Department of Energy
National Nuclear Security Administration
Washington, DC 20585

April 29, 2004

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW
Suite 700
Washington, D.C. 20004

Dear Mr. Chairman:

In your December 31, 2003, correspondence concerning the Oxide Conversion Facility at the Y-12 National Security Complex you asked to be kept informed of the site's progress toward addressing various issues concerning weld quality assurance and the facility's safety basis. The enclosed correspondence from the Y-12 Site Office (YSO) provides you an update on their progress toward resolution of these issues. In addition, followup discussions with your staff have been productive in clarifying issues and working toward resolution of issues. As noted in the attachment further work is necessary to fully address the issues highlighted in your correspondence. YSO will follow-up with your staff over the next several months to resolve outstanding issues and will provide you with an update on our progress upon resolution of the issues via video conference not later than June 30, 2004.

If you have any questions, please contact me or have your staff contact Jeff Underwood at (301) 903-8303.

Sincerely,

Everet H. Beckner
Deputy Administrator
for Defense Programs

Enclosure

cc w/enclosure:
M. Whitaker, DR-1

DOE F 1325.8
(10/00)

United States Government **Department of Energy**

National Nuclear Security Administration

memorandum

DATE: April 8, 2004

REPLY TO
ATTN OF: Y12-40:Sundie

SUBJECT: **RESPONSE TO DEFENSE NUCLEAR FACILITIES SAFETY BOARD (DNFSB) STAFF ISSUE REPORT ON THE BUILDING 9212 OXIDE CONVERSION FACILITY (OCF)**

TO: Dr. Everet H. Beckner, Deputy Administrator for Defense Programs, NA-10, FORS

Reference: Letter John T. Conway to Dr. Everet H. Beckner, Staff Issue Report on the Safety Review of Oxide Conversion Facility at Y-12 National Security Complex, dated December 31, 2003.

The referenced letter identified six issues by the DNFSB Staff on the startup of the OCF. We requested BWXT Y-12, L.L.C (BWXT Y-12) to review and provide the necessary corrective actions to resolve each issue. BWXT Y-12 developed, documented and transmitted the appropriate responses in a letter to my staff. The Y-12 Site Office (YSO) has reviewed the responses and has attached a summary of our review. We agree with all of the resolutions and/or corrective actions proposed, with the exception of the response to issue number three. This issue deals with potential worker exposure to hydrogen fluoride (HF) in cylinder pigtail operations. YSO does not agree with the response as written, and is currently working with BWXT Y-12 to establish more definitive corrective action(s) in a timely manner. We expect to reach agreement on the resolution to this issue in the next 2 weeks. Also, as stated in the attachment, YSO is evaluating the issue of the additional missing weld radiographs. We will provide updates to both your office and the DNFSB staff when we resolve these remaining issues. Please feel free to use this information to provide status to the DNFSB staff.

Should you have any questions, please direct them to Dan Hoag at 865-576-0511.

for William J. Brumley
Manager
Y-12 Site Office

Attachment

cc w/attachment:
Dan Hoag, Y12-40, YSO
Bob Edlund, Y12-30, YSO
Chelsea Hubbard, Y12-50, YSO

Steve Wellbaum, Y12-40, YSO
Terry B. Olberding, Y12-30, YSO
Douglas J. Dearolph, Y12-01, YSO
Don F. Owen, 9704-2, MS 8017, DNFSB

ATTACHMENT

Y-12 Technical Reponses to Defense Nuclear Facilities Safety Board (DNFSB) Staff Issue Report on the Building 9212 Oxide Conversion Facility (OCF)

1. Weld Quality Assurance

Item: Seventeen (17) welds were accepted with missing radiographic films. The justification for not re-radiographing the welds was cost, difficulty of obtaining portable equipment, and lack of observed problems with other welds.

Response: The Y-12 Plant performed a review of "critical" welds and documented the results in a report, HF Supply and Fluidbeds Facility Weld Integrity Review, Y/EN-6172. This review incorporated several elements including inspection requirements, location, filler materials, procedure used, inspection methods/reports, and availability of radiographic film. Of the 1013 welds covered in the report, radiographs were not available in records for 47 of the welds but reader sheets for all welds, including those missing radiographs, were available. Of the 47 welds, 30 were re-radiographed with equipment that produces high-resolution than standard weld inspection equipment. All 30 welds were deemed acceptable. To provide further technical justification for the acceptability of these welds, system testing done in 2003 at pressures exceeding process conditions (approximately three time normal pressure) and no leaks were found.

