DRAFT MODEL SAFETY EVALUATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

TECHNICAL SPECIFICATIONS TASK FORCE TRAVELER

TSTF-551, REVISION 3,

"REVISE SECONDARY CONTAINMENT SURVEILLANCE REQUIREMENTS"

1.0 INTRODUCTION

By application dated **[enter date]**, (Agencywide Documents Access and Management System (ADAMS) Accession No. **[MLXXXXXXXXX]**, **[name of licensee]** (the licensee) requested changes to the technical specifications (TS) for **[name of facility]**. Specifically, the licensee requested changes to the TSs to adopt Technical Specifications Task Force (TSTF) traveler, TSTF-551, Revision 3, "Revise Secondary Containment Surveillance Requirements," dated October 3, 2016 (ADAMS Accession No. ML16277A226). The NRC approved the traveler on **Month, Day, 2017 (ADAMS Accession No. MLXXXX**).

The proposed changes would allow the **[secondary]** containment vacuum limit to not be met provided that the standby gas treatment (SGT) system remains capable of establishing the required **[secondary]** containment vacuum within the **[specified time]** and revises the TS to permit **[secondary]** containment access opening to be open to permit ingress and egress.

2.0 REGULATORY EVALUATION

2.1 SYSTEM DESCRIPTION

The **[secondary]** containment is a structure that encloses the primary containment, including components that may contain primary system fluid. The safety function of the **[secondary]** containment is to contain, dilute, and hold up fission products that may leak from primary containment following a design basis accident (DBA) to ensure the control room operator and offsite doses are within the regulatory limits. There is no redundant train or system that can perform the **[secondary]** containment function should the **[secondary]** containment be inoperable.

The **[secondary]** containment boundary is the combination of walls, floor, roof, ducting, doors, hatches, penetrations and equipment that physically form the **[secondary]** containment. Routinely used **[secondary]** containment access openings contain at least one inner and one outer door in an airlock configuration. In some cases, **[secondary]** containment access openings are shared such that there are multiple inner or outer doors. All **[secondary]** containment access doors are normally kept closed, except when the access opening is being used for entry and exit of personnel, equipment, or material.

[Secondary] containment operability is based on its ability to contain, dilute, and hold up fission products that may leak from primary containment following a DBA. To prevent ground level

exfiltration of radioactive material while allowing the **[secondary]** containment to be designed as a mostly conventional structure, the **[secondary]** containment requires support systems to maintain the pressure at less than atmospheric pressure. During normal operation, non-safety related systems are used to maintain the **[secondary]** containment at a slight negative pressure to ensure any leakage is into the building and that any **[secondary]** containment atmosphere exiting is via a pathway monitored for radioactive material. However, during normal operation it is possible for the **[secondary]** containment vacuum to be momentarily less than the required vacuum for a number of reasons, such as during wind gusts or swapping of the normal ventilation subsystems.

During emergency conditions, the SGT system is designed to be capable of drawing down the **[secondary]** containment to a required vacuum within a prescribed time and continue to maintain the negative pressure as assumed in the accident analysis. For **[name of facility]**, the SGT must be able to establish the required vacuum within **[insert time requirement]**. The leak tightness of the **[secondary]** containment together with the SGT system ensure that radioactive material is either contained in the **[secondary]** containment or filtered through the SGT system filter trains before being discharged to the outside environment via the elevated release point.

2.2 PROPOSED TECHNICAL SPECIFICATION CHANGES

The proposed changes would allow the **[secondary]** containment vacuum limit to not be met provided the SGT system remains capable of establishing the required **[secondary]** containment vacuum. The proposed changes would also allow for the temporary opening of the inner and outer doors of [**secondary**] containment for the purpose of ingress and egress (i.e., normal opening and prompt closure of a door for transit).

2.2.1 Revision to Surveillance Requirement 3.6.4.1.1

[*NOTE: This change is applicable to NUREGs-1433 and -1434*.]

