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August 30, 2018

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Greetings:

The NRC announced a "Special Inspection" at San Onofre Nuclear Generating Station to review events surrounding the Aug 3, 2018, fuel-loading "near miss" incident. Through this letter we hope to provide guidance to this investigation by the NRC from our standpoint of providing public oversight, including a request for expanding the scope of your investigation. Please distribute this letter appropriately within the NRC so our concerns will be known by the inspection team.

The issues we are concerned with are as follows:
1. NEAR MISS INCIDENT: Safety inspector and whistle-blower David Fritch spoke at the 9 Aug 2018 Community Engagement Panel (CEP) meeting in Oceanside. Fritch described a near-miss incident where a fully loaded spent nuclear fuel canister (multi-purpose canister, MPC) being lowered into the underground vault caught on the MPC Guide Ring, and was held by only 1/4 inch from falling 18 feet into the underground vault while the rigging was completely deployed, no longer supporting the canister.

Fritch, an OSHA inspector who has been working on the San Onofre site where spent fuel is being moved to the underground spent fuel storage installation only 100 ft from the water's edge, said that the workers thought they had lowered the canister into the underground vault, only to find out that it had become lodged on a guide ring.

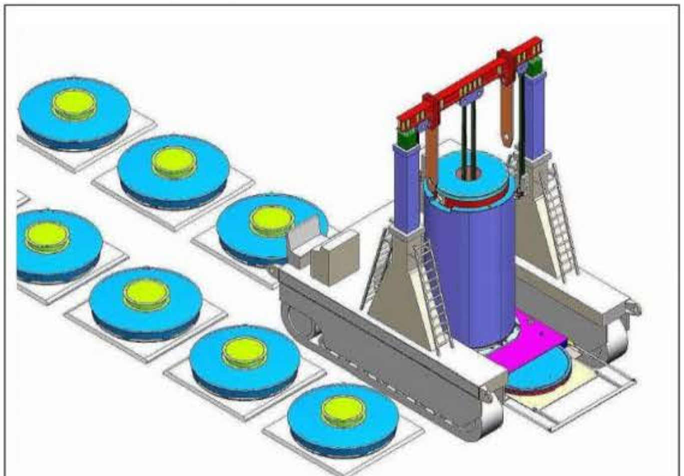

Figure 1: Transporter lowering an MPC canister into an underground vault protected by Transfer Cask

Fritch's full remarks and the initial SCE response to them at the meeting can be viewed in the meeting video [1]. His comments are attached to this letter. See also media coverage [2].

The facts broached by the testimony of Fritch at the CEP meeting have been corroborated by Southern California Edison (SCE). The workers had moved a canister full of spent fuel assemblies inside a Holtec "HI-TRAC" transfer cask using a transporter that can both lift the canister and transfer cask and roll them over to

the underground vault where the canister is to be placed. Steel, lead, and water are the principal shielding materials in the HI-TRAC transfer cask so workers can work near the MPC without receiving an excess dose of radiation.
Once over the underground vault, the bottom of the transfer cask has a sliding door that can move out of the way so the MPC-37 canister can be lowered into the vault. (Figure 1).

The rigging holding the canister lowered all the way, and workers thought the canister had successfully been lowered into the vault. However, the bottom of the canister had become lodged on the top of the MPC Guide Ring, which exists about four feet from the top of the vault, and the MPC canister was only barely held by about 1/4 inch from falling about 18 feet into the vault. (Figure 2).

Apparently, the workers then took radiation readings and were concerned that the readings were too high. They discovered that the canister was teetering on the alignment ring. They pulled the canister up with the rigging and re-centered it, and then successfully lowered it into the vault. Fritch also said that this was at least the second time such an incident occurred.

Some have commented that there was no risk to the public in this near miss incident. We disagree. This event **could have been a major disaster**, and it is one that has not been adequately modeled nor is there any plan to deal with it.

The NRC reviewed a mathematical model of a drop test of a canister devised by Holtec [3] Also, Brookhaven National Labs published this more detailed model [4].

