHC ORR for PRF restart began in February 1992 and is scheduled for completion in early January 1993. The DOE ORR will immediately follow the WHC ORR. After the PRF campaign is complete, a reduced scope WHC ORR and DOE ORR will be conducted prior to restart of the RMC Line. The date for the restart of the RMC line has not been confirmed.

Four members of the DNFSB review team spent two days reviewing the PRF ORR and the PFP criticality safety program. The review included a briefing from the WHC PRF ORR Co-chairman, a meeting with PFP management, a tour of the PFP facility, attendance at a WHC PRF Readiness Review Board (RRB) meeting, reviews of applicable WHC ORR documents, and interviews with WHC Criticality, and Safety, Environmental, and Quality Assurance personnel. A DOE-RL representative was present for the entire review.

(2) Facility Observations: The review of criticality safety at PFP revealed that the overall level of criticality safety knowledge and preparedness at the facility

appears adequate for restart of the solvent extraction line and related upcoming activities. The individuals responsible for criticality safety practices in the plant appear well qualified and dedicated. All parties have a keen appreciation for the importance of strictly following the ANSI/ANS standards on criticality safety. The design of the plant promotes criticality safety, with the possible exception of the large low-level waste tanks (241-Z tanks), which are not geometrically safe. Although tank size makes an accidental criticality unlikely, a detailed review of the procedures that govern the use of these tanks is desirable before restart.

Criticality safety training was also examined. In particular, a draft form of the criticality safety computer software package was reviewed. The software package is an interactive learning device consisting of lessons in various subjects including basic atomic physics, criticality definitions, critical geometries, process parameters, operations management, and several others. The information in each package was compiled using input from criticality experts at various DOE facilities. Although the package is not yet complete, the portion reviewed consisted of satisfactory explanations in the areas of atomic physics and criticality definitions, presenting much of the material through animations. The overall theme of the training course emphasized two crucial points: (1) that criticality is an instantaneous event with potentially fatal consequences; and (2) under no circumstances should an employee alter normal operating practices, move controlled material, or collect spilled material without checking with appropriate criticality control personnel.

On a facility-wide basis, four major issues remain to be completed prior to restart of the PRF:

- **FSAR Approval:** The new PFP FSAR has not been approved. PFP is currently operating under the old SAR and Operational Safety Requirements (OSR). An updated FSAR was completed by WHC and forwarded to DOE-HQ (DP-60) for approval in January 1991. Approximately 150 Safety Evaluation Report (SER) comments/questions were forwarded to WHC in July 1992. WHC has responded to seventy-five of the comments, and responses to the remaining items are being developed. No major issues that question the validity of the FSAR have been identified. WHC's PRF schedule is based on the assumption that DOE-HQ approval of the FSAR is obtained by October 19, 1992.

To minimize delays associated with obtaining DOE-HQ approval of the FSAR, DOE-RL gave WHC permission to develop new PFP procedures based on the draft FSAR. However, WHC cannot implement or train to the new FSAR until it is approved.

FSAR implementation is a critical path to startup. After the FSAR is approved, a significant amount of work must be completed prior to the DOE ORR since all operators must be trained and new procedures must be implemented. No new OSRs will result from the new FSAR, rather old OSRs that do not meet the requirements for being an OSR as defined in 10 CFR 50.36 are being deleted. This will greatly simplify the training process.