Surveillance requirement (SR) 3.6.4.1.1 requires verification that **[secondary]** containment vacuum is ≥ **[0.25]** inch of vacuum water gauge. This SR would be modified by a note that states:

> Not required to be met for 4 hours if analysis demonstrates one standby gas treatment (SGT) subsystem is capable of establishing the required **[secondary]** containment vacuum.

2.2.2 Revision to Surveillance Requirement 3.6.4.1.3

[*NOTE: This change is applicable to NUREG-1433 only*.]

SR 3.6.4.1.3 requires verification that one **[secondary]** containment access door in each access opening is closed. This SR would be modified by adding the following phrase to the end of the SR statement, "…except when the access opening is being used for entry and exit."

2.2.3 Revision to Surveillance Requirement 3.6.4.1.4

An editorial change is made to SR 3.6.4.1.4 in which the words “standby gas treatment” are replaced with the initialism “SGT.”

2.3 REGULATORY REQUIREMENTS AND GUIDANCE

The regulation at Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36(a)(1) requires an applicant for an operating license to include in the application proposed TS in accordance with the requirements of 10 CFR 50.36. The applicant must include in the application, a “summary statement of the bases or reasons for such specifications, other than those covering administrative controls.” However, per 10 CFR 50.36(a)(1), these technical specification bases “shall not become part of the technical specifications.”

Additionally, 10 CFR 50.36(b) requires:

> Each license authorizing operation of a … utilization facility … will include technical specifications. The technical specifications will be derived from the analyses and evaluation included in the safety analysis report, and amendments thereto, submitted pursuant to 10 CFR 50.34 [“Contents of applications; technical information”]. The Commission may include such additional technical specifications as the Commission finds appropriate.

The categories of items required to be in the TSs are provided in 10 CFR 50.36(c). As required by 10 CFR 50.36(c)(2)(i), the TSs will include limiting conditions for operation (LCOs), which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. Per 10 CFR 50.36(c)(2)(i), when an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the condition can be met.

The regulation at 10 CFR 50.36(c)(3) requires TSs to include items in the category of SRs, which are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met.

The NRC staff’s guidance for review of TSs is in Chapter 16, *Technical Specifications*, of NUREG-0800, Revision 3, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants” (SRP), dated March 2010 (ADAMS Accession No. ML100351425).

NUREG-0800, SRP Section 15.0.1, “Radiological Consequence Analyses Using Alternative Source Terms,” Revision 0, dated July 2000 (ADAMS Accession No. ML003734190), provides guidance to the NRC staff for the review of alternate source term (AST) amendment requests. SRP 15.0.1 states that the NRC reviewer should evaluate the proposed change against the guidance in Regulatory Guide (RG) 1.183, “Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors,” Revision 0, dated July 2000 (ADAMS Accession No. ML003716792).

RG 1.183 provides acceptable methodology for analyzing the radiological consequences of several design basis accidents to show compliance with 10 CFR 50.67. RG 1.183 provides guidance to licensees on acceptable application of AST (also known as the accident source

term) submittals, including acceptable radiological analysis assumptions for use in conjunction with the accepted AST.

10 CFR 50.67, "Accident source term," states that:

> (i) An individual located at any point on the boundary of the exclusion area for any 2-hour period following the onset of the postulated fission product release, would not receive a radiation dose in excess of 0.25 Sv (25 rem) total effective dose equivalent (TEDE),
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> (ii) An individual located at any point on the outer boundary of the low population zone, who is exposed to the radioactive cloud resulting from the postulated fission product release (during the entire period of its passage), would not receive a radiation dose in excess of 0.25 Sv (25 rem) TEDE, and
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> (iii) Adequate radiation protection is provided to permit access to and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 0.05 Sv (5 rem) TEDE for the duration of the accident.