Following discussion with YSO, BWXT agreed to radiograph twelve (12) welds. This number does not include four welds which are part of an ASME U-Stamped Code Vessel, and were accepted on this basis. One weld is not accessible. On March 27, 2004, BWXT radiographed nine of the 12 welds using a radiography subcontractor. All nine welds were found to be acceptable. The remaining welds will be radiographed in mid-April. This includes the ten welds of interest to the DNFSB Staff. The specific weld ID numbers were discussed between respective members of our staffs.

At this time, BWXT indicates that additional film cannot be located. An evaluation of this situation is in progress. YSO is monitoring the progress and will evaluate the results when available.

Actions:

1. Based on discussions with YSO and as a measure to provide additional risk reduction, BWXT Y-12 conducted radiography of 9 of the 12 OCF welds as discussed above. This activity is expected to be completed by the contractor no later than mid-April, 2004. YSO Subject Matter Experts are observing these activities in the field.
2. YSO will monitor the progress of the issue with the missing welds.

2. Safety Basis – Criteria used in selecting and classify controls for the protection of facility workers.

Item: The criteria used to select and classify controls for the protection of facility workers appear to be less stringent than those used for collocated workers. This seems counter to the current DOE Directives to provide equal protection to all workers from significant hazardous conditions.

Response: The BIO uses criteria for identifying controls for the facility worker that consider both prompt death (High Consequences) and serious injury (Moderate Consequences). In general, consequences to the worker were identified in both categories; however, due to the conservative nature of the analysis for HF exposures, all facility worker exposures to HF requiring the identification of controls had High consequences. Exposures to HF resulting in Low consequences (i.e., no serious injury in the facility) were also identified. However, these events did not require the identification of controls. By definition ERPG-3 concentrations, used for the selection of onsite worker controls, result in effects that is not life threatening. In this sense, ERPG-3 is essentially equivalent to the "serious injury" criteria used for the facility worker. Exposures to onsite workers in excess of ERPG-3 and exposures resulting in "serious injury" to the facility

worker would both require the identification of safety-significant controls. Therefore, both onsite workers and facility workers receive equal protection from "significant hazardous conditions".

Action Items: YSO will confirm the proper execution of the worker safety controls selection criteria ensuring consistent protection against serious injury (or significant exposures) for facility and collocated workers. This action will coincide with the review and approval of Revision 18 to the BIO supporting OCF operations. The expected completion date is April 23, 2004.

3. Safety Basis – Potential worker exposure to hydrogen fluoride (HF)

Item: Potential worker exposure to hydrogen fluoride (HF) in cylinder pigtail operations due to inadequate face velocity at cylinder enclosure door. The method for transmitting this issue to the contractor was informal.

Response: It was noted in the BIO that enclosure ventilation maybe one of other available controls that could reduce the exposures. But as indicated in the safety basis documents, reliance for reduction of exposure in all instances cannot be ensured due to other exposure pathways including those outside the enclosure. An Industrial Hygiene Risk Assessment and Health Risk Characterization has been performed for the operations providing the greatest risk of HF exposure, and appropriate PPE has been selected based on this assessment to provide for the safety of the worker.

While BWXT Y-12 considers the risk to the worker during pigtail operations adequately addressed by required PPE, further re-evaluation of non-intrusive engineered controls will be conducted, such as a portable glove-bag that could provide additional risk reduction.

Action Plan:

1. YSO transmitted the issue by e-mail on January 15 as part of the YSO Verification Team Issues list as defined by YSO procedure 5.4, *Startup and Restart of Facilities at Y-12.* BWXT responded by formal letter to T.D. Sherry, Deputy Manager, YSO, dated 2/18/04. YSO disagreed with the proposed resolution and informed BWXT by formal letter from the YSO Deputy Manager on 3/12/04. BWXT identified non-intrusive options to reduce the potential for worker exposure during pigtail connection/disconnection and provided a proposed resolution to YSO. YSO is evaluating the BWXT proposal and anticipates completion of the evaluation by late April.

4. Safety Basis – Prevent or mitigate potential accident in the Dock Scrubber

Item: One system relied upon to prevent or mitigate potential accident conditions did not appear to have been properly identified as safety-significant. The dock scrubber system is relied upon as secondary confinement to prevent releases of HF in the event of a primary confinement leak and the dock scrubber water flow system is not identified as safety-significant.

Response: The accident analysis provided in the 9212 BIO recognizes the potential for the loss of scrubber and credits controls that reduces the likelihood for a release to occur that requires the dock to remain operational while the release occurs. The primary control for these releases is the engineered, primary confinement boundary and associated isolation devices. This subsystem is robust and effectively addresses the significant HF release scenarios. Classification of this subsystem is safety significant. Evaluations within the safety basis documents that cover these types of events are included in the 9212 Complex Basis for Interim Operations (BIO), Section 5.6.3.4.6. The controlled frequency bin established by the current control set is "Extremely Unlikely," the lowest frequency bin for these analyses. Because the dock scrubber in not single failure proof its failure is a recognized event and remains analyzed in the BIO. The consequence of the dock scrubber failure during a postulated HF event remains "High."

