

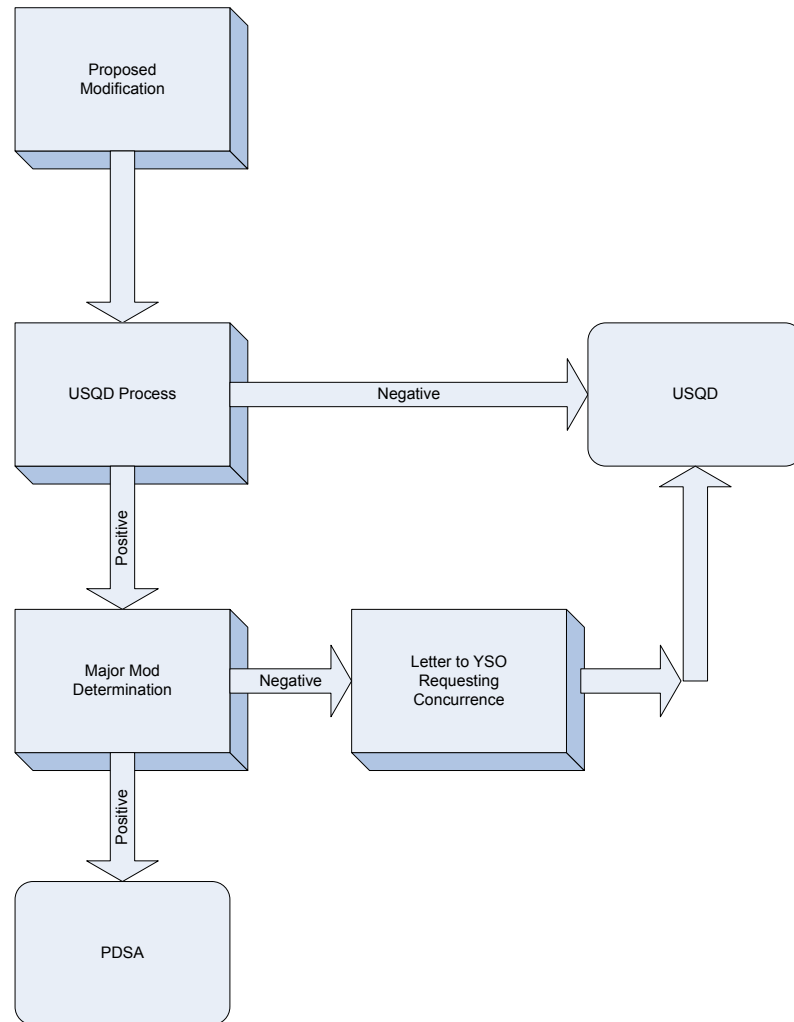
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# **Safety in Design Workshop Major Modification Determinations at Y-12**

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# Major Modification Process



# Examples of Major Modification Determinations

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- IR Debonding
- DU/Binary Consolidation
- Oven Consolidation
- Relocation of Mission Essential Material
- Production Microwave Caster
- Rubber Shop Relocation
- CNC Turning Lathe



# Two Examples of Multiple “Tripped Criteria”

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- IR Debonding – First example where we applied the Major Modification process. We answered ‘Yes’ to four of the six criteria and requested YSO concurrence that it did not constitute a Major Modification.
- DU/Binary – This was a significant change in operation/footprint of existing HC 2 facilities but was deemed not a Major Modification due to the known nature of the hazards and previous DOE approval through SB documents at other facilities.



# Infrared Debonding

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- The proposed project adds a new piece of equipment into a HC2 facility. The piece of equipment will introduce new technology into the disassembly process. Currently, the piece of equipment is being tested and developed. Currently, objects bonded together are manually separated; the new technology will separate bonded objects thermally with infrared light bulbs.



# IR Debonding Criteria

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- Add a new building or facility with a material inventory greater than or equal to HC3 inventory limits or increase the HC of an existing facility?
- Change the footprint of an existing HC1, 2, or 3 facility with the potential to adversely impact any credited safety function?
- No. The project does not involve the addition of a new building or facility not will it increase the HC of the existing facility.
- No. The project does not change the footprint of the existing facility. The project involves placing a piece of equipment into the existing footprint of the facility. The installation of the piece of equipment has the potential to affect credited safety functions of SSC controls currently within the building (e.g., facility structure and fire suppression system). However, there are facility SMP's in place that will protect existing SSC controls if they require modification.



# IR Debonding Criteria

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- Change an existing process or add a new process resulting in a Safety Basis change requiring DOE approval?
- Utilize a new technology or GFE not currently in use or not previously formally reviewed/approved by DOE for the affected facility?
- Yes. The new piece of equipment could potentially be viewed as a change to the existing process. However, the consideration of technology application and Safety Basis impact potential will be addressed by Criteria 4, 5, and 6. No further assessment of this criterion is therefore required for this evaluation.
- Yes. The piece of equipment will introduce new technology that has never previously been formally reviewed/approved by DOE for disassembly. Mock-up testing performed by Y-12 to date, using surrogate objects has yielded promising results. Based upon the mock-up testing, there is reasonably high degree of confidence in the ability of the new technology to be successfully applied via this project. Uncertainty with the ability to properly specify applicable nuclear safety design criteria will be addressed in Criterion 6.