3.0 TECHNICAL EVALUATION

The NRC staff evaluated the licensee's application to determine if the proposed changes are consistent with the guidance, regulations, and licensing information discussed in Section 2.3 of this safety evaluation (SE). In determining whether an amendment to a license will be issued, the Commission is guided by the considerations that govern the issuance of initial licenses to the extent applicable and appropriate. In making its determination as to whether to amend the license, the NRC staff considered those regulatory requirements that are automatically conditions of the license through 10 CFR 50.54.

The regulation at 10 CFR 50.36(a)(1) states, in part: "A summary statement of the bases or reasons for such specifications … shall also be included in the application, but shall not become part of the technical specifications." Accordingly, along with the proposed TS changes, the licensee also submitted TS Bases changes that correspond to the proposed STS changes for information only.

3.1 PROPOSED CHANGE TO SURVEILLANCE REQUIREMENT 3.6.4.1.1

A note is being added to SR 3.6.4.1.1. The note allows the SR to not be met for up to 4 hours if an analysis demonstrates that one SGT subsystem is capable of establishing the required **[secondary]** containment vacuum. During normal operation, conditions may occur that result in SR 3.6.4.1.1 not being met for short durations. For example, wind gusts that lower external pressure or loss of the normal ventilation system that maintains **[secondary]** containment vacuum may affect **[secondary]** containment vacuum. These conditions may not be indicative of degradations of the **[secondary]** containment boundary or of the ability of the SGT system to perform its specified safety function.

The note provides an allowance for the licensee to confirm **[secondary]** containment operability by confirming that one SGT subsystem is capable of performing its specified safety function. This confirmation is necessary to apply the exception to meeting the SR acceptance criterion. While the duration of these occurrences is anticipated to be very brief, the allowance is permitted for a maximum of 4 hours, [which is consistent with the time permitted for **[secondary]** containment to be inoperable per [Condition A of LCO 3.6.4.1 or the corresponding Condition for the plant-specific TS].

The NRC staff has evaluated the impact of this note on the licensee's design basis radiological consequence analyses to ensure that the proposed change will not result in an increase in the dose consequences and that the resulting calculated doses remain within the design criteria specified in 10 CFR 50.67 and the accident specific design criteria outlined in RG 1.183.

The proposed addition of the note to SR 3.6.4.1.1 does not change the TS requirement to meet SR 3.6.4.1.4 and SR 3.6.4.1.5. SR 3.6.4.1.4 requires verification that the **[secondary]** containment can be drawn down to ≥ [0.25] inch of vacuum water gauge in ≤ [120] seconds using one SGT subsystem. SR 3.6.4.1.5 requires verification that the **[secondary]** containment can be maintained ≥ [0.25] inch of vacuum water gauge for 1 hour using one SGT subsystem at a flow rate ≤ [4000] cubic feet per minute. In addition, TS LCO 3.6.4.3, "Standby Gas Treatment (SGT) System," must be met; otherwise the licensee shall shut down the reactor or follow any remedial action permitted by TSs until the condition can be met.

As discussed above, **[secondary]** containment operability is based on its ability to contain, dilute, and hold up fission products that may leak from primary containment following a DBA. To prevent ground level exfiltration of radioactive material the **[secondary]** containment pressure must be maintained at a pressure that is less than atmospheric pressure. The **[secondary]** containment requires support systems to maintain the control volume pressure less than atmospheric pressure. Following an accident, the SGT system ensures the **[secondary]** containment pressure is less than the external atmospheric pressure. During normal operation, non-safety related systems are used to maintain the **[secondary]** containment at a negative pressure. However, during normal operation it is possible for the **[secondary]** containment vacuum to be momentarily less than the required vacuum for a number of reasons. These conditions may not be indicative of degradations of the **[secondary]** containment boundary or of the ability of the SGT system to perform its specified safety function. Since the licensee meets the requirements of SR 3.6.4.1.4, SR 3.6.4.1.5, meets the LCO or is following the Actions of TS LCO 3.6.4.3, and the licensee's analysis confirms **[secondary]** containment operability by confirming that one SGT subsystem is capable of performing its specified safety function, then there is reasonable assurance that the **[secondary]** containment and SGT subsystem will maintain the vacuum requirements during a DBA.