The dock scrubber provides a mitigative function during specific HF release events and there are failures that could make the dock scrubber unavailable and prevent it from doing this function. The dock scrubber's availability is monitored through interlocks that are also classified as safety significant. The

parameters that continuously monitor the availability of the dock scrubber are flow to the pack column, level of scrub solution available, and enclosure pressure ensuring operation of the venturi. If any of these parameters fall outside of defined ranges, the safety significant PLC actuates the primary confinement/isolation system and stops any flows within the process equipment, obviating the need for the scrubber. Redundancy is also provided for the monitoring portion of these interlocks and the function is protected upon loss of power.

As part of the start-up process, the structure, system, and component (SSC) classification of the entire OCF system is being finalized. Based on the discussion above, BWXT-Y12 has determined the scrubber system, including the pump and associated piping, to be safety significant non-nuclear. In addition, the SSC grading will be revised to reflect this classification. Finally, as part of this classification, BWXT Y-12 will evaluate the system to ensure the safety significant function is achieved.

Action: The SSC grading of the OCF system is complete. BWXT is in the process of providing this information to YSO for review.

5. Safety Basis – Criticality Safety Evaluations for UF4 Glovebox

Item: The criticality safety evaluation for the fluid beds does not evaluate the complete discharge of product from the UF_4 receiver onto the floor of the glovebox concurrent with the introduction of a moderator.

Response: The current version of the fluid beds criticality safety evaluation (CSE) was developed in accordance with the double contingency principle as outlined in DOE orders, national standards, and Y-12 plant procedures. For the fluid beds CSE; the hazard evaluation study (HES) process was one of the sources relied upon to identify credible abnormal scenarios. With the exception of an earthquake, no abnormal event was identified that would lead to the conditions of a loss of confinement of uranium powder concurrent with an introduction of liquid in the unconfined powder. None of the OCF subject matter experts believe that such a scenario is credible except possibly during an earthquake. Moreover, this specific event was judged to be incredible based on the multiple failures necessary to support progression of the potential accident scenario. Thus, this event was not evaluated as part of the natural phenomena studies that were conducted to support OCF.

Based on the DNFSB concern, an additional natural phenomena evaluation was conducted to review the concern related to water intrusion in the UF_4 receiver glovebox concurrent with a loss of confinement of UF_4 powder. The structural analysis results support that the glovebox and connected ductwork will maintain sufficient integrity to prevent the introduction of water during a design basis seismic event.

The structural evaluation will be referenced in the CSE as justification for the glovebox and connected ductwork preventing the intrusion of water from external sources during an earthquake. A passive design feature requirement specifying the integrity of the glovebox as it relates to water intrusion will be imposed. The implementation of this requirement will require the development of a periodic surveillance on the glovebox integrity as well as the connected ductwork. YSO is requesting BWXT to evaluate the feasibility of installation of a criticality drain on the glove box as a "Defense-In-Depth" feature.

Actions:

1. Revise criticality safety evaluation to incorporate results of the structural analysis and to impose a surveillance requirement for the structural integrity of the glovebox and connected ductwork. This activity is complete.
2. Complete the evaluation of the installation of a criticality drain on the receiver glove box by April 30, 2004.

6. Emergency Management Hazards Analysis

Item: This information is provided in response to the concern associated with Emergency Management Hazards Assessment (EMHA). The specific concern identified in the Staff Issue Report was that hazard

analyses performed in support of the EMHA appeared to use assumptions which were different from those made during preparation of the BIO resulting in similar events requiring dissimilar levels of protection. A specific example provided was the event associated with a break in the HF transport pipe. The analysis presented in the BIO resulted in more conservative results that the analysis in the EMHA and the recommend-attain was made that the EMHA be based on adequately conservative analyses to ensure appropriate protection of workers and the public.

Response: HF release analyses performed in the development of the EMHA were reviewed and discussed with the facility safety analyst responsible for preparing the BIO and DSA. Except for the release of hot HF from a transfer pipe leak, the assumptions and results of the analyses prepared for the safety basis and the EMHA were consistent. The assumptions used in support of the safety basis for the transfer line break were compared to the assumptions used in the development of the EMHA. It was determined that the assumptions used in the development of the EMHA were not consistent with nor as conservative as those used in support of the safety basis analyses. Specifically, the release height and upward velocity of the plume used in the EMHA were significantly higher than the values used in support of the safety basis. Revision of these factors in the model used for the EMHA analysis resulted in downwind consequences that were consistent, yet conservative, with those obtained in the Documented Safety Analysis (DSA) analysis. The EMHA and associated EALs are being revised to be more consistent with the assumptions in the safety bases in order to ensure appropriate protection of the public and workers.