- **Tank Farms:** A Tank Farm USQ on criticality must be resolved to allow PFP to transfer liquid waste during PRF operations. Interim authorization for Tank Farms to receive low level liquid waste transfers, with less than 15 grams of fissile material per shipment, has been extended through August 1992. However, PRF will require shipments with potential fissile material quantities in excess of this limit during hot operations. It was stated by operations personnel that more frequent, smaller, transfers could be made to ensure the 15 gram limit is not exceeded, however, this is not the preferred procedure.
- **216-Z-20 Crib Disposition:** The 216-Z-20 crib is used for drainage of condensate and cooling water during PRF operations. The PFP Wastewater Sampling and Analysis Plan, and corresponding QA Plan, were approved by EPA and the Washington State Department of Ecology. Written confirmation of permission to discharge was received by DOE-RL from both organizations, but has not yet been granted by DOE-RL to WHC. DOE-RL will provide formal approval to PFP to discharge to the crib prior to the cold chemical runs.
- **Complete the WHC ORR and DOE ORR:** Per the WHC schedule of 24 June 1992, the ORR was scheduled for completion in mid-September 1992 followed by completion of the DOE ORR and subsequent PRF startup (hot operation) in early October 1992. However, completion of the WHC ORR has been rescheduled for early January 1993, and the Readiness to Proceed Memorandum will be forwarded to DOE-RL on January 8, 1993. The DOE ORR will follow the WHC ORR, but the length and content of the DOE ORR has not been defined. Restart is scheduled for the end of February 1993. The primary cause for the delay was stated as delay in FSAR approval, however it was obvious to the review team that PFP and the RRB could not have completed the WHC ORR by mid-September.

(3) **WHC ORR:** WHC's first ORR plan for the upcoming PRF campaign was returned by DOE-RL to WHC for revision because it did not adequately describe the ORR. In early August, WHC forwarded their revised plan to DOE-RL for approval. It is currently being reviewed. DOE-HQ (DP) approval will ultimately be required of the WHC ORR plan. In the interim, the WHC ORR proceeds.

WHC asserts that their ORR plan uses the methodology and rigor of ORRs done at WIPP, Rocky Flats Building 559, and the Westinghouse Savannah River Company (WSRC). WHC's ORR plan reviews six functional areas: Management Controls; Administration; Personnel Readiness; Equipment and Systems; Environmental, Health, Safety and Quality Assurance; and Supplemental Closeout Activities (which ensure that all outstanding commitments have been addressed and concurrence received on those items that are not necessary for restart). Each of these functional areas includes a statement of scope which is expanded into a series of performance objectives. Each performance objective is, in turn, developed into lines of inquiry along with acceptance criteria for appropriate areas of plant operations. These specific lines of inquiry, along with acceptance criteria, are further developed to identify the objective evidence that is required to satisfy their respective performance objectives. Attachment 3 presents the areas of plant operations chosen for evaluation in a matrix with the six functional areas of review and reflects the scope of the WHC PRF ORR.

The WHC PRF RRB intends to apply performance-based evaluations: the ORR plan calls for evaluations to be in the form of documented reviews, interviews, walkdowns, demonstrations, and drills. The evaluations will use a graded approach based on knowledge of the safety envelope and environmental requirements, emergency casualty response, knowledge and control of operations and procedures, configuration control, conduct of operations and maintenance, and training program implementation.

The nine members of the PRF RRB have been appointed by the President, WHC, based on their independence from PRF line management as well as their 270 man-years of combined experience in the nuclear field. A waiver from current WHC management guidance was obtained authorizing the RRB's independence from line management. (As discussed previously, the current revision of WHC MRP 5.50 requires a line manager to chair the RRB.)

The responsibilities of the RRB include: approval of lines of inquiry and acceptance criteria, review and approval of affidavits, assessment of open issues and establishing closure methods for punchlist items, and submitting a formal recommendation of the board's assessment of operational readiness to the President, WHC, upon completion of the readiness review. To provide objective evidence that certifies satisfactory completion of established lines of inquiry, affidavits are required to be submitted by facility line management for each line of inquiry. A total of 2385 affidavits were initially identified for this ORR. The RRB has reduced the total affidavits required to 2286 by consolidating similar lines of inquiry.

To support the RRB, the concept of a lead reviewer is used to enhance the affidavit approval process. A lead reviewer is responsible for ensuring that affidavit packages in his assigned area of expertise have been sufficiently developed by line management. In addition, lead reviewers perform independent assessments and interviews to validate affidavits, as well as document reviews, observations and walkdowns before presenting affidavit packages to the RRB. A lead reviewer approval form is attached to each affidavit.