Therefore, the NRC staff has determined that: if the conditions do not affect (1) the ability to maintain the **[secondary]** containment pressure during an accident, at a pressure that is less than atmospheric, and (2) the time assumed in the accident analyses to draw down the **[secondary]** containment pressure, then the **[secondary]** containment can perform its safety function and may be considered TS operable. This is evident by being able to successfully perform and meet SR 3.6.4.1.4 and SR 3.6.4.1.5. These SRs require the SGT system to establish and maintain the required vacuum in the **[secondary]** containment as assumed in the accident analyses.

Furthermore, because the specified safety functions of the **[secondary]** containment and SGT subsystem can be performed in the time assumed in the licensee's accident analysis, then the fission products that bypass or leak from primary containment, or are released from the reactor coolant pressure boundary components located in **[secondary]** containment prior to release to the environment, will be contained and processed as assumed in the licensee's design basis radiological consequence dose analyses. The NRC staff finds that the proposed change does not affect the current radiological consequence analyses and concludes that the proposed change is acceptable with respect to the radiological consequences of DBAs.

3.2 PROPOSED CHANGE TO SURVEILLANCE REQUIREMENT 3.6.4.1.3

[NOTE: The proposed change is not applicable if the radiological dose consequence analysis assumes the [secondary] containment pressure is below atmospheric pressure prior to or coincident with the time at which the accident or event occurs. Such an analysis assumption would require a revised radiological dose consequence analysis considering the new release point (the open [secondary] containment doors), with appropriate atmospheric dispersion factors, and any other necessary revisions to the accident or event analysis.]

The NRC staff review was limited to the licensee's request to provide an allowance for the brief, inadvertent, simultaneous opening of redundant **[secondary]** containment access doors during normal entry and exit conditions. Planned activities that could result in the simultaneous opening of redundant **[secondary]** containment access openings, such as maintenance of a **[secondary]** containment personnel access door or movement of large equipment through the openings that would take longer than the normal transit time, will be considered outside the scope of the NRC staff's review.

The NRC staff reviewed the changes to SR 3.6.4.1.3. The NRC staff determined that the SR continues to provide appropriate confirmation that **[secondary]** containment boundary doors are properly positioned and capable of performing their function in preserving the **[secondary]** containment boundary. The NRC staff determined that the SRs continue to appropriately verify the operability of the **[secondary]** containment and provide assurance that the necessary quality of systems and components are maintained in accordance with 10 CFR 50.36(c)(3).

Additionally, the NRC staff evaluated the impact of modifying the TS to allow **[secondary]** containment access openings to be open for entry and exit on the licensee's design basis radiological consequence dose analyses to ensure that the modification will not result in an increase in the radiation dose consequences and that the resulting calculated radiation doses will remain within the design criteria specified in 10 CFR 50.67 and the accident specific design criteria outlined in RG 1.183. The NRC staff review of these DBAs determined that there are two DBAs that take credit for the **[secondary]** containment, and are possibly impacted by the brief, inadvertent, simultaneous opening of both an inner and outer access door during normal entry and exit conditions, the loss of coolant accident (LOCA) and the fuel handling accident (FHA) in **[secondary]** containment.

3.2.1 LOCA

Following a LOCA, the **[secondary]** containment structure is maintained at a negative pressure ensuring that leakage from primary containment to **[secondary]** containment can be collected

and filtered prior to release to the environment. The SGT system performs the function of maintaining a negative pressure within the **[secondary]** containment, as well as collecting and filtering the leakage from primary containment. The licensee credits the SGT system for mitigation of the radiological releases from the **[secondary]** containment. In the LOCA analysis, the **[secondary]** containment draw down analysis assumes that SGT system can draw down the **[secondary]** containment within **[5 minutes]**. TS SR 3.6.4.1.4 requires one SGT subsystem to draw down the **[secondary]** containment, to greater than or equal to **[0.25]** inches of vacuum water gauge in a maximum allowable time of **[120]** seconds.

