NSP000035C

XII. **Attachments**

- Attachment 1 - Task Analysis
- Attachment 2 - Barrier Analysis
- Attachment 3 - Change Analysis
- Attachment 4 - Evaluation of RMSP Procedures
- Attachment 5 - Event and Causal Factors Flow Chart
- Attachment 6 - Why Staircases
- Attachment 7 - Evaluation of Safety Culture Impacts
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Attachment 1: Task Analysis		
(1) Steps in Procedure or Practice. (Enter step number and short description.)	**(2) Walk through by Analyst or trained individual. (State how actual matches procedure.)**	**(3) Questions / Conclusions about how task was / should be performed.**
Evaluate the material • D11.7, step 6.9, instructions for RWSC or designee prior to packaging material • RPIP 1122, hot particle program	RWSC is to consider potential for small sources of irradiated material prior to packaging the material (wrapping in plastic) No mention of evaluation of material in RPIP 1122	RWSC provides little oversight of the packaging process, because items packaged correctly are not considered to be susceptible to changing dose rates. The RWSC does not consider the evaluation of the material a necessary part of the RMSP. **(RC1)**
Package the material • RPIP 1122, hot particle program	Material is packaged for controlling the spread of contamination at PI. Discrete particles need to be restrained for shipment, both so the particle doesn't move and so the equipment containing the particle doesn't move. RPIP 1122 is mute on packaging options and methods for discrete particles. RPIP does not implement effective methods to detect discrete particles that are fixed in materials.	The accepted practice at PI is the same as it has been for the last 20 years, and PI has relied on a single individual for more than 10 years. **(RC2)** Put equipment in polyethylene, and if it will be handled, put in Herculite. Industry standards dictate fixing discrete particles and fixing loose equipment so it does not move around during shipment. Discrete particles need to be restrained for shipment, both so the particle doesn't move and so the equipment containing the particle doesn't move. Procedures do not describe methods **(RC1)**

Attachment 1: Task Analysis		
(1) Steps in Procedure or Practice. (Enter step number and short description.)	**(2) Walk through by Analyst or trained individual. (State how actual matches procedure.)**	**(3) Questions / Conclusions about how task was / should be performed.**
Place the material in the shipping container • D11.7, step 6.9.2 ensures that the materials are packaged in such a manner that under conditions normally incident to transportation, the materials will not shift within the package.	There must be a requirement that any materials subject to discrete particle contamination is adequately maintained from the faces of the container. This will ensure a robust program. This is a more concrete task than ensuring you find all discrete particles.	This evolution should be observed by a qualified RWSC. The use of secondhand information does not ensure the material is loaded correctly due to differing mindsets and experience. **(RC2)** Even though the container did not have permanent shoring for the lid, industry best practice is to ensure that radioactive material is packaged such that it does not come in contact with any interior faces of the shipping container.
Survey the material to be shipped • D11.7, steps 6.10.5, 6.10.6, and 6.10.7 ensure that material to be shipped is surveyed. • RPIP 1319 (loading LSA/Sea-land boxes) requires materials to be loaded so that nothing shifts.	Each is a SHALL statement. There was no discussion of packaging of equipment so the equipment does not move.	The requirements to evaluate the materials, observe the packaging, and observe the loading, all must be SHALL statements to have a robust RMSP. **(RC1)** All the appropriate surveys were completed, the results of some were questioned and some results were re-surveyed. All of these are appropriate actions. It is impossible to survey shifted materials.
Complete administrative paperwork • D11.7	Adequate but not very well laid out on these requirements.	Shipping paperwork was processed correctly with no identified deficiency.

Attachment 2: Barrier Analysis
Definition – Barriers are devices employed to protect and enhance the safety and performance of the plant.

Energy / Hazard	Barrier	Assessment	Target
Detection of discrete particles on equipment.	Qualified Workers	A gross survey of the equipment was completed when the sipper was first lifted from the spent fuel pool after the completion of the used fuel test for defects. This survey was completed by qualified RP technicians covering the spent fuel pool job. This survey was completed for the purpose of contamination control and determining the decon method. Based on the gross survey it was decided that decontamination of the canister would take place underwater. As the equipment was decontaminated, a detailed survey was completed by qualified in house and contract RP technicians. The purpose of this survey was for exposure control. The individuals involved in the surveying of the material were qualified to do the job coverage task according to station requirements in place at the time. No effective barrier existed to confirm Subpart H qualifications for individuals involved in shipping related activities. This barrier was determined to be in place, although no specific training and qualification requirements for radioactive shipments could be identified. **(CC2)**	Detailed evaluation of the material

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Energy / Hazard	Barrier	Assessment	Target
Detection of discrete particles on equipment.	Job Planning / Preparation	No specific task was included in the work plan for the radiological evaluation of the equipment. The RP technicians were briefed on the removal of the equipment from the refuel pool to include a survey for exposure control. The briefing did not include specific direction for surveying for shipment. The task was not planned as an integral part of the work planning process. **(RC2)** This barrier was determined to be missing. This was a missed opportunity to have the task clearly defined and scheduled.	Risk significant rad shipping evolutions are appropriately planned via the work planning process and have adequate ALARA planning.

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Energy / Hazard	Barrier	Assessment	Target
Detection of discrete particles on equipment	Procedures / Work Instructions	Procedure RPIP 1122 – Hot Particle Program does not provide adequate guidance. The procedure does not include an applicability statement outlining when the procedure is to be used. There is no indication that the procedure was to be included in the task of surveying the equipment on 10/23/08. A second example is that step 7.1 requires either a direct frisk of the material to be removed or a large area (Masslin) survey. Large area surveys will not detect particles embedded in the material (such as in small crevasses or plastic coatings etc.). These particles can become dislodged after removal from the particle area. Direct surveying of the material should be the final determining factor for removal of material from an area. Additionally direct survey of the material must be done if the material is to be shipped offsite in order to ensure that any potential small discrete source of radiation is identified. Another example is the guidance in step 7.3.2 is weak in that it does not direct the contact of shipping personnel for evaluation of appropriate surveying methods and packaging material to ensure their suitability for shipping. This barrier was determined to be in place but ineffective.	