The inconsistency between the EMHA and the BIO associated with the analysis of the release of hot HF vapor from the transfer line is an anomaly, as all other release analyses are consistent. This is also true site-wide due to the fact that the safety basis documents are used as the basis for the identification of operational emergency events for analysis in the EMHAs. As a result, EMHAs are in agreement and consistent with safety basis documents.

Action: Revise EMHA and EALs for HF releases by 31 March 2004.

BWXT Y-12
Protecting America's Future

February 18, 2004

Mr. Theodore D. Sherry
Deputy Manager, Y-12 Site Office
National Nuclear Security Administration
Post Office Box 2050
Oak Ridge, Tennessee 37831-8009

Dear Mr. Sherry:

Contract DE-AC05-00OR22800, Response to Defense Nuclear Facilities Safety Board Staff Issue Report on the Building 9212 Oxide Conversion Facility

Reference: *Letter Theodore D. Sherry to James A. Conner dated January 9, 2004, Response to Defense Nuclear Facilities Safety Board Staff Issue Report on the Building 9212 Oxide Conversion Facility*

BWXT Y-12 has reviewed the Oxide Conversion Facility issues noted in December 31, 2003, Defense Nuclear Facilities Safety Board letter covering the Defense Nuclear Facilities Safety Board staff review on October 28 and 29, 2003, of Oxide Conversion Facility. From our review and discussions with your staff, there were six items that required further evaluation and response. For each of these Oxide Conversion Facility items, we have investigated the concerns, reviewed the technical basis of the work that was done, informally received feedback from your staff and prepared a response that is enclosed in the Attachment. While the technical justification for the majority of the Oxide Conversion Facility items reviewed was found to be adequate, the potential for additional risk mitigation was considered in generating our responses. Five of the Oxide Conversion Facility items; welding record concerns, potential worker exposure during connection of Hydrogen Fluoride cylinder, Oxide Conversion Facility scrubber sub-system safety classification, criticality safety evaluation for fluid beds and Emergency Management assumptions for accident analysis have actions noted to track follow-up resolutions. Due to the requirement to conduct further evaluation to assess the impact of response to address potential worker exposure during connection of Hydrogen Fluoride cylinder, a proposed formal action plan for this item will be submitted by March 31, 2004. Based on the technical justification provided in the attachment addressing the adequacy of controls for worker protection, it is recommended that issue be considered closed.

Should you have any questions, please contact Pam Horning at 241-5297.

Very truly yours,

James A. Conner
Deputy General Manager

JAC:go

Attachment: As Stated

c/att: D. J. Dearolph, YSO
C. D. Hubbard, YSO
T. B. Olberding, YSO
D. K. Hoag, YSO
K. D. Ivey, YSO
D. F. Owen, DNFSB

DOE/ORO NO OH-0476
360104

Internal Distribution February 18, 2004, James A. Conner to Theodore D. Sherry letter Contract DE-AC05-00OR22800, Response to Defense Nuclear Facilities Safety Board Staff Issue Report on the Building 9212 Oxide Conversion Facility

c/att: R. A. Cordani
J. P. Crociata
P. A. Horning
D. P. Kohlhorst
J. C. Sinclair
W. D. Strunk
YDCC-RC

Attachment
Letter: J. A. Conner to T. D. Sherry
February 18, 2004

ATTACHMENT

Y-12 TECHNICAL RESPONSES TO DEFENSE NUCLEAR FACILITIES SAFETY BOARD (DNFSB) STAFF ISSUE REPORT ON BUILDING 9212 OXIDE CONVERSION FACILITY (OCF)

Attachment
Letter: J. A. Conner to T. D. Sherry
February 18, 2004

ATTACHMENT

Y-12 Technical Reponses to Defense Nuclear Facilities Safety Board (DNFSB) Staff Issue Report on the Building 9212 Oxide Conversion Facility (OCF)

1. Weld Quality Assurance

Item: Seventeen (17) welds were accepted with missing radiographic films. The justification for not re-radiographing the welds was cost, difficulty of obtaining portable equipment, and lack of observed problems with other welds.