A sampling of several RRB lead reviewers' approval forms indicated that verification of the adequacy of the affidavits was cursory in nature. However, subsequent discussions with a lead reviewer revealed that his reviews of submitted affidavits were detailed and complete. The WHC PRF ORR Co-chairman recognized the importance of properly documenting the adequacy of each review and stated that she would provide guidance to the lead reviewers regarding the depth and content of their approval form comments.

Attendance at a RRB meeting during which various affidavits were discussed revealed an active open forum discussion in which each RRB member felt free to raise any particular concerns he might have. However, given that less than 100 of the 2300 affidavits have been approved to date, the review team is concerned that the RRB may not be able to maintain the level of intensity and thoroughness demonstrated and still meet the scheduled affidavit review deadline of October 18, 1992.

The ES&Q oversight organizations will conduct their own independent reviews in their respective areas. The Quality Assurance group alone is developing a checklist (which mirrors the RRB checklist) to sample 250 of the 2300 affidavits. The three oversight organizations have representatives at the RRB meetings as "observers" but they are not members of the RRB. Some ES&Q personnel voiced concerns that the additional independent reviews were unnecessarily redundant. The tentative review scopes presented to the review team were based on the old/existing ORR process and appeared redundant given the current WHC PFP ORR plan.

In summary, the WHC PRF ORR embodies most of the desired attributes extracted from DOE-wide directives and DNFSB expectations for ORRs. The exceptions that were identified by the review team are as follows:

- The ORR was begun before the facility was ready for restart. For example, the WHC ORR began in February 1992, yet, to date, (1) the physical upgrades in the control room are not complete; and (2) operator training is still in Phase I (classroom instruction stage).

- Formal provisions for dissenting opinions of RRB members to be identified and expressed to the facility restart approval authority do not exist.

It is also important to note that the sheer magnitude of this ORR effort may become a major drawback to its effectiveness. During the review, several PFP management personnel voiced a concern that the PRF ORR process was driven by what was thought to be expected rather than what is technically required. As a result of this belief, and the lack of specific DOE-HQ guidance, a conservative approach is being used by PFP, as evidenced by the extensive redundancy of effort between the RRB and "independent" ES&Q organizations. Responding to 2300 lines of inquiry may overburden line management, distracting their focus from important restart issues and increasing both review costs and schedule delays. In addition, the lines of inquiry are so comprehensive that they may be taken as prescriptive requirements for restart; in essence, the RRB will subrogate PFP/PRF line management.

(4) DOE ORR: A formal plan for the conduct of the DOE ORR for the PRF restart does not yet exist. The ORR Chairman has been designated and was in attendance for part of the review team visit. He stated that due to limited resources, the PRF DOE ORR has taken lower priority than the Savannah River Site HB-Line ORR and Rocky Flats Building 707 ORR. This has delayed development and approval of the ORR plan as well as selection of team members. No ORR documentation was available for review.

v. 242-A Evaporator:

(1) Background: The 242-A Evaporator was originally placed into operation in 1977, concentrating double shell tank wastes until 1984. At that time, it became evident that the processing of liquid waste would be necessary over a period longer than the expected evaporator design lifetime of 10 years. Therefore, a material upgrade program was begun. Both the construction upgrade and acceptance testing programs are essentially complete. This upgrade program is expected to allow evaporator operation to continue through the year 2000. Restart of the evaporator is currently scheduled to occur in January 1993.

Two members of the DNFSB review team spent one day reviewing the 242-A Evaporator ORRs. The review included a tour of the 242-A Evaporator Building (with the exception of the evaporator room itself due to radiological access controls), a briefing from WHC management about the WHC ORR, attendance at a 242-A Evaporator restart planning meeting, and a review of applicable WHC and DOE ORR plans (in draft form). The DOE-RL 242-A Evaporator Program Manager and a DOE-RL support contractor were present for the entire review.