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Energy / Hazard	Barrier	Assessment	Target
Detection of discrete particles on equipment	Procedures / Work Instructions	Procedure D11.7, Radioactive Materials – Shipment – LSA / SCO / LTD Qty to a Licensed Facility, step 6.9.1, states: "**6.9** Prior to packaging, the RWSC or designee should: **6.9.1** Consider the potential for small sources of irradiated material to inadvertently remain within the internals of the equipment. The higher radiation levels of the irradiated materials may be masked by the intrinsic shielding of the equipment." The procedure is inadequate in its guidance on packaging. **(RC1)**	
Detection of discrete particles on equipment	Verification / Validation	PI shipping personnel visited the fuel floor during the equipment evaluation step in the shipping process. This barrier was determined to be weak. Procedure guidance does not require verification and validation of the evaluation process. Though the shipper is qualified to conduct the surveys, this task has been typically delegated to RP technicians. **(CC2)**	PI shipping personnel are present to evaluate any evolutions that are risk significant.
Detection of discrete particles on equipment	Supervisor Oversight	The supervisor was monitoring multiple tasks during the course of the outage. The current and previous supervisors are not qualified in the area of shipping. **(CC2)**	The supervisor provides meaningful oversight for tasks that represent significant risk

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Energy / Hazard	Barrier	Assessment	Target
Detection of discrete particles on equipment	Worker Practices	The personnel assigned to the initial evaluation of the fuel sipping equipment completed an adequate assessment of the equipment for hot particles.	All discrete particles that are of dose consequence for the planned tasks are located and adequate radiological controls put in place to keep dose ALARA.

Attachment 3 - Change Analysis

Problem Statement – Prairie Island failed to ensure equipment was adequately packaged to prevent excessive radiation levels on the exterior of a container shipped from Prairie Island to Waltz Mill.

Previous Condition	Current Condition	Change / Difference	Impact or Assessment
Sipper design – lid is integral to sipper design	Lid detaches from sipper canister.	Position of lid is no longer tied to canister	Shipping container did not change for change to equipment
Sipper lid – lid is used for single canister only.	Lid used for either canister	More efficient overall site fuel sipping evolution	New design puts lid in path of fuel detritus
Sipper Canister – single barrel	Two barrels	Makes sipping evolution quicker, can load one while testing another bundle	Requires different lid design.
Decontamination methodology – There was a special tool to 'hose off' the internals of the sipper; spray hoses were used for the rest of the equipment.	The lid was decontaminated while suspended over the pool The canisters and remaining sipper equipment was decontaminated underwater with a high pressure spray hose.	Past methods had special tools to spray down inside of sipper canister.	No noted impacts.
Shipping container – design of the sipper was with integral lid, permanent shoring was used to maintain distance from equipment to faces of container	New lid design (detached) was not accommodated in the container.	Equipment that went in the SFP was no longer maintained from the face of the box, by design	Error likely situation – equipment exposed to discrete particles not kept from faces of box. Additional container loading activities were needed.
Container loading – no items immersed in SFP were able to be close (by design) to the sides of the container	Some items (the lid) were able to be placed close to the sides of the container	No longer maintain a specific location for all items immersed in SFP (except for umbilical)	Error likely situation – Additional packaging material required to maintain lid away from sides of the container.

Attachment 3 - Change Analysis

Problem Statement – Prairie Island failed to ensure equipment was adequately packaged to prevent excessive radiation levels on the exterior of a container shipped from Prairie Island to Waltz Mill.

Previous Condition	Current Condition	Change / Difference	Impact or Assessment
Wrapping methodology – wrapped to PI standards which control contamination spread. Packaged as part of sipper, not separate.	Wrapped to PI standards which control contamination spread. Wrapped separately from sipper.	None.	Changes needed to package shipped materials subject to discrete particles. Need to fix equipment and/or discrete particles to prevent movement during shipment.
Condition of fuel sipping equipment – Material came into PI without any radiological controls.	Material left PI with significant radiological hazards	Immersed in SFP, subjected to discrete particles	Change in equipment radiological status changed the packaging and shipping requirements, but changes were not assessed properly.

Evaluation of procedure D11.7: Radioactive materials shipment – LSA/SCO/LTD QTY to a licensed facility.

This evaluation is limited to sections of procedure D11.7 which have specific bearing on RCE 01157726 Radioactive Material Shipment Exceeded DOT Limits.

1. Step 6.9, 6.9.1 and 6.9.2 should be part of the radioactive material packaging procedure (RPIP-1319). See evaluation below.

2. Step 6.9.1 directs the Radioactive Material Shipping Coordinator (RWSC) or designee to consider the potential impact of small sources of irradiated material (discrete particles) to remain within the internals of the equipment. This requirement needs to have guidance added to enable the RWSC to perform an effective evaluation to ensure that any potential sources have been identified, and measures taken to prevent them from migrating to a position where they could have an effect on shipment parameters. The consequences part of the steps should be converted to a caution statement placed above the action step.

3. Step 6.9.2 directs the RWSC or designee to ensure that the materials be packaged in such a manner that under conditions normally incident to transportation the materials will not shift within the package. Add guidance to ensure that an effective evaluation of the method(s) used to prevent movement is adequate. The consequences part of the steps should be converted to a caution statement placed above the action step.