Response: The Y-12 Plant performed a review of "critical" welds and documented the results, HF Supply and Fluidbeds Facility Weld Integrity Review, Y/EN-6172. This review incorporated several elements including inspection requirements, location, filler materials, procedure used, inspection methods/reports, and availability of radiographic film. The report documents the checks of the welding process completed by the fabricating vendor and the on-site construction services. The weld radiographs of several of the welds were re-examined by either Y-12 examiners or ORNL examiners through a service agreement. A sample of 30 to 40 % of the weld radiographs was re-examined through this process and are also documented in the report.

Of the 1013 welds covered in the report identified above, radiographs were not available in records for 47 of the welds but inspection sheets for all welds, including those missing radiographs, were available. Following testing activities with surrogate material, a portion of the system was disassembled which allowed specific sections to be removed for radiography at a fixed facility. Of the 47 welds, 30 were re-radiographed with equipment that produces high-resolution than standard weld inspection equipment. All 30 welds were deemed acceptable. This successful re-examination of the 30 welds provides further indication that the entire family of welds was acceptable.

After extensive technical review, it was determined that re-radiographing the 17 welds in question, which is less than two percent of the population, was not required. This was justified by having the inspection reports for the entire population of welds and the re-radiographing of 30 of the 47 welds missing radiographic film. To provide further technical justification for the acceptability of these welds, system testing done in 2003 at pressures exceeding process conditions (approximately three time normal pressure) and no leaks were found.

The table attached to this response provides a summary of the remaining subject 17 welds. For each weld the table provides the process service conditions, materials of construction, type of weld, and identification of the specific reader sheet of that weld. Also included on the table is an estimate of the amount of coverage re-examination would provide if radiography were to be completed. This estimate was provided by Y-12 Plant weld examination personnel and is based upon typical in-field radiography techniques. Based on the installed configuration only 4 of the 17 welds would be able to be shot 100%, 8 welds would be able to be shot with 50% coverage, and one weld is not accessible for radiography. The other 4 welds are part of an ASME "U" Stamped Code Vessel and are accepted on this basis.

Attachment
Letter: J. A. Conner to T. D. Sherry
February 18, 2004

TABLE
Assessment Information on 17 Welds in OCF (Field Radiography using IR-192 source)

No.	Weld ID No.	System	Operating Pressure	Type of Weld	Size of Piping	Reader Sheet	Inspections Completed VT, DP	Accessible for IR-192 Source [1]
1	P-201 #7	HF/N2	~25-30	Butt	1	9227/DHTL	Both	(2) RT's superimposed @90 degree separation. 100% coverage
2	P-202B #26	N2	45	Butt	1/2	3216/NWT	Both	Cannot shoot 0% coverage
3	P-209A #2	H2/N2	~30	Butt	1/2	3191/NWT	Both	(2) RT's superimposed @90 degree separation. 100% coverage
4	P-209A #3	H2/N2	~30	Butt	1/2	3191/NWT	Both	(1) RT superimposed 50% coverage
5	P-209B #1	H2/N2	~30	Butt	1/2	3237/NWT	Both	(1) RT superimposed 50% coverage
6	P-209B #2	H2/N2	~30	Butt	1/2	3237/NWT	Both	(1) RT superimposed 50% coverage
7	P-209B #3	H2/N2	~30	Butt	1/2	3191/NWT	Both	(1) RT superimposed 50% coverage
8	P-209B #4	H2/N2	~30	Butt	1/2	3237/NWT	Both	(1) RT superimposed 50% coverage
9	P-209B #7	H2/N2	~30	Butt	1/2	3196/NWT	Both	(1) RT superimposed 50% coverage
10	P-209B #8C1	H2/N2	~30	Butt	1/2	3204/NWT	Both	(1) RT superimposed 50% coverage
11	P-209B #9C1	H2/N2	~30	Butt	1/2	3200/NWT	Both	(1) RT superimposed 50% coverage
12	P-209B #10	H2/N2	~30	Butt	1/2	3196/NWT	Both	(2) RT's superimposed @90 degree separation. 100% coverage
13	P-302 #1	HF/N2	~40	Butt	1/2	3237/NWT	Both	(2) RT's superimposed @90 degree separation. 100% coverage
14	FB-D-600 1	H2/N2	~5 psi	Vessel		3204/NWT	Both	ASME "U" Stamped Code Vessel No [2] re-radiograph required
15	FB-D-600 2	H2/N2	~5 psi	Vessel		3204/NWT	Both	ASME "U" Stamped Code Vessel No [2] re-radiograph required
16	FB-D-600 3	H2/N2	~5 psi	Vessel		3200/NWT	Both	ASME "U" Stamped Code Vessel No [2] re-radiograph required
17	FB-D-600 4	H2/N2	~5 psi	Vessel		3200/NWT	Both	ASME "U" Stamped Code Vessel No [2] re-radiograph required

[1] Based on the size of the welds, each weld would require two shots for 100% coverage, under ideal conditions a Source to Film Distance of 18-21" is required for 2-2T sensitivity. However, because the welds are installed and have equipment surrounding them with limited space to perform radiography the coverage using IR-192 would only be as follows: 4 @100% coverage, 8@50% coverage, and 1 @ 0% coverage as the weld is inaccessible. With this amount of coverage the radiographs would only be a confirming activity.