(2) Facility Observations: During the review team's tour of the 242-A Evaporator, the following observations were made:

- Facility housekeeping is poor: trash, tools, scaffold material, electrical cable, and excess parts were noted on all levels of the condenser room.
- The Health Physics Technician who accompanied the tour did not have her anti-contamination hood fastened in front. When questioned, she stated that the hood had defective fasteners and she did not want to hold up the tour to find a satisfactory hood.
- A door in the condenser room surface contamination boundary, which was posted to be kept shut for ventilation balance, was held partially open with a stick.
- The motor control centers (MCCs) in the AMU room were posted with handmade signs stating "Caution only electricians may operate switchgears." There was no reference to the source or authorization for these signs. It was reported that until the existing breakers in the MCCs are replaced (part of the upgrade program), only electricians are qualified to operate the present equipment. No electricians are assigned to the back shifts and there may be occasions when operators will need to operate this equipment.

- The WHC facility manager displayed detailed knowledge of equipment and systems as he guided the tour. He took action immediately when deficiencies were noted which could be corrected at the time.
- The DOE-RL Program Manager and his support contractor who accompanied the tour both stated that they had not been in the evaporator room in over 12 months because they did not consider that they had adequate cause to accept the resulting radiation dose. Observation of the evaporator room from outside the room is not possible.

(3) WHC ORR: The status of the 242-A Evaporator restart is as follows: (a) an integrated restart schedule has been issued, which includes about 700 tasks/activities, (b) a dedicated startup task force is in place and functioning, (c) the WHC ORR plan with acceptance criteria has been circulated within WHC for review (using the WHC PFP/PRF ORR as a model), and (d) a tank farm standing ORR team is in the process of being established. This team will conduct the WHC 242-A Evaporator ORR, which is expected to commence September 1, 1992 and conclude December 31, 1992.

As discussed previously in section 4.a.iii.(2), the WHC ORR of the 242-A Evaporator represents the new/evolving WHC practice of conducting ORRs, and is therefore exceedingly detailed and explicit. Additional observations relative to the WHC ORR are:

- Mr. Halverson, WHC has been assigned the duties of "242-A Evaporator Start-up Manager," a line management responsibility. As such, his independence as the WHC ORR "champion" may be jeopardized; especially with respect to the 242-A Evaporator.
- The 242-A Evaporator WHC ORR lines of inquiry currently number about 860 and efforts are continuing to consolidate and eliminate unnecessary lines.
- Members of WHC's tank farm standing ORR team, which will conduct the evaporator ORR, have been nominated but not yet approved. The proposed chairman has considerable experience with ORRs for various tank farm tests and modifications (albeit using the old/existing practice). In addition to the chairman, the team will include a secretary and four members to assess facility operations, engineering, maintenance, and operations support. Proposed members include two contractor personnel who participated in the WIPP ORR, and one WHC employee each from N-Reactor and the Fast Flux Test Facility (FFTF). ORR team independence is assured by the fact that none of the proposed members report to the Director, Tank Farm Project.

- Evaporator "cold" runs, using non-radioactive feed, are planned for the purpose of training and qualifying only one crew. Cold runs will be restricted in number and length due to the resulting creation of contaminated water. As a result, WHC desires that the runs also be observed by the WHC and DOE ORR teams. Additional crews will complete their practical training factors once operation resumes under the qualified crew.
- There is no requirement or mention of performance-based assessments. The WHC ORR team satisfies itself concerning the correctness of the affidavit packages and *may* test them with independent performance-based assessments, but there is no documented guidance.
- Acceptance of affidavits and supporting evidence requires a unanimous vote of the WHC ORR team members present at the meeting. A quorum for an official ORR team meeting is four of six members. ORR team members who are not present are not subsequently asked to vote on accepting the affidavit.
- The acceptance criteria in the WHC ORR plan are not sufficiently defined. For example, numerous criteria require that "personnel clearly understand," or that "operators are attentive," or that "operators exhibit an understanding." The WHC ORR plan does not contain explicit requirements for the ORR team to conduct operator interviews or observe operator evolutions and drills.