4. Consider adding a step in the checklist here that the material was packaged in accordance with RPIP-1319.

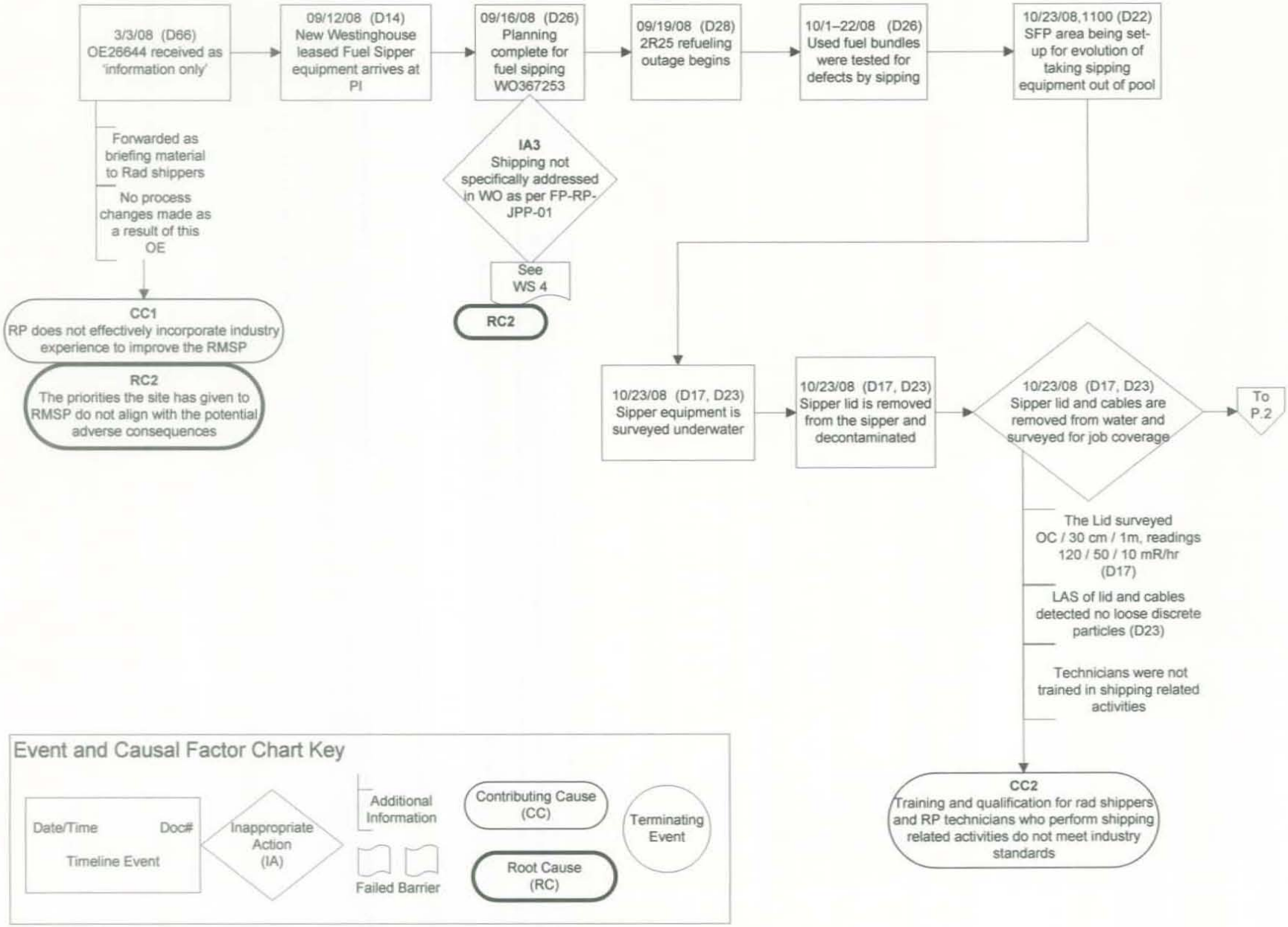
Evaluation of procedure RPIP 1319: Loading LSA Boxes/Sea-land Containers.

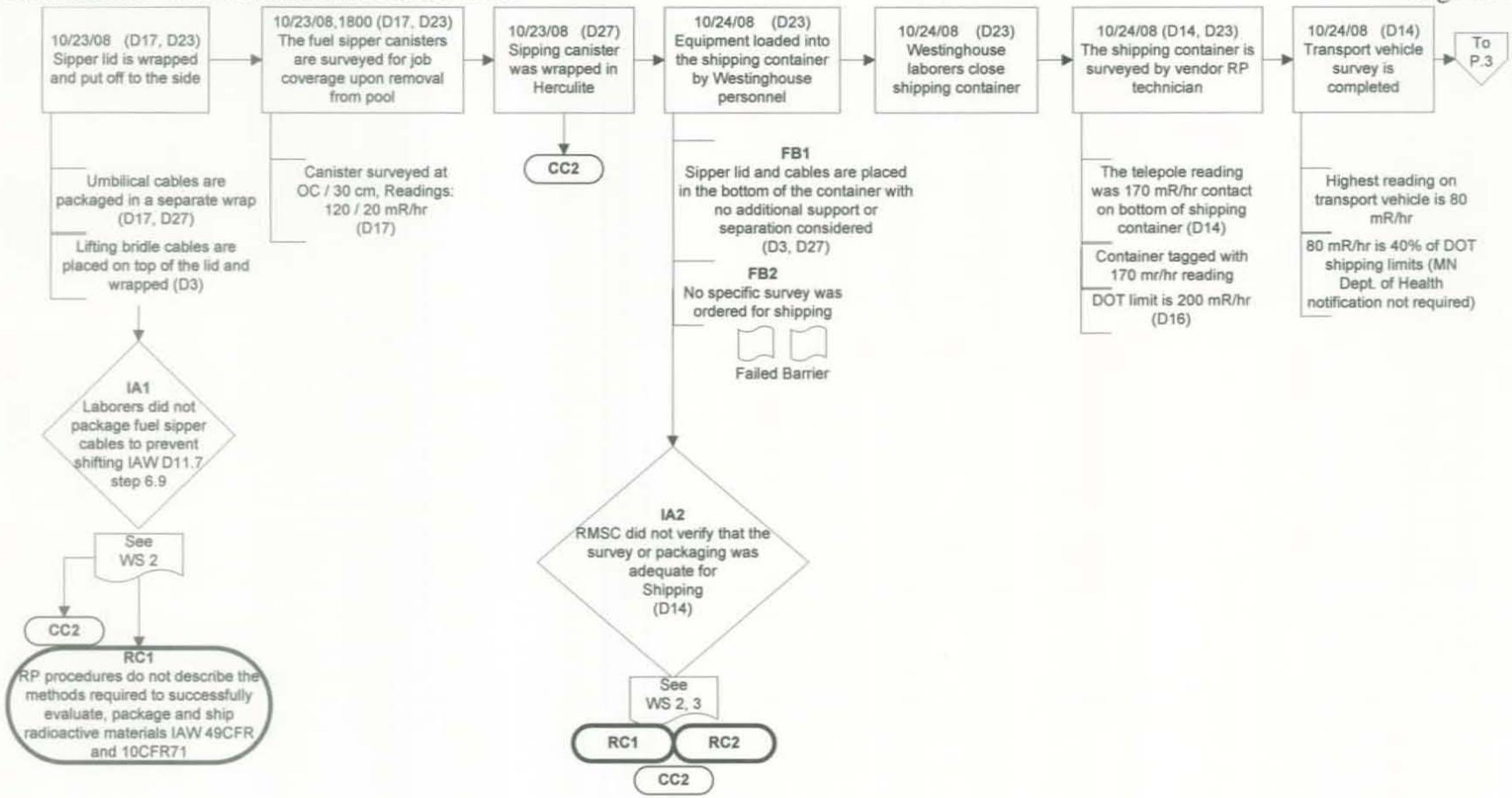
1. The title should be "Packaging of Radioactive Material for Shipment" and expanded be a comprehensive procedure that controls the packaging of all radioactive materials shipped offsite. The one exception would be items packaged in accordance with an engineering package such as steam generators, reactor head etc.