[2] The HF fluid bed vessel welds are on a "U" stamped vessel, which has been accepted and verified as meeting ASME code requirements by an Authorized Inspection agency, and should be accepted on this basis. Therefore, no radiography need be performed on this vessel.

Action Plan: Based on discussions with YSO and as a measure to provide additional risk reduction, BWXT Y-12 will proceed to conduct radiography of the 12 OCF welds noted in the attached table. We expect this activity to be completed by April 15, 2004.

2. Safety Basis – Criteria used in selecting and classify controls for the protection of facility workers.

Item: The criteria used to select and classify controls for the protection of facility workers appear to be less stringent than those used for collocated workers. This seems counter to the current DOE Directives to provide equal protection to all workers from significant hazardous conditions.

Response: "This concern resulted from a misinterpretation of the BIO process used to determine the required control set for protection of the facility worker. The BIO uses criteria for identifying controls for the facility worker that consider both prompt death (High Consequences) and serious injury (Moderate Consequences). In general, consequences to the worker were identified in both categories; however, due to the conservative nature of the analysis for HF exposures, all facility worker exposures to HF requiring the identification of controls had High consequences. Exposures to HF resulting in Low consequences (i.e., no serious injury in the facility) were also identified. However, these events did not require the identification of controls. By definition ERPG-3 concentrations, used for the selection of onsite worker controls, result in effects that is not life threatening. In this sense, ERPG-3 is essentially equivalent to the "serious injury" criteria used for the facility worker. Exposures to onsite workers in excess of ERPG-3 and exposures resulting in "serious injury" to the facility worker would both require the identification of safety-significant controls. Therefore, both onsite workers and facility workers receive equal protection from "significant hazardous conditions".

The facility worker receives significant benefit from preventive and mitigates controls selected to protect the onsite worker as well as the public. Because of the facility worker's close proximity to potential HF releases, it is possible for significant exposures to be received in the unmitigated case where no controls are assumed to be present. These exposures could be sufficient to result in death if controls fail or if the worker is unable to evacuate the vicinity of the release. There is no intent to imply that the only necessary condition for selection of controls for the facility worker is the potential for unmitigated exposures resulting in prompt death. The following text explains the process used for control selection and identifies some of the specific controls that protect the facility worker.

The BIO criteria used for the categorization of OCF accident consequences designates an event a High consequence if the exposure at 100 meters is greater than ERPG-3 or significant unmitigated exposures could occur to the facility worker that might possibly result in prompt death. The BIO criteria for a Moderate consequence event are "serious injury in the facility." In this case, serious injury is consistent with the definition of ERPG-3. These criteria are consistent with the DOE STD 3011-94 guidance used to develop the set of credited controls for OCF. DOE-STD-3011-94 clearly states that these criteria are for binning purposes only and do not reflect acceptability of accident consequences. The HF events evaluated in the approved safety basis for OCF operations were judged to result in either Low, Moderate, or High consequences to the facility worker. In this context, the terms High and Moderate are essentially triggers to the safety analyst that preventive and/or mitigative controls are warranted to protect the worker from these events. Following this guidance, control sets for prevention/mitigation were assigned to those events with consequences in the Moderate and High ranges. As stated previously, the High consequence judgement was invoked for unmitigated HF releases that could expose the facility worker to significant doses.