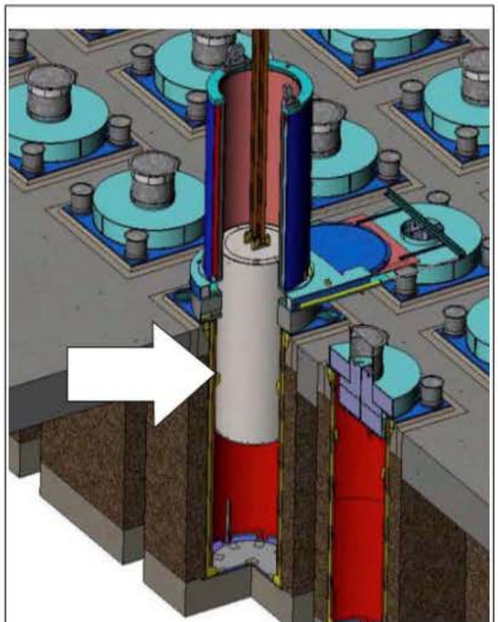

Figure 2: Arrow shows location of alignment ring which was supporting the entire ~45 ton mass on about 1/4" from falling about 18 feet into the vault.

Although the model devised above included a drop of the canister inside the HI-STORM (above-ground) shell, this analysis was limited to a drop of **only 12 inches, not 18 feet.** The other aspects of that report concerned drops of the HI-TRAC transfer cask holding a canister. Those models considered larger drops of up to 100 feet. But in those modeled drops, they considered that the contained canister was a "rigid cylinder" and they did not consider the damage to the MPC itself. If you've heard of drop tests of "30 feet", these tests include the transportation cask or transfer cask. These casks provide structural support and/or impact limiters, and those tests do not consider damage to the contained canister either.

As a trained engineer, my thoughts are as follows. First, models can be wrong, as they have never been validated by any actual drops of fully loaded MPC-37 canisters to see what would happen. But intuition says that if the fully loaded, (~45 tons) 5/8" thick stainless steel canister had fallen the 18 feet, it would have suffered substantial damage, particularly at the bottom which takes the full weight of the rest of the cylinder. The containment of the canister may have been breached (most likely at the weld to the base plate), and it very likely would have become wedged in the bottom of the vault (because the sides of the cylinder may have bent in and out or bent to one side). The concrete would be damaged by the falling canister and the shock wave produced by the fall may damage other nearby canisters. The canister spreading to the sides would likely damage the air vents of the underground vault, perhaps crushing them

and eliminating any circulating air. Then, the fuel may quickly overheat. If the fuel assemblies inside were also compromised, there is a risk that a critical reaction would have been sustained. It could have resulted in a meltdown or explosive scenario, contaminating the coastal area for many miles. It is unclear how anyone could then get the crumpled canister back out of the underground vault even if the canister containment boundary is not compromised.

These mistakes place the population of approximately 8.4 million residents around the facility at extreme risk of a major disaster, as well as likely radioactive contamination of the ocean and beach areas around the facility.

--> Camera systems are not utilized to allow workers to safely watch the canister at all times.
--> Of concern also was the fact that Edison did not disclose this near-miss at their own meeting.
--> It seems such events have happened at least one other time, also not disclosed.
--> Edison has no plan for what to do if a real disaster should unfold.

Fritch also listed a number of concerns regarding the dismal safety culture at the plant. He said they were under-trained, under-staffed, and did not communicate lessons learned to subsequent workers.

2. CHANGED COMPONENTS:
Secondly, we learned at the March 2018 CEP meeting that Holtec had modified the MPC canister system by changing the design of the ends of the "shim" blocks, which are open to encourage circulation of the helium inside the canister. The design was changed from a more robust end with cut-outs to a flat cut design with stand-off pins. SCE reported that they discovered some loose pins in the bottom of a canister.

Holtec apparently changed the design without informing their customers or the NRC.

We note that the two issues combined would have caused even worse problems. That is, if the pin design is used, coupled with the near miss drop, then these pins would surely bend or break off and the canister would more quickly overheat due to lack of internal cooling circulation of the helium.

Given this newly acknowledged accident scenario, we request that the NRC expand the scope of their inquiry to include the defective canisters already installed in the ISFSI. As these are defective designs, Holtec should pay for the removal of the four defective canisters and to swap out the assemblies into a canister that meets specifications.