# IR Debonding Criteria

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- Create the need for new or revised safety basis controls (hardware or administrative)?
- Yes. Given the potential failure modes and release mechanisms associated with this project, new or revised SB controls should be at a minimum. Existing safety management programs and controls should adequately cover the majority of the potential failure modes and release mechanisms introduced by this project. New hardware controls are not anticipated at this time. However, new administrative controls are foreseen. The new administrative control would be of similar nature to other administrative control already in place within the facility.



# IR Debonding Criteria

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- Involve a hazard not previously evaluated in the DSA?
- Yes. The project will involve a hazard (infrared heating) not previously evaluated in the DSA; however, the new hazard is of similar nature to other hazards (thermal) already within the facility and would be primarily controlled by existing SMP's and controls. Given this situation, it is expected that the new piece of equipment will have a minimal impact on the current DOE approved SB and permits the ability to specify applicable nuclear safety design criteria with a reasonable degree of certainty.



# IR Debonding Criteria

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- Summary and Recommendation:
  - Multiple criteria were tripped in the PDSA evaluation. The assessment of each of the tripped criteria identified a minimal degree of risk inherent in the project. Preliminary hazards analysis further evaluated the tripped criteria.
  - The conclusion of the preliminary hazards analysis indicate that the change to the existing process is not of a substantial nature which will require significant modification to existing safety significant hardware controls, or the addition of new safety class or safety significant hardware controls. The project will not introduce new hazards requiring modification to existing SS SSC's. An administrative control is anticipated; however, this control would be of similar nature to other administrative controls already in place within the facility.



# Depleted Uranium/Binary Metal Consolidation Project

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- This consolidation project only seeks to duplicate existing depleted uranium/binary processes in Building 9212 via installation of new, or refurbishment of existing equipment, the hazards associated with operation of the depleted uranium/binary process equipment have been studied in previous analyses conducted for other facilities.



# DU/Binary Criteria

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- Add a new building or facility with a material inventory greater than or equal to HC3 inventory limits or increase the HC of an existing facility?
- Change the footprint of an existing HC1, 2, or 3 facility with the potential to adversely impact any credited safety function?
- No. Bldg 9212 and Bldg 9996 are both part of the 9212 Complex. The 9212 Complex is currently categorized as Hazard Category 2. Consolidation of DU and binary equipment and operations from Bldgs 9201-5 and 9204-4 to these areas has no impact on the HC of the 9212 Complex.
- Yes. Upon completion of both phases of the DU/B project a portion of the consolidated operation will be located in the 9212 Complex, while the remainder will be located in the 9215 Complex. Consolidation of the operations in these locations will create the need for routine hazardous material flow between the two nuclear facilities. As a result, it will no longer be possible to maintain segmentation between 9212 and 9215.



# DU/Binary Criteria

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- Change an existing process or add a new process resulting in a Safety Basis change requiring DOE approval?
- Utilize a new technology or GFE not currently in use or not previously formally reviewed/approved by DOE for the affected facility?
- Yes. Although the DU/Binary operations are presently conducted in other facilities at Y-12, some of the processes to be transferred to 9212 are not currently analyzed in the 9212 Complex safety basis. The addition of these processes will introduce new hazards and associated controls and will require YSO approval.
- Yes. The DU/Binary project will introduce GFE to the 9212 Complex that is not currently in use or previously formally reviewed/approved by YSO for the affected facility.



# DU/Binary Criteria

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- Create the need for new or revised safety basis controls (hardware or administrative)?
- Involve a hazard not previously evaluated in the DSA?
- Yes. The hazards associated with the processes introduced to the 9212 Complex have the potential to create the need for new or revised SB controls.
- Yes. The YSO approved SB for the 9212 Complex does not currently evaluate all hazards associated with the consolidated DU/Binary operations. An example is grit blasting of DU alloy components.



# DU/Binary Criteria

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- Summary and Recommendation:
  - Multiple criteria were tripped in this PDSA needs evaluation. However, there are other relevant factors pertaining to the DU/Binary project that need to be considered. This consolidation project only seeks to duplicate existing depleted uranium/binary processes in an alternate nuclear facility. Although the present project phase will be executed in 9212 via installation of new, or refurbishment of existing equipment, the hazards associated with operation of the DU/Binary process equipment have been studied in previous processes, and based upon the quantity of the hazards involved with existing operations, crediting controls for protection of the public or workers in surrounding facilities is not expected. While there is a potential for crediting controls for certain 9212 workers, the controls, if necessary, are expected to be equivalent to those presently identified for similar operations.



# Summary

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- The approach we use at Y-12 to establishing a major modification determination to YSO involves:
  - Performing an evaluation based on the USQD process early in the project planning stages,
  - Defining the safety analysis approach and documentation, along with key safety design approaches, in the early project planning documents, and
  - Getting early understanding and agreement with YSO on the major modification determination.