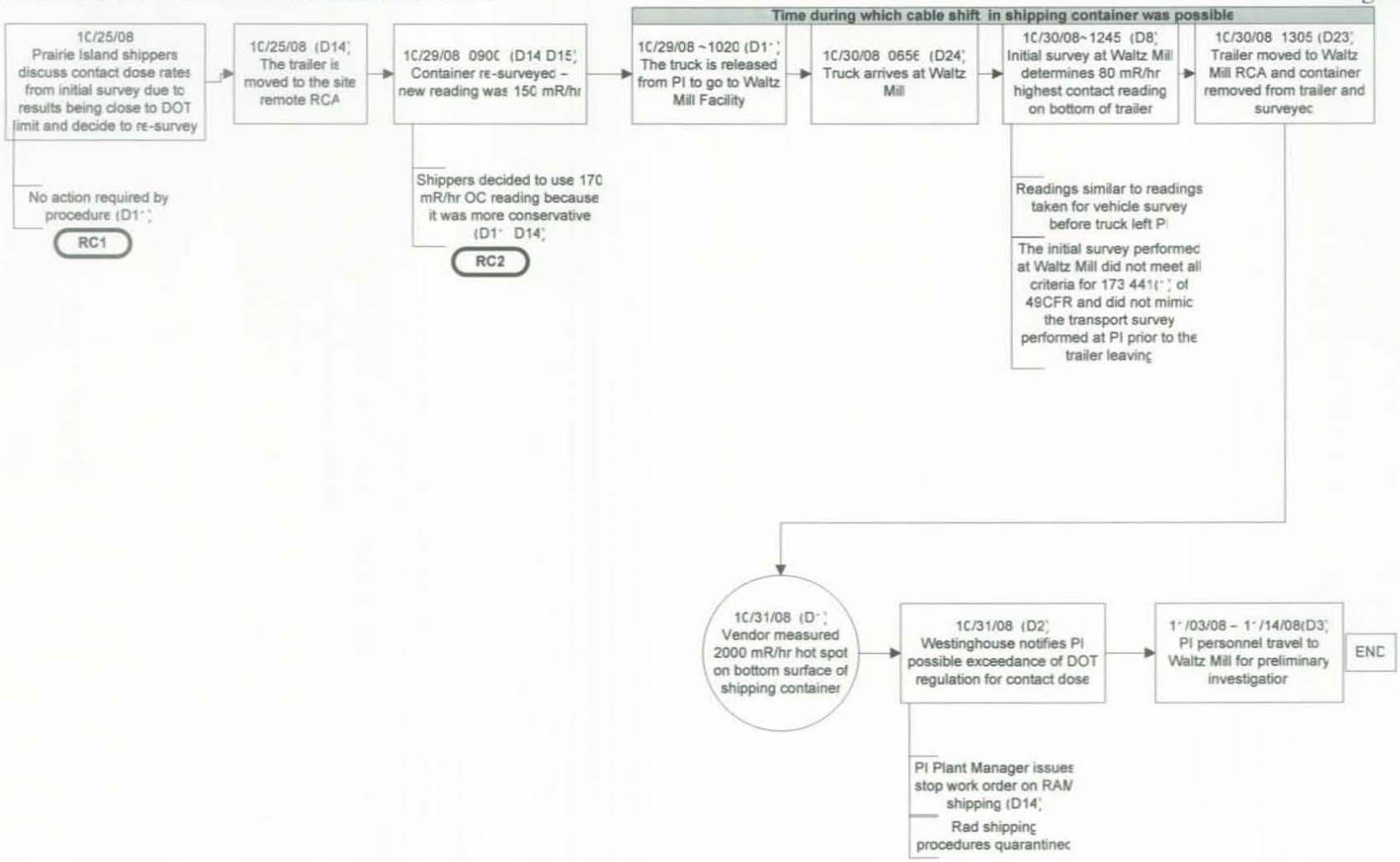
2. A complete rewrite of the procedure needs to be accomplished. Currently the procedure is designed to give guidance for segregating and packaging waste material for shipment. There is no guidance outlining methods to be used for securing material such that it will not move during transport.

3. There is no guidance outlining methods to be used for securing material such that it will not move during transport. The only mention of securing material is in the precautions and limitations with no guidance given.

4. Discrete particles are not mentioned in the procedure.


3/3/08 (D66) OE26644 received as 'information only'
09/12/08 (D14) New Westinghouse leased Fuel Sipper equipment arrives at PI
09/16/08 (D26) Planning complete for fuel sipping WO367253
09/19/08 (D28) 2R25 refueling outage begins
10/1–22/08 (D26) Used fuel bundles were tested for defects by sipping
10/23/08,1100 (D22) SFP area being set-up for evolution of taking sipping equipment out of pool
Forwarded as briefing material to Rad shippers
No process changes made as a result of this OE
CC1
RP does not effectively incorporate industry experience to improve the RMSP
RC2
The priorities the site has given to RMSP do not align with the potential adverse consequences
IA3
Shipping not specifically addressed in WO as per FP-RP-JPP-01
See WS 4
RC2
10/23/08 (D17, D23) Sipper equipment is surveyed underwater
10/23/08 (D17, D23) Sipper lid is removed from the sipper and decontaminated
10/23/08 (D17, D23) Sipper lid and cables are removed from water and surveyed for job coverage
To P.2
The Lid surveyed OC / 30 cm / 1m, readings 120 / 50 / 10 mR/hr (D17)
LAS of lid and cables detected no loose discrete particles (D23)
Technicians were not trained in shipping related activities
CC2
Training and qualification for rad shippers and RP technicians who perform shipping related activities do not meet industry standards
Event and Causal Factor Chart Key
Date/Time
Doc#
Timeline Event
Inappropriate Action (IA)
Additional Information
Failed Barrier
Contributing Cause (CC)
Root Cause (RC)
Terminating Event


10/23/08 (D17, D23) Sipper lid is wrapped and put off to the side
10/23/08,1800 (D17, D23) The fuel sipper canisters are surveyed for job coverage upon removal from pool
10/23/08 (D27) Sipping canister was wrapped in Herculite
10/24/08 (D23) Equipment loaded into the shipping container by Westinghouse personnel
10/24/08 (D23) Westinghouse laborers close shipping container
10/24/08 (D14, D23) The shipping container is surveyed by vendor RP technician
10/24/08 (D14) Transport vehicle survey is completed
To P.3
Umbilical cables are packaged in a separate wrap (D17, D27)
Lifting bridle cables are placed on top of the lid and wrapped (D3)
Canister surveyed at OC / 30 cm, Readings: 120 / 20 mR/hr (D17)
CC2
FB1
Sipper lid and cables are placed in the bottom of the container with no additional support or separation considered (D3, D27)
FB2
No specific survey was ordered for shipping
Failed Barrier
The telepole reading was 170 mR/hr contact on bottom of shipping container (D14)
Container tagged with 170 mr/hr reading
DOT limit is 200 mR/hr (D16)
Highest reading on transport vehicle is 80 mR/hr
80 mR/hr is 40% of DOT shipping limits (MN Dept. of Health notification not required)
IA1
Laborers did not package fuel sipper cables to prevent shifting IAW D11.7 step 6.9
See WS 2
CC2
RC1
RP procedures do not describe the methods required to successfully evaluate, package and ship radioactive materials IAW 49CFR and 10CFR71
IA2
RMSC did not verify that the survey or packaging was adequate for Shipping (D14)
See WS 2, 3
RC1
RC2
CC2