3. NO ACCIDENT SCENARIO PLANS: Coupled with these two issues is the lack of any plans for what to do if such an event were to occur. The response by SCE representative Tom Palmisano to the question regarding what they would do had the canister actually fallen the 18 feet (see [1]) was that they would take readings, make reports, and then figure out what to do. We find this lack of pre-laid plans

appalling. We have also learned that moving a compromised canister back to the spent fuel pool is problematic, as reflooding a very hot canister is a tricky and dangerous proposition that may result in cracking the cladding due to the sudden temperature changes. However, it has been a standard assumption in the nuclear industry that a pool would be available at the dry storage site and used to stabilize a failed or compromised canister. [5]

It is important to note that the Holtec spent fuel dry storage systems uses components that are used at various stages in the process and each component provides only part of the functionality of the overall system. The MPC itself provides only containment and does not provide shielding nor sufficient structural robustness for transportation or storage. Shielding is provided during transfer of the MPC to the ISFSI through the use of the Transfer Cask (HI-TRAC) which surrounds the MPC. This is transported to the U-MAX underground ISFSI after the spent fuel assemblies are inserted in the MPC and it is welded shut. It is at this stage of handling the MPC canister, lowering it into the underground vault, that we find the canister has no additional protection from the fall. Also, when the canisters are to be moved to their ultimate destination and each is removed from the ISFSI and loaded back into the Transfer Cask, we again have the risk that it might fall into the vault. Then finally, when the MPC is removed from the Transfer Cask and moved into the Transportation Cask (Holtec HI-STAR 190), we have a similar highly risky period when the MPC is not yet protected by the transportation Cask. These transitions include manipulations of the MPC alone, and mean that risk factors will be higher. All these transitions should be included in the review process which should occur at this juncture. We notice also that these critical transitions are not adequately covered by NRC human factors documents. [6]

Citizens Oversight has petitioned the NRC to improve the rules surrounding the storage of spent nuclear fuel accepted by the NRC for processing. The Docket Number for the Petition: PRM-72-8. The two related documents are available as ADAMS Accession number for the Petition (NRC Rule Changes): ML18022B210; the attachment (HELMS Proposal) ML18022B213. One of the key suggestions to satisfy the HELMS criteria is to upgrade the canisters with a secondary outer shell so as to meet the 1,000 year design life criteria. We submit that this may be an essential tool to deal with a compromised canister that is leaking to the environment. Therefore, we request that the information related to this incident be provided to those NRC analysts working on the rule-making petition mentioned above.

Citizens Oversight calls on the NRC to include the following in a formal investigation into the situation. including the following:

1. **STOP:** Make a full-stop on any further movement of spent fuel to the underground facility until a full analysis, report, and corrective actions are defined and taken.

2. **INVESTIGATE:** The Nuclear Regulatory Commission (NRC) must investigate this incident to determine:
    1. how these mistakes occurred.
    2. a list of similar incidents which also occurred, as mentioned by Fritch.
    3. why the NRC was unaware of this incident, and why such incidents are not reported and why a special inspection and investigation is required to know about such near-miss incidents.
    4. a list of similar accidents that may occur during the sensitive transitions of the MPC from one enclosure to another, for example during the removal of the canister from the vault and then lowering it into the upright transportation cask.
    5. whether scraping damage to canisters will compromise their corrosion immunity.

6. engineering modeling of accident scenarios including a free drop of at least 18 feet (and probably more to account for full rigging failure) including modeling of canister internal structures and allowed design changes (such as the aforementioned bolt changes).
7. further modeling of the ISFSI structure, including the steel vault liner and concrete, to determine if such a drop would compromise part of or the entire ISFSI facility, knowing that the high-high tide line is only inches below the bottom of the ISFSI structure. During construction, whistle-blowers informed us that SCE had to pump down the ground water in the excavation for the bottom slab structure.
8. what would be done if everything went wrong, i.e. the canister is dropped in the vault, it gets stuck in the bottom, the containment is breached, and a critical reaction commences. How would the canister be stabilized? To remove it, would the concrete slab need to be cut apart? Unlike the horizontal NUHOMS design, this ISFSI is not modular and there is no means to take it apart to allow access to a canister that has been dropped.

3. **DISCLOSE:** SCE should disclose all prior similar events, including the one referenced by Mr. Fritch, and any other "mistakes" made by their staff during the spent fuel loading operation. The NRC must insure that all issues are being addressed appropriately.