(4) DOE ORR: Although the review team did not have an opportunity to talk with DOE personnel who would serve on the 242-A Evaporator ORR team, a review of the DOE Implementation Plan for an Operational Readiness Review for the Hanford 242-A Evaporator (Draft), undated (latest version as of August 13, 1992), was performed. This ORR plan is heavily based on the WIPP ORR plan, and is therefore extremely comprehensive. With minor exceptions, the ORR plan successfully captures the essence of the desired attributes for ORRs. The 12-page plan is supported by the following attachments: Attachment 1, Objectives and Sub-Objectives (6 pages); Attachment 2, Criteria and Review Approaches (118 pages); and, Attachment 3, Technical Expert Work Sheets (not available). The excerpts below demonstrate the completeness of the ORR Plan.

- Although responsible (DOE) EM/TFPO management is represented in key positions on the EM/TFPO ORR team, the majority of the team is independent of any connections to the 242-A Evaporator Project. (Page 1 of 12)
- The team will assess the quality of the implementation plan to bring the entire 242-A Evaporator Facility into full compliance with applicable rules, regulations, and DOE Orders. (Page 2 of 12)

- The EM/TFPO ORR team will assess the adequacy of previous reviews, appraisals, audits, and assessments by others in conjunction with preparations for the evaporator startup; assuring that all findings affecting safe startup have been satisfactorily resolved. (Page 2 of 12)
- The EM/TFPO ORR will include assessments of: normal and abnormal operating and emergency procedures; operator and technician knowledge as evidenced by selective oral examinations and observation by EM/TFPO ORR team members of actual performance; plant management/supervision knowledge as evidenced by selective oral examinations and observation by EM/TFPO ORR team members of actual performance; as-built drawings with respect to actual plant configuration through walk-downs of selected systems; the Final Safety Analysis Report (FSAR) to assure that it is consistent with the as-built plant, and is current with existing procedures and staffing. (Page 3 of 12)
- The EM/TFPO ORR will be conducted by a team of technical experts in management, engineering, nuclear facility safety, and conduct of operations. The Team Leader will be assigned by DOE-HQ (EM). (Page 6 of 12)
- Any EM/TFPO ORR team member is free to issue a dissenting opinion. Should resolution not be achieved, provisions will be made to include the dissenting opinion in the final report. (Page 7 of 12)
- Each of the Sub-Objectives identified in Attachment 1 is expanded in Attachment 2 to specify:
 - Acceptance "Criteria" which, if satisfied, will demonstrate fulfillment of the Sub-Objective.
 - "Approaches" to how those criteria will be satisfied (e.g., interviews, walk-downs, document reviews).
 - A "Basis" for why the Sub-Objective is important and appropriate.
 - "References" which include DOE Orders and directives, Codes of Federal Regulations (CFRs), Nuclear Regulatory Commission (NRC) and Institute of Nuclear Power Operations (INPO) standards, and national consensus standards (e.g., American Society of Mechanical Engineers, ASME, National Fire Protection Association, NFPA).

The exceptions to the desired attributes extracted from DOE-wide directives and DNFSB expectations for ORRs that were identified by the review team are as follows:

- The EM/TFPO ORR may be initiated prior to completion of final readiness reviews by WHC and when/if appropriate may be a parallel effort with WHC.

(Page 2 of 12) Note that this may be justifiable on the basis of reducing liquid waste generation as a result of training and drills.

- A DOE-RL review of Facility Representative training and process knowledge is not *explicitly* included in the criteria for the ORR plan objectives and sub-objectives involving DOE-RL TFPO.