Time during which cable shift in shipping container was possible
1C/25/08 Prairie Island shippers discuss contact dose rates from initial survey due to results being close to DOT limit and decide to re-survey
No action required by procedure (D1
RC1
1C/25/08 (D14) The trailer is moved to the site remote RCA
1C/29/08 090C (D14 D15) Container re-surveyed – new reading was 150 mR/hr
Shippers decided to use 170 mR/hr OC reading because it was more conservative (D1 D14)
RC2
1C/29/08 ~1020 (D1) The truck is released from PI to go to Waltz Mill Facility
1C/30/08 065E (D24) Truck arrives at Waltz Mill
1C/30/08~1245 (D8) Initial survey at Waltz Mill determines 80 mR/hr highest contact reading on bottom of trailer
Readings similar to readings taken for vehicle survey before truck left P
The initial survey performed at Waltz Mill did not meet all criteria for 173 441(of 49CFR and did not mimic the transport survey performed at PI prior to the trailer leaving
1C/30/08 1305 (D23) Trailer moved to Waltz Mill RCA and container removed from trailer and surveyed
1C/31/08 (D) Vendor measured 2000 mR/hr hot spot on bottom surface of shipping container
1C/31/08 (D2) Westinghouse notifies PI possible exceedance of DOT regulation for contact dose
PI Plant Manager issues stop work order on RAM shipping (D14)
Rad shipping procedures quarantined
1/03/08 – 1/14/08(D3) PI personnel travel to Waltz Mill for preliminary investigation
END

Why 1.0 Rad shipping container from PI exceeded 49CFR173.441 limits for contact radiation levels over 200 mrem/hr (D1, D16)

Why 1.1 Contact reading on bottom of box @ Waltz Mill Westinghouse facility read 2000 mR/hr (D1)

Why 1.1.1 A discrete particle was close to bottom of container (D3)

Why A The discrete particle shifted during transport or unloading (D15, D1)

Why a. Was not packaged to prevent shifting IAW D11.7 step 6.9.2 (D11)

- IA1 - See WS2

Why B A discrete particle was contained in the shipment

Why a. Equipment was immersed in SFP

Why b. Particle was not removed prior to packaging

- Particle was not detected during job coverage survey to remove sipper from SFP (D17)

Why c. See WS3

Why 2.0 Workers did not package the fuel sipper to prevent shifting (cables not fixed to lid, lid not separated from bottom of the box) IAW D11.7 (IA1).

Why 2.1 No perceived need to package for discrete particles

Why 2.1.1 No survey indicated significant discrete particles (D17)

Why A Refer to WS3

Why 2.1.2 PI relied on vendor to package the package (D14)

Why A The vendor personnel were experienced and had been used for this task in the past

Why B It was the vendor's equipment

Why C Vendor personnel were the most experienced persons available to perform job (D14)

Why a. No in-house qualification for shipping-specific tasks (CC)

Why 2.1.3 Step 6.9.2 of D11.7 is not prescriptive

Why A See RC1

Why B The site relies on a single individual to control RMSP evolutions

See RC2

Why 3.0 Particle was not detected during job coverage survey for removing and wrapping the fuel sipper from the spent fuel pool

Why 3.1 Particle was difficult to detect with job coverage survey (D4, D5, D17,diagram)

Why 3.1.1 Dose rates measured with RO-2 at 30 cm were 20-30 mR/hr (i.e. not significant to general area dose rates) (D23, diagram)

Why 3.1.2 Large Area Smears of equipment and cables detected no particles (D23, D17)

Why 3.1.3 All discrete particles found in area were of low dose concern (D17, D23)

Why 3.2 Survey conducted for job coverage per RPIP 1135 versus an equipment survey for rad shipment evaluation IAW D11.7 (D11, D25)

Why 3.2.1 Person doing job coverage survey was not required to be familiar with D11.7 and D11.7 was not referenced in work documentation (see WS4)

Why A Person was following RPIP 1122 - Hot Particle Program (D29)

Why a. RPIP 1122 is not prescriptive with respect to rad shipping concerns (RC1)

Why B Rad shipper brief was only about decontamination target levels, not discrete particles (D14, D23).

Why C RMSP is outside work management program

Why a. See WS4

Why D Personnel completing surveys and packaging equipment are not qualified RWSC.

Why a. No training program exists to specifically describe shipping tasks

- The training and qualification for rad shippers and RP personnel who perform shipping related activities does not meet industry standards (CC2, RC2)

Why 3.2.2 RWSC did not verify survey or packaging was adequate for shipping (IA2) (D13)

Why A D11.7, section 6.9 did not require additional, shipping-specific, surveys (D13)

Why a. RC1

Why B RWSC relied on RPSs to perform rad shipping evolutions (see WS2)

Why C RWSC was focused on documentation and transport survey (D14)

Why a. Believed the job coverage survey was adequate to address transport requirements of D11.7 step 6.9.

- Did not adequately incorporate industry OE related to similar rad shipment issues (OE23408, OE26644) (CC1)
- Site relied on single individual to conduct rad shipments instead of strong process guidance. (RC1)

Why D Dose rates seen during the job coverage survey were close to decon targets (reduction from 40000 mR/hr to 120 mR/hr) (D11, D14, D17)