Conservatively, the DBA LOCA radiological consequence analysis in **[Updated Final Safety Analysis Report (UFSAR) Chapter 15]** assumes that following the start of a DBA LOCA the **[secondary]** containment pressure of **[0.25]** inches of vacuum water gauge is achieved at approximately **[10]** minutes. The license assumes that releases into the **[secondary]** containment prior to the **[10]**-minute draw down time leak directly to the environment as a ground level release with no filtration. After the assumed **[10]**-minute draw down these releases are filtered by the SGT system and released via the SGT system exhaust vent.

Based on this information, the NRC staff concludes that the licensee's DBA LOCA analysis has sufficient conservatism by assuming a draw down time of **[10]** minutes from the start of the DBA LOCA. Margin exists to ensure that the **[secondary]** containment can be reestablished during a brief, inadvertent, simultaneous opening of the inner and outer doors, and there is reasonable assurance that a failure of a safety system needed to control the release of radioactive material to the environment will not result. The brief, inadvertent, simultaneous opening of the **[secondary]** containment access doors does not impact the design bases and will not result in an increase in any on-site or off-site dose.

Based on the above discussion, the NRC staff finds that the licensee's proposed change to the TSs does not impact the licensee's design basis LOCA radiological consequence analysis and will not result in an increase in any onsite or offsite dose. Therefore, the NRC staff concludes that this change is acceptable with respect to the radiological consequences of the DBAs.

[The licensee was approved for AST methodology and the radiological dose consequences analyses for DBAs via license amendment[s] **[insert license amendment number]** for **[name of facility]**.] The NRC staff reviewed the impact of the proposed changes to **[name of facility]** TS, on all DBAs currently analyzed in the **[name of facility]** Updated Final Safety Analysis Report (UFSAR) that could have the potential for significant dose consequences. **[Chapter 15]** of the **[name of facility]** UFSAR describes the DBAs and their radiological consequence analysis results.]

3.2.2 FHA in **[Secondary]** Containment

During normal operation, non-safety related systems are used to maintain the **[secondary]** containment at **[0.25]** inches of vacuum water gauge to ensure that any leakage is into the building and that any **[secondary]** containment atmosphere exiting the building is via a monitored pathway. The refuel floor, which is inside the **[secondary]** containment, is maintained at a negative **[0.25]** inches of vacuum water gauge by normal operating ventilation systems. The refueling floor exhaust ductwork in the **[secondary]** containment is equipped with radiation monitors to detect a fuel handling accident. When a radiological release is sensed by the radiation monitors, a **[secondary]** containment isolation signal is generated. This initiates

the SGT system and the normal ventilation system isolates. The radiation monitor is positioned such that it will detect the release and send a closure signal to the **[secondary]** containment isolation dampers.

Following a FHA, the **[secondary]** containment structure is maintained at a negative pressure by the SGT system ensuring that fission products released from the spent fuel pool to **[secondary]** containment can be collected and filtered prior to release to the environment. In the FHA analysis, the **[secondary]** containment draw down analysis demonstrates that SGT system can draw down the **[secondary]** containment within **[5 minutes]**. The licensee credits the SGT system for mitigation of the radiological releases from the **[secondary]** containment. TS SR 3.6.4.1.4 requires one SGT subsystem to draw down the **[secondary]** containment, to greater than or equal to **[0.25]** inches of vacuum water gauge in a maximum allowable time of **[120]** seconds.

Conservatively, the DBA FHA radiological consequence analysis in **[UFSAR Chapter 15]** assumes that following the start of a DBA FHA the **[secondary]** containment pressure of **[0.25]** inches of vacuum water gauge is achieved at approximately **[10]** minutes. The license assumes that releases into the **[secondary]** containment prior to the **[10]**-minute draw down time leak directly to the environment as a ground level release with no filtration. After the assumed **[10]-**minute draw down these releases are filtered by the SGT system and released via the SGT system exhaust vent.