**Excerpts From DOE-RL Office of Compliance Audit Report 92-02
DOE-RL Operational Readiness Review Process**

The DOE-RL Office of Compliance commissioned Stone and Webster (S&W) to perform an independent audit of the ORR processes used at the Hanford Site. This audit was conducted in three parts (DOE-RL, WHC and PNL) by a team of four S&W personnel over the period January 27, 1992 to March 24, 1992. The audit team evaluated six completed DOE-RL ORRs, which in turn involved activities/facilities reviewed in the course of four WHC and two PNL ORRs.

The following excerpts are reproduced from the report (DOE-RL Office of Compliance, Audit Report 92-02) which assessed DOE-RL ORRs and are presented as summary findings together with examples given in the report. The DNFSB review team did not attempt to verify these findings; they are provided here for completeness and because these particular excerpts represent issues of particular interest to the DNFSB review team.

- **DOE-RL should provide procedures on directives that identify all essential requirements for conducting an ORR. This order should also define the responsibility assumed by those signing ORR documents. (Page 5 of 13)**

Management Direction - Both evaluation board chairmen interviewed noted that there are no guidelines provided by DOE management to perform their activities. Both teams followed their own procedures in the performance of their reviews: The DOE Tank Farm organization uses TFP-51.05 and the Operations organization uses OPD-5480.5. Differences in these procedures are a direct result of a lack of guidelines from DOE management. (Page 7 of 13)

- **ORE boards should identify key issues that are essential to the safe operation of the facility under review and verify that those issues are in place before authorizing startup. (Page 5 of 13)**

Review of Contractor ORR Activities - There was no evidence that DOE ORE personnel are verifying that objective evidence is required and filed by ORR boards. It appears that neither contractor ORR personnel nor DOE ORE personnel appreciate that signatures on an ORR must be supported by sufficient evidence to justify closeout. (Page 6 of 13)

- **The ORE should verify that the ORR process has identified all safety requirements contained in applicable safety documents, and that those requirements have been implemented into hardware, work plans, and procedures. (Page 5 of 13)**
- **Training should be provided to contractor and DOE-RL personnel in the ORR/ORE process. (Page 5 of 13)**
- **DOE should examine the DOE-RL follow-up system for tracking ORR-related comments before and after startup. (Page 5 of 13)**

DOE RL does not have its own system to track punchlist items, but depends on the Westinghouse tracking system to carry DOE open items. Some review comment records (RCRs) were closed out by the ORE Chairman without approval of the originator. (Page 11 of 13)

- **DOE should establish a uniform system to generate comments by DOE-RL, to issue those comments to contractors, and to resolve comments, both internally and externally. (Page 5 of 13)**

**Excerpts From DOE-RL Office of Compliance Audit Report 92-02
WHC Operational Readiness Review Process**

The DOE-RL Office of Compliance commissioned Stone and Webster (S&W) to perform an independent audit of the ORR processes used at the Hanford Site. This audit was conducted in three parts (DOE-RL, WHC and PNL) by a team of four S&W personnel over the period January 27, 1992 to March 24, 1992. The audit team evaluated six completed DOE-RL ORRs, which in turn involved activities/facilities reviewed in the course of four WHC and two PNL ORRs.

The following excerpts are reproduced from the report (DOE-RL Office of Compliance, Audit Report 92-02) which assessed WHC ORRs and are presented as summary findings together with examples given in the report. The DNFSB review team did not attempt to verify these findings; they are provided here for completeness and because these particular excerpts represent issues of particular interest to the DNFSB review team.