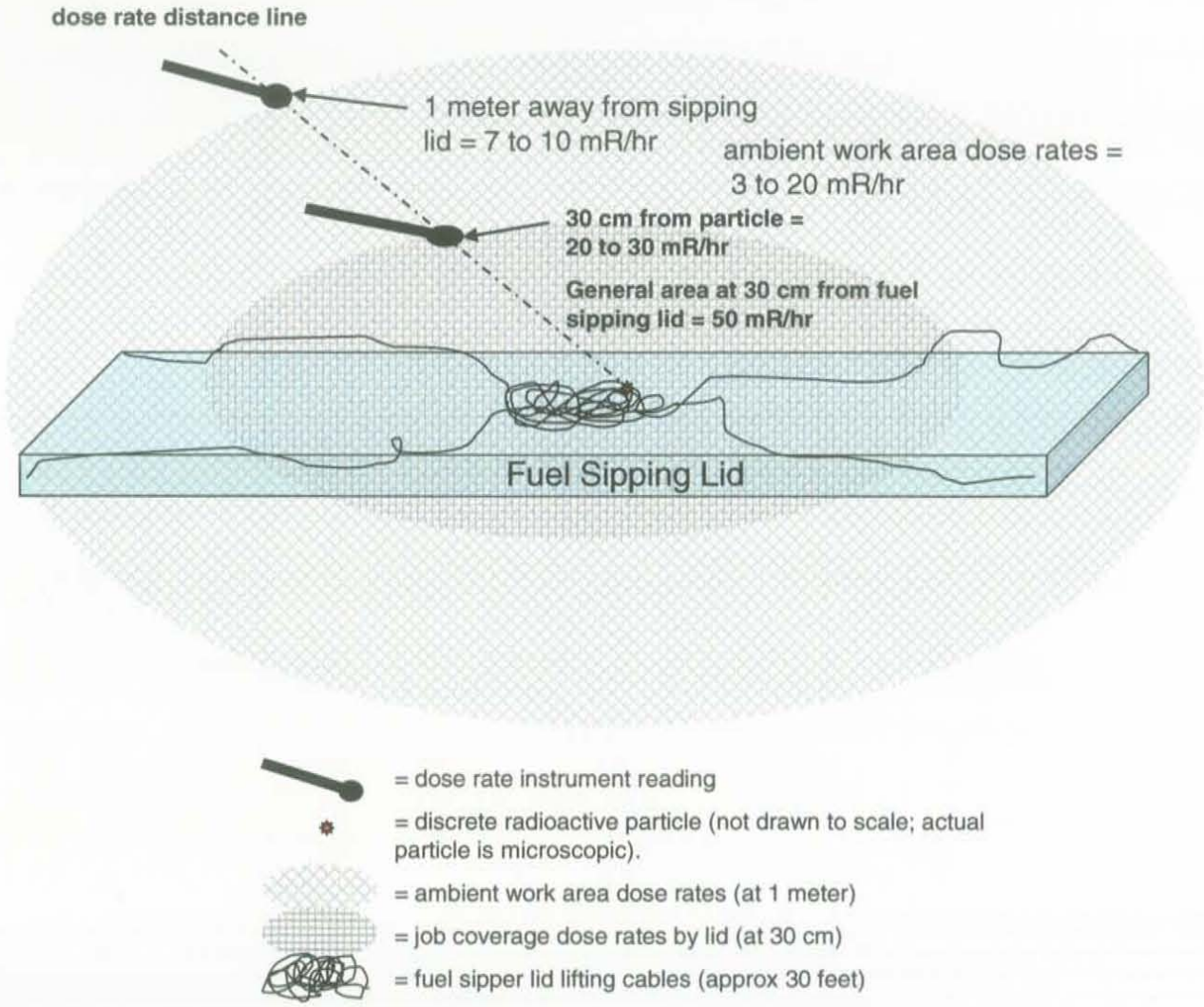
Why E Dose rates were not out of line with worker and RWSC expectations for SFP equipment (D14)

Why a. Dose rates were close to the target dose rates provided to RPS (D11)

Why b. No other surveys conducted prior to packaging for shipment

- D11.7, step 6.9 did not require additional, shipping-specific, surveys (D13, RC1)

Comparison of fuel sipping lid general area and discrete particle dose rates



Why 4.0 Shipping not specifically addressed in WO 367253 as required by FP-RP-JPP-01, step 5.5 (IA3).

Why 4.1 Job was not Passport approved until the beginning of the 2R25 refueling outage. (D26)

Why 4.1.1 WO was moved up from post-outage to beginning of outage (D23, D26)

Why A Utilize available contractor resources. (D14)

Why 4.2 RP Planners consider sipping and shipping to be part of refueling

Why 4.2.1 Fuel sipping has always been part of refueling evolution

Why 4.2.2 Work Order process does not consider RMSP a discrete task

Why A RMSP is outside work management program

Why a. RC1 and RC2

Safety Culture Component:	Description of Component	Impact	Description of Impact:	CAP ref:
Human Performance (HU)				
HU – (H.1) Decision Making	**Decision-Making**. - Decisions demonstrate that nuclear safety is an overriding priority. Specifically (as applicable): • **The site makes safety-significant or risk-significant decisions using a systematic process, especially when faced with uncertain or unexpected plant conditions, to ensure safety is maintained. This includes formally defining the authority and roles for decisions affecting nuclear safety, communicating these roles to applicable personnel, and implementing these roles and authorities as designed and obtaining interdisciplinary input and reviews on safety-significant or risk-significant decisions.** • **The licensee uses conservative assumptions in decision making** and adopts a requirement to demonstrate that the proposed action is safe in order to proceed rather than a requirement to demonstrate that it is unsafe in order to disapprove the action. The licensee conducts effectiveness reviews of safety-significant decisions to verify the validity of the underlying assumptions, identify possible unintended consequences, and determine how to improve future decisions. • The licensee communicates decisions and the basis for decisions to personnel who have a need to know the information in order to perform work safely and in a timely manner. H.1(c)	Impact ☒ Yes ☐ No	The site did not have a method for determining risk significance of events related to rad shipping. Assumptions regarding the adequacy of the rad survey and container packing technique were not conservative. When the original equipment survey indicated 120 mrem/hr, and the subsequent container survey indicated 170 mrem/hr, the opportunity to validate the integrity of that packaging was missed. **(CC1)**	CAPR 01157726-06 CAPR 01157726-07 CA 01157726-25

Safety Culture Component:	Description of Component	Impact	Description of Impact:	CAP ref:
HU – (H.2) Resources	**Resources** - The licensee ensures that personnel, equipment, procedures, and other resources are available and adequate to ensure nuclear safety. Specifically, those necessary for: • Maintaining long term plant safety by maintenance of design margins, minimization of long-standing equipment issues, minimizing preventative maintenance deferrals, and ensuring maintenance and engineering backlogs are low enough to support safety. • **Sufficient qualified personnel are trained and available to maintain work hours within working hour's guidelines.** • **Complete, accurate and up-to-date design documentation, procedures, and work packages,** and correct labeling of components. • Adequate and available facilities and equipment, including physical improvements, simulator fidelity and emergency facilities and equipment.	Impact ☒ Yes ☐ No	Procedures are not adequate. **(CC3)** Training is required for RPTs performing RMSP work. A qualification program will be implemented. **(CC2)**	CAPR 01157726-07 CA 01157726-20 CAPR 01157726-13 CA 01157726-22