Attachment
Letter: J. A. Conner to T. D. Sherry
February 18, 2004

The process hazards analysis prepared for the BIO evaluated unmitigated HF releases. These releases were always of a conservative nature such that when the workers were significantly impacted (i.e., > Low), the onsite receptors were also impacted. For instance, a maintenance error that in most facilities would only impact the facility worker was assumed to involve conservatively high quantities of HF such that the airborne concentration at the onsite worker location (100 meters) would exceed ERPG-3. As a result, a control was identified (i.e., independent verification of purge and sampling) that would not only reduce the frequency of exposure to the onsite worker but would also reduce the frequency of exposure to the facility worker. As a result of this approach, the controls identified to mitigate the consequences or reduce the frequency of the event to the onsite receptor are just as applicable to the facility worker. Another good example is the event for which the HF detector interlock in the HFB was credited. This event was assumed to involve the maximum release of 160 lbs. of HF. Since a 160 lb. HF release would cause ERPG-3 at 100 meters to be exceeded, the control (i.e., HF detector interlock) was designated as a SS_{nn} SSC based on the potential impact to the onsite worker. However, by isolating HF in the credited primary confinement, the HF detector interlock protects the onsite receptor and, in addition, reduces and minimizes potential facility worker exposures. Based on this conservative approach, no operational event of significance involving HF was considered to impact the worker only. Therefore, the controls identified for HF releases to the onsite and offsite receptors also provide significant protection for the operator. This includes the passive design features for safety identified in the OSR. Examples of these are the HF confinement boundaries (both primary and secondary boundaries) which include, but are not limited to, the double-walled HF supply and exhaust piping and the cylinder, vaporizer, and HFB enclosures. In addition to the controls that benefit both the onsite and facility worker, some controls provide exclusive protection for the facility worker. Examples include PPE and facility-specific training that directs facility worker response to a HF release. These controls provide protection not afforded the onsite receptor.

In addition to the controls identified, it was emphasized in our previous meeting with the DNFSB that the worker could smell extremely low concentrations of HF, approximately 1/10 of the ERPG-1 concentration. "ERPG-1 is defined as the maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to one hour without experiencing other than mild, transient adverse health effects". Based on this information and the training that the facility operator receives, the operator will evacuate the area of a release to avoid exposure. In the absence of having his evacuation route blocked, the operator is unlikely to be overcome by a HF release such that evacuation is impossible. Since the facility worker is administratively prevented from entering the fluid bed enclosures during process operations where evacuation routes might be compromised by a release, blockage of the evacuation routes from the area is not a concern. The primary and secondary confinement systems also serve to reduce the rate of a HF release such that the operator has adequate time to evacuate and avoid significant exposure. Therefore, with consideration given to operator evacuation and the credited control set, the mitigated consequences for the facility worker from postulated events are expected to be low.

Based on the previous discussion, the control selection criteria used in the 9212 BIO do not provide preferential treatment for the on-site worker at the expense of the facility worker. The formal criteria are essentially equivalent. However, in reality the facility worker receives additional benefit from special training to immediately evacuate in the event of a HF release and is equipped with PPE. These controls serve the facility worker only and are provided to reduce exposures to potential releases.

3. Safety Basis – Potential worker exposure to hydrogen fluoride (HF)

Item: Potential worker exposure to hydrogen fluoride (HF) in cylinder pigtail operations due to inadequate face velocity at cylinder enclosure door.

Response: It was noted in the BIO that enclosure ventilation may be one of other available controls that could reduce the exposures. But as indicated in the safety basis documents, reliance for reduction of exposure in all instances cannot be ensured due to other exposure pathways including those outside the enclosure. An Industrial Hygiene Risk Assessment and Health Risk Characterization has been performed for the operations providing the greatest risk of HF exposure, and appropriate PPE has been selected based on this assessment to provide for the safety of the worker.

While BWXT Y-12 considers the risk to the worker during pigtail operations adequately addressed by required PPE, further re-evaluation of non-intrusive engineered controls will be conducted, such as a portable glove-bag that could provide additional risk reduction.

Action Plan: Identify feasibility of non-intrusive options to reduce the potential for worker exposure during pigtail connection/disconnection. Provide results of evaluation to YSO by 31 March 2004.

4. Safety Basis – Prevent or mitigate potential accident in the Dock Scrubber

Item: One system relied upon to prevent or mitigate potential accident conditions did not appear to have been properly identified as safety-significant. The dock scrubber system is relied upon as secondary confinement to prevent releases of HF in the event of a primary confinement leak and the dock scrubber water flow system is not identified as safety-significant.

Response: The accident analysis provided in the 9212 BIO recognizes the potential for the loss of scrubber and credits controls that reduces the likelihood for a release to occur that requires the dock to remain operational while the release occurs. The primary control for these releases is the engineered, primary confinement boundary and associated isolation devices. This subsystem is robust and effectively addresses the significant HF release scenarios. Classification of this subsystem is safety significant. Evaluations within the safety basis documents that cover these types of events are included in the 9212 Complex Basis for Interim Operations (BIO), Section 5.6.3.4.6. The controlled frequency bin established by the current control set is "Extremely Unlikely," the lowest frequency bin for these analyses. Because the dock scrubber in not single failure proof its failure is a recognized event and remains analyzed in the BIO. The consequence of the dock scrubber failure during a postulated HF event remains "High."