- **The ORR scope was not sufficiently defined to develop a checklist that bounds the activity under review. (Page 6 of 24)**
- **Checklist items were insufficiently described to allow the ORR board to prepare appropriate acceptance criteria. (Page 6 of 24)**

Checklists simply required that the safety assessment document (SAD) be issued and approved, rather than the final SAD be issued and the requirements of the SAD be incorporated into the appropriate work documents. (Page 10 of 24, three separate findings)

- **Checklists did not always address employee concerns. (Page 6 of 24)**

All but one checklist contained an item that required a formally documented review of employee concerns, and none required active solicitation of concerns from those involved with the activity. (Page 11 of 24)

- **Acceptance criteria did not direct personnel to verify that a checklist requirement is implemented. (Page 6 of 24)**

(22 separate findings of safety analysis report (SAR) or SAD requirements not incorporated into plans or procedures, Pages 12 & 13 of 24)

- **The documentation provided and accepted by the ORR board was insufficient to judge satisfactory closeout of checklist items. Acceptance criteria should require**

sufficient objective evidence to conclude that the checklist item is implemented.
(Page 6 of 24)

The [ORR] board accepted an affidavit which simply stated that emergency plans were in place. There were no procedures listed and no statement that the plan was reviewed against accidents specific to Window C activities. (Page 15 of 24)

A list of Engineering Change Notice (ECN) numbers was submitted without the names of the ECNs or a description of the changes. The ORR board could make no judgement as to closure of this item without knowing what these numbers represent. (Page 15 of 24)

...the Audit Team found that some important issues were punchlisted by the ORR board to support schedules... The Audit Team finds it inappropriate to allow line personnel to close out key issues with no ORR board approval. (Page 16 of 24)

- **There was a lack of adequate procedure/program controls to ensure that ESQ [Environmental, Safety and Quality] independent overviews are performed and documented in a uniform and consistent manner. (Page 6 of 24)**

Some ESQ organizations were performing verifications of the ORR checklist items through surveillances ...while other ESQ organizations only checked "yes" or "no" to signify ESQ verification. (Page 18 of 24)

ESQ oversight organizations did not review the initial ORR plan, checklist, and acceptance criteria to assure the proper issues had been addressed ...(Page 18 of 24)

- **There was no formal lessons-learned/feedback system to identify, evaluate, and feed back information regarding problems to the front end of other ORRs, and prevent recurrence. (Page 6 of 24)**
- **There are no audits of the effectiveness of the ORR process, or training being conducted on the ORR process. (Page 6 of 24)**

Excerpt From WHC-SP-0767 Revision 1
WHC Plutonium Finishing Plant Operational Readiness Review

Figure 1-5. Plutonium Reclamation Facility ORR Scope

READINESS REVIEW FUNCTIONAL AREAS	MANAGEMENT CONTROLS	ADMINISTRATIVE CONTROLS	PERSONNEL READINESS	EQUIPMENT/SYSTEMS	ES&H AND QA	SUPPLEMENTAL ITEMS
ORR SCOPE						
EMERGENCY PREPAREDNESS	9	5	4		2	5
ENGINEERING	14	20	5	5		
ENGINEERING LABS	13	7	4	4	3	
ENVIRONMENTAL ASSURANCE	8	6	5	2	6	
ENVIRONMENTAL/TPA	11	4	2		2	
FIRE PROTECTION	11	9	4	1	3	
MAINTENANCE	14	11	5	3	1	5
MANAGEMENT	13	10	2	4	6	5
OPERATIONS	13	8	3	5		
OSHA	13	6	4	3	3	
QUALITY OVERSIGHT	11	8	5		6	5
RADIOACTIVE/CHEMICAL PACKAGE	10	9	6	5	7	5
RADIOLOGICAL PROGRAMS	14	11	5	5	3	5
SAFETY ASSURANCE	15	12	5	4		
SAFEGUARDS AND SECURITY	9	12	5		2	
SUPPORT - 222S, Standard Lab	12	7	5	3	1	
SUPPORT - PPSL	3	5	4	3	1	
SUPPORT - Sanitary Water	4	4		1		
SUPPORT - Site Power	4	5		1		
SUPPORT - Steam Plant	4	5		1		
SUPPORT - Tank Farms	5	6	3	1		
SYSTEMS 1, 2, AND 3		6		7		
SYSTEMS 4				3		
TRAINING AND CERTIFICATION	13	4	6			5
TOTAL AVAILABLE OBJECTIVES	15	25	6	13	11	5