Safety Culture Component:	Description of Component	Impact	Description of Impact:	CAP ref:
HU – (H.3) Work Control	**Work Control - The licensee plans and coordinates work activities, consistent with nuclear safety.** Specifically (as applicable): o The licensee appropriately plans work activities by incorporating: ▪ **risk insights** ▪ **job site conditions, including environmental conditions, which may impact human performance; plant structures, systems, and components; human-system interface; or radiological safety** ▪ The need for planned contingencies, compensatory actions, and abort criteria. o The licensee appropriately coordinates work activities by incorporating actions to address: ▪ **The impact of changes to the work scope or activity on the plant and human performance.** ▪ **The impact of the work on different job activities,** the need for work groups to maintain interfaces with offsite organizations, **and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant and human performance.** ▪ The need to keep personnel apprised of work status, the operational impact of work activities, and plant conditions that may affect work activities ▪ Long-term equipment reliability by limiting temporary modifications, operator work-arounds, safety systems unavailability, and reliance on manual actions. Maintenance scheduling is more preventive than reactive.	Impact ☒ Yes ☐ No	RMSP activities are usually completed outside of the work management process. Shipping tasks and the risks associated with shipping are frequently not addressed in work packages. RP technicians providing job coverage for decontamination are not aware of rad waste shipping requirements with respect to discrete particle issues. **(CC3)**	CAPR 01157266-06 CAPR 01157726-07 CAPR 01157726-13 CA 01157726-22 CA 01157726-24

Safety Culture Component:	Description of Component	Impact	Description of Impact:	CAP ref:
HU – (H.4) Work Practices	**Work Practices** - Personnel work practices support human performance. Specifically (as applicable): • **The licensee communicates human error prevention techniques**, such **as holding pre-job briefings,** self and peer checking, and proper documentation of activities. **These techniques are used commensurate with the risk of the assigned task,** such that work activities are performed safely. Personnel are fit for duty. In addition, personnel do not proceed in the face of uncertainty or unexpected circumstances. • The licensee defines and effectively communicates expectations regarding procedural compliance. Personnel follow procedures. • **The licensee ensures supervisory and management oversight of work activities, including contractors, such that nuclear safety is supported.**	Impact ☒ Yes ☐ No	Inadequate oversight (RMSP and supervisors) during packaging, surveying and crating evolutions. Some of the behaviors that contributed to this event do not support human performance . **(CC1)**	CAPR 1157726-07 CA 01157726-14

Problem Identification and Resolution (PI&R)				
Safety Culture Component:	Description of Component	Impact	Description of Impact:	CAP ref:
PI&R – (P.1) Corrective Action Program	**Corrective Action Program** - The licensee ensures that issues potentially impacting nuclear safety are promptly identified, fully evaluated, and that actions are taken to address safety issues in a timely manner, commensurate with their significance. Specifically (as applicable): • **The licensee implements a corrective action program with a low threshold for identifying issues**. The licensee identifies such issues completely, accurately, and in a timely manner commensurate with their safety significance. • The licensee periodically trends and assesses information from the CAP and other assessments in the aggregate to identify programmatic and Issue common cause problems. The licensee communicates the results of the trending to applicable personnel. • The licensee thoroughly evaluates problems such that the resolutions address causes and extent of conditions, as necessary. This includes properly classifying, prioritizing, and evaluating for operability and reportability conditions adverse to quality. This also includes, for significant problems, conducting effectiveness reviews of corrective actions to ensure that the problems are resolved. • The licensee takes appropriate corrective actions to address safety issues and adverse trends in a timely manner, commensurate with their safety significance and complexity. • If an alternative process (i.e., a process for raising concerns that is an alternate to the licensee's corrective action program or line management) for raising safety concerns exists, then it results in appropriate and timely resolutions of identified problems.	Impact ☐ Yes ☒ No	None	None

Safety Culture Component:	Description of Component	Impact	Description of Impact:	CAP ref:
PI&R – (P.2) Operating Experience	**Operating experience - The licensee uses operating experience (OE) information, including vendor recommendations and internally generated lessons learned, to support plant safety.** Specifically (as applicable): • The licensee systematically collects, evaluates, and communicates to affected internal stakeholders in a timely manner relevant internal and external OE. • **The licensee implements and institutionalizes OE through changes to station processes, procedures, equipment, and training programs.**	Impact ☒ Yes ☐ No	OE is reviewed but some issues identified in OE are not evaluated nor are corrective actions properly implemented. Relevant changes to station processes, procedures, equipment and training programs are not effectively implemented. **(RC1)**	CA 1157726 – 12 CA 1157726 – 16

Safety Culture Component:	Description of Component	Impact	Description of Impact:	CAP ref:
PI&R – (P.3) Self-Assessment	**Self- and Independent Assessments** - The licensee conducts self- and independent assessments of their activities and practices, as appropriate, to assess performance and identify areas for improvement. Specifically (as applicable): • **The licensee conducts self-assessments at an appropriate frequency;** such assessments are of sufficient depth, are comprehensive, are appropriately objective, and are self-critical. The licensee periodically assesses the effectiveness of oversight groups and programs such as CAP, and policies. • The licensee tracks and trends safety indicators which provide an accurate representation of performance. • The licensee coordinates and communicates results from assessments to affected personnel, and takes corrective actions to address issues commensurate with their significance.	Impact ☒ Yes ☐ No	Assessments are only included as part of the overall RP program itself. The RMSP needs a separate requirement for assessments , based on program risk exposure, in order to be more self-critical. **(CC1)**	CA 1157726-17

Safety Conscious Work Environment (SCWE)				
Safety Culture Component:	**Description of Component**	**Impact**	**Description of Impact:**	**CAP ref:**
SCWE – (S.1) Environment for Raising Concerns	**Environment For Raising Concerns** - An environment exists in which employees feel free to raise concerns both to their management and/or the NRC without fear of retaliation and employees are encouraged to raise such concerns. Specifically (as applicable): • Behaviors and interactions encourage free flow of information related to raising nuclear safety issues, differing professional opinions, and identifying issues in the CAP and through self assessments. Such behaviors include supervisors responding to employee safety concerns in an open, honest, and non-defensive manner and providing complete, accurate, and forthright information to oversight, audit, and regulatory organizations. Past behaviors, actions, or interactions that may reasonably discourage the raising of such issues are actively mitigated. As a result, personnel freely and openly communicate in a clear manner conditions or behaviors, such as fitness for duty issues, which may impact safety; and personnel raise nuclear safety issues without fear of retaliation. • IF alternative processes (i.e., a process for raising concerns or resolving differing professional opinions that are alternates to the licensee's corrective action program or line management) for raising safety concerns or resolving differing professional opinions exists, THEN they are communicated, accessible, have an option to raise issues in confidence, and are independent, in the sense that the program does not report to line management (i.e., those who would in the normal course of activities be responsible for addressing the issue raised).	Impact ☐ Yes ☒ No	None	None