The dock scrubber provides a mitigative function during specific HF release events and there are failures that could make the dock scrubber unavailable and prevent it from doing this function. The dock scrubber's availability is monitored through interlocks that are also classified as safety significant. The parameters that continuously monitor the availability of the dock scrubber are flow to the pack column, level of scrub solution available, and enclosure pressure ensuring operation of the venturi. If any of these parameters fall outside of defined ranges, the safety significant PLC actuates the primary confinement/isolation system and stops any flows within the process equipment, obviating the need for the scrubber. Redundancy is also provided for the monitoring portion of these interlocks and the function is protected upon loss of power.

As part of the start-up process, the structure, system, and component (SSC) classification of the entire OCF system is being finalized. Based on the discussion above, BWXT-Y12 has determined the scrubber system, including the pump and associated piping, to be safety significant non-nuclear. In addition, the SSC grading will be revised to reflect this classification. Finally, as part of this classification, BWXT Y-12 will evaluate the system to ensure the safety significant function is achieved.

Action: Finalize the SSC grading of the OCF system by 31 March 2004.

5. Safety Basis – Criticality Safety Evaluations for UF4 Glovebox

Item: The criticality safety evaluation for the fluid beds does not evaluate the complete discharge of product from the UF_4 receiver onto the floor of the glovebox concurrent with the introduction of a moderator.

Response: The current version of the fluid beds criticality safety evaluation (CSE) was developed in accordance with the double contingency principle as outlined in DOE orders, national standards, and Y-12 plant procedures. For the fluid beds CSE, the hazard evaluation study (HES) process was one of the sources relied upon to identify credible abnormal scenarios. With the exception of an earthquake, no abnormal event was identified that would lead to the conditions of a loss of confinement of uranium powder concurrent with an introduction of liquid in the unconfined powder. None of the OCF subject matter experts believe that such a scenario is credible except possibly during an earthquake. Moreover, this specific event was judged to be incredible based on the multiple failures necessary to support progression of the potential accident scenario. Thus, this event was not evaluated as part of the natural phenomena studies that were conducted to support OCF.

Based on the DNFSB concern, an additional natural phenomena evaluation was conducted to review the concern related to water intrusion in the UF_4 receiver glovebox concurrent with a loss of confinement of UF_4 powder. The structural analysis results support that the glovebox and connected ductwork will maintain sufficient integrity to prevent the introduction of water during a design basis seismic event.

The structural evaluation will be referenced in the CSE as justification for the glovebox and connected ductwork preventing the intrusion of water from external sources during an earthquake. A passive design feature requirement specifying the integrity of the glovebox as it relates to water intrusion will be imposed. The implementation of this requirement will require the development of a periodic surveillance on the glovebox integrity as well as the connected ductwork.

Action: Revise criticality safety evaluation to incorporate results of the structural analysis and to impose a surveillance requirement for the structural integrity of the glovebox and connected ductwork. We expect this activity will be completed by February 24, 2004.

6. Emergency Management Hazards Analysis

Item: This information is provided in response to the concern associated with Emergency Management Hazards Assessment (EMHA). The specific concern identified in the Staff Issue Report was that hazard analyses performed in support of the EMHA appeared to use assumptions which were different from those made during preparation of the BIO resulting in similar events requiring dissimilar levels of protection. A specific example provided was the event associated with a break in the HF transport pipe. The analysis presented in the BIO resulted in more conservative results that the analysis in the EMHA and the recommend-attain was made that the EMHA be based on adequately conservative analyses to ensure appropriate protection of workers and the public.

Response: HF release analyses performed in the development of the EMHA were reviewed and discussed with the facility safety analyst responsible for preparing the BIO and DSA. Except for the release of hot HF from a transfer pipe leak, the assumptions and results of the analyses prepared for the safety basis and the EMHA were consistent. The assumptions used in support of the safety basis for the transfer line break were compared to the assumptions used in the development of the EMHA. It was determined that the assumptions used in the development of the EMHA were not consistent with nor as conservative as those used in support of the safety basis analyses. Specifically, the release height and

upward velocity of the plume used in the EMHA were significantly higher than the values used in support of the safety basis. Revision of these factors in the model used for the EMHA analysis resulted in downwind consequences that were consistent, yet conservative, with those obtained in the Documented Safety Analysis (DSA) analysis. The EMHA and associated EALs are being revised to be more consistent with the assumptions in the safety bases in order to ensure appropriate protection of the public and workers.

The inconsistency between the EMHA and the BIO associated with the analysis of the release of hot HF vapor from the transfer line is an anomaly, as all other release analyses are consistent. This is also true site-wide due to the fact that the safety basis documents are used as the basis for the identification of operational emergency events for analysis in the EMHAs. As a result, EMHAs are in agreement and consistent with safety basis documents.

Action: Revise EMHA and EALs for HF releases by 31 March 2004.