Based on this information, the NRC staff concludes that the licensee's DBA FHA analysis has sufficient conservatism by assuming a draw down time of **[10]** minutes from the start of the DBA FHA. Margin exists to ensure that the **[secondary]** containment can be reestablished during brief, inadvertent, simultaneous opening of the inner and outer doors, and there is reasonable assurance that a failure of a safety system needed to control the release of radioactive material to the environment will not result. The brief, inadvertent, simultaneous opening of the **[secondary]** containment access doors does not impact the design bases and will not result in an increase in any on-site or off-site dose.

Based on the above discussion, the NRC staff finds that the licensee's proposed change to the TSs does not impact the licensee's design basis FHA radiological consequence analysis and will not result in an increase in any onsite or offsite dose. Therefore, the NRC staff concludes that this change is acceptable with respect to the radiological consequences of the DBAs.

The NRC staff review was limited to the licensee's request to provide an allowance for the brief, inadvertent, simultaneous opening of redundant **[secondary]** containment access doors during normal entry and exit conditions. Planned activities that could result in the simultaneous opening of redundant **[secondary]** containment access openings, such as maintenance of a **[secondary]** containment personnel access door or movement of large equipment through the openings that would take longer than the normal transit time, will be considered outside the scope of the NRC staff's review.

3.2.3 Conclusion

As described above, the NRC staff reviewed the technical basis provided by the licensee to assess the radiological impacts of the changes to the **[secondary]** containment in the licensee's TSs. The NRC staff finds that the licensee proposed change to SR 3.6.4.1.3 is consistent with

regulatory requirements and guidance identified in Section 2.3 of this SE. The NRC staff finds, with reasonable assurance that the licensee's change to the TSs will continue to comply with these criteria and that that the licensee's estimates of the dose consequences of a design basis LOCA and FHA will comply with the requirements of 10 CFR 50.67 and the accident specific dose guidelines specified in RG 1.183. Therefore, the proposed changes are acceptable with regard to the radiological consequences of the postulated DBAs.

3.3 PROPOSED CHANGE TO SURVEILLANCE REQUIREMENT 3.6.4.1.4

The changes to SR 3.6.4.1.4 are editorial only and do not change any technical aspects of SR 3.6.4.1.4. The NRC staff determined that the change is acceptable.

3.4 SUMMARY

The NRC staff reviewed the proposed changes and determined that changes to the TS meet the standards for TS in 10 CFR 50.36(b). The proposed SRs assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met, and satisfy 10 CFR 50.36(c)(3). Additionally, the changes to the TS were reviewed for technical clarity and consistency with customary terminology and format in accordance with SRP Chapter 16.

Additionally, the NRC staff has evaluated the impact of the proposed changes on the design basis radiological consequence analyses against the regulatory requirements and guidance identified in Section 2.3 of this SE. The NRC staff finds, with reasonable assurance that the licensee's change to the TSs will continue to comply with the requirements of 10 CFR 50.67 and the guidelines specified in RG 1.183. Therefore, the proposed changes are acceptable with regard to the radiological consequences of the postulated DBAs.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the **[Name of State]** State official was notified of the proposed issuance of the amendment on **[enter date]**. The State official had **[no]** comments. **[If comments were provided, they should be addressed here]**.

5.0 ENVIRONMENTAL CONSIDERATION

[Note: *This section is to be prepared by the PM. As needed, the PM should coordinate with NRR's Environmental Review and Projects Branch (RERP) to determine the need for an EA. Specific guidance on preparing EAs and considering environmental issues is contained in NRR Office Instruction LIC-203, "Procedural Guidance for Preparing Categorical Exclusions, Environmental Assessments, and Considering Environmental Issues."*]

The amendment changes requirements with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20 and changes SRs. The NRC staff has determined that the amendment involves no significant increase in the amounts and no significant change in the types of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such

finding published in the *Federal Register* on **[DATE (XX FR XXX)]**. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public

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