Safety Culture Component:	Description of Component	Impact	Description of Impact:	CAP ref:
SCWE – (S.2) Preventing, Detecting, and Mitigating Perceptions of Retaliation	**Preventing, Detecting, and Mitigating Perceptions of Retaliation** - A policy for prohibiting harassment and retaliation for raising nuclear safety concerns exists and is consistently enforced in that:. • All personnel are effectively trained that harassment and retaliation for raising safety concerns is a violation of law and policy and will not be tolerated. • Claims of discrimination are investigated consistent with the content of the regulations regarding employee protection and any necessary corrective actions are taken in a timely manner, including actions to mitigate any potential chilling effect on others due to the personnel action under investigation. • The potential chilling effects of disciplinary actions and other potentially adverse personnel actions (e.g., reductions, outsourcing, and reorganizations) are considered and compensatory actions are taken when appropriate.	Impact ☐ Yes ☒ No	none	none

Other Safety Culture Components (OTH)

This section describes components of safety culture which are not associated with cross-cutting areas. These components, when combined with the cross-cutting area components comprise the safety culture components. Components in this section should be considered if any of the cross cutting areas align to a root or contributing cause.

Safety Culture Component:	Description of Component	Impact	Description of Impact:	CAP ref:
OTH – (O.1) Accountability	**Accountability** - Management defines the line of authority and responsibility for nuclear safety. Specifically (as applicable): • Accountability is maintained for important safety decisions in that the system of rewards and sanctions is aligned with nuclear safety policies and reinforces behaviors and outcomes which reflect safety as an overriding priority. • Management reinforces safety standards and displays behaviors that reflect safety as an overriding priority. • The workforce demonstrates a proper safety focus and reinforces safety principles among their peers.	Impact ☐ Yes ☒ No	none	none

Safety Culture Component:	Description of Component	Impact	Description of Impact:	CAP ref:
OTH – (O.2) Continuous Learning Environment	**Continuous learning environment - The licensee ensures that a learning environment exists.** Specifically (as applicable): • **The licensee provides adequate training and knowledge transfer to all personnel on site to ensure technical competency.** • Personnel continuously strive to improve their knowledge, skills, and safety performance through activities such as benchmarking, being receptive to feedback, and setting performance goals. The licensee effectively communicates information learned from internal and external sources about industry and plant issues.	Impact ☒ Yes ☐ No	Adequate training has not been provided to ensure personnel performing RMSP duties have the required technical competency. **(CC2).**	AR 01157726 - 20
OTH – (O.3) Organizational Change Management	**Organizational change management** -Management uses a systematic process for planning, coordinating, and evaluating the safety impacts of decisions related to major changes in organizational structures and functions, leadership, policies, programs, procedures, and resources. Management effectively communicates such changes to affected personnel.	Impact ☐ Yes ☒ No	none	none
OTH Safety Policies	**Safety policies** - Safety policies and related training establish and reinforce that nuclear safety is an overriding priority in that: • These policies require and reinforce that individuals have the right and responsibility to raise nuclear safety issues through available means, including avenues outside their organizational chain of command and to external agencies, and obtain feedback on the resolution of such issues. • Personnel are effectively trained on these policies. • Organizational decisions and actions at all levels of the organization are consistent with the policies. Production, cost and schedule goals are developed, communicated, and implemented in a manner	Impact ☐ Yes ☒ No	none	none

	that reinforces the importance of nuclear safety. • Senior managers and corporate personnel periodically communicate and reinforce nuclear safety such that personnel understand that safety is of the highest priority.			
Conclusions	**Conclusions and comments from Cross Cutting Element Review:** The evaluation of the safety culture impacts reveals several programmatic flaws that need to be addressed. The issues identified during this assessment have been adequately addressed in the root cause evaluation corrective actions. Corrective action 1161675 has been written to evaluate the extent of condition of these safety culture issues at the site.			

Glossary of Terms used in this report

Acronym	Meaning
CAP	Corrective Action Program
CFR	Code of Federal Regulations
DOT	Department of Transportation
IAW	In Accordance With
LAS	Large area smear (also, masslin)
LSA	Low Specific Activity
LTD	Limited
mR/hr	Milliroentgens per hour
mrem/hr	Millirem per hour
OC	On contact reading
OE	Operating Experience
RAM	Radioactive material
RMSP	Radioactive Material Shipping Program
RP	Radiation Protection
RPIP	Radiation Protection Implementing Procedure
RPM or RPCM	Radiation Protection and Chemistry Manager
RPT	Radiation Protection Technician
RWSC	Radioactive Waste Shipping Coordinator
SCO	Surface Contaminated Object
SFP	Spent Fuel Pool

Attachment 8

Root Cause Evaluation Charter
CAP AR #01157726

Manager Sponsor: Bob Hite

Problem Statement:

On Wednesday, 10/30/2008, a shipping container was received by the Waltz Mill site that exceeded 10CFR part 71.47 limits for shipping radioactive materials. This was a violation of Prairie Island procedure D11.7, section 6.10.6, exceeding 200 mrem/hr on contact with the shipping container on an open transport. The container (Box 311677) was shipped from the Prairie Island facility and contained fuel sipping equipment.

Investigation Scope:

The evaluation will determine the root cause of exceeding DOT shipping limitations as required by 10 CFR part 71.47.

The scope of the review will include an investigation of the methods used to determine radiation levels of the components shipped, as well as methods for verifying dose rates on the exterior of the shipping container and the trailer. The investigation will also try to determine the most likely contributor of the changing dose, where the material contributing to the high dose rates came from and why the dose rates changed. Additionally, the RCE will determine any organizational and industry weaknesses that contribute to the probability of incurring transport issues related to radiation dose limits.

Investigation Methodology:

The team will use interviews, FMEA, cause and effects analysis and why staircases, and other methods listed in FG-PA-RCE-01, section 5.9.1, to determine the root cause for the failure to adequately control a radioactive shipment.

Team Members:

Team Leader	Jeff LeClair	Operations
Team Member	Monti rep	Fleet RP
Team Member	Myke Mazzitello	RP/Chem
Team Member	Jeff Kivi (RCE qual)	Licensing
Team Mentor	Gene Woodhouse	Performance Assessment
Field Team	Scott Nelson	Fleet RPM
Field Team	Clay Sweet	RP/Chem

Milestones:

Date Assigned: 11/07/08

Status Update: *11/12/08, 11/19/08*

Draft Report: *11/17/08*

Final Report: *11/21/08*

Communications Plan:

Updates to PARB as per milestones.

Initial communication made to station via Clock Reset Red Sheet.

Follow-up to the NRC via established processes.

Approved: Bob Hite
Management Sponsor

Date: 11/06/08

Approved by: **Screen Team** / PARB on 11/07/08
Date