4. **RESPOND:** SCE should provide a response to the claims that they are under-staffed, under-trained, and have a poor safety culture, including steps to be taken to become safety oriented.

5. **PLAN:** Akin to Item 2.8 above, SCE & NRC should explain the steps they would take to deal with the problem, assuming the worst, as described above. It is unacceptable to hear yet again from Tom Palmisano of SCE that they would "evaluate the situation and decide what to do at the time." Since similar accident scenarios could occur when the canisters are eventually removed from the ISFSI vaults and transferred to the Transportation Casks for transportation out of the facility, how will a dropped canister be stabilized if the spent fuel pools are demolished? <u>If a spent fuel pool is necessary in such a scenario, then NRC should not allow the pools to be demolished prior to removal of all of the spent fuel from the site.</u>

6. **REDESIGN:** Holtec should change their design of the spent fuel system so that:
   1. It is impossible for a canister get stuck in the lowering process
   2. Observability is improved during that process so there can be no confusion as to the state of the canister at all times. We suggest the canister lowering process should be live-streamed so the public can witness the operation.
   3. All other transitions, when the canister is moved from one containment to another, are critical and must be addressed with specific plans.
   4. Movement of spent fuel should not continue until these now known accident conditions are fully addressed and accounted for in the FSAR and CoC.

7. **REMOVE DEFECTIVE CANISTERS:** SCE and Holtec should remove the four defective canisters that use the bolt design and replace the canister with one which meets all specifications. This is particularly important now with acknowledgment of this and similar accident scenarios that include drops of at least 18 feet.

8. **ROBUST, COMPREHENSIVE AND TRANSPARENT MONITORING** -- The fact that this near disaster was not disclosed to the public is related to the culture of secrecy and poor transparency. We see this also in the lack of robust and transparent monitoring. It is all but

impossible to find and decode the official reports of radioactive monitoring and the public has had to look to third party resources to set up their own monitoring. This does not assuage fear and doubt which otherwise will surface. The NRC should review monitoring and reporting procedures to insure that they are robust, comprehensive, transparent, and easy to interpret.

Nuclear Regulatory Commission, please completely fulfill your responsibilities and include the full scope of this failure in your review.

Sincerely,

Ray Lutz, Engineer
Citizens' Oversight Projects (COPs)
619-820-5321

Joined and endorsed by:
Dr. Tom English, Former Advisor on high-level nuclear waste disposal to President Carter's Office of Science and Technology Policy, Sweden's Ministry of Industry, NASA, and California Energy Resources Conservation and Development Commission.

More Information:

[1] Video of the CEP meeting with Fritch's comments and response by SCE, as well as other references on this issue: http://www.copswiki.org/Common/M1870

[2] San Diego Union Tribune Article: http://www.sandiegouniontribune.com/business/energy-green/sd-fi-songs-whistleblower-20180810-story.html

[3] Preliminary Safety Evaluation Report, Docket No. 72-1040, HI-STORM UMAX Canister Storage System, Holtec International, Inc., Certificate of Compliance No. 1040" which can be accessed from the NRC ADAMS document repository: https://www.nrc.gov/docs/ML1412/ML14122A441.pdf

[4] Impact Analysis Of Spent Fuel Dry Casks Under Accident Scenarios, Brookhaven National Labs (2003) https://www.bnl.gov/isd/documents/25144.pdf

[5] Macfarlane, Allison "Interim Storage of Spent Fuel in the United States", Annu. Rev. Energy Environ. 2001. 26:201–35, "The waste handling building will need at least one pool in the event of failed casks, failed spent-fuel assemblies, or earthquake damage." http://web.mit.edu/stgs/pdfs/annurev.energy.pdf

[6] Sandia National Labs & NRC, "Preliminary, Qualitative Human Reliability Analysis for Spent Fuel Handling", NUREG/CR-7017, https://www.nrc.gov/docs/ML1105/ML110590883.pdf Sec. 7.2 "Dropping a Cask"

TRANSCRIPT OF DAVID FRITCH STATEMENT AT 9 AUG 2018 CEP MEETING

Thank you, my name is David Fritch. I'm a worker on the ISFSI project. I work in the spent fuel project – F-R-I-T-C-H. I do industrial safety, so OSHA stuff, not nuclear stuff, but I'm out there.
And uh, I may not have a job tomorrow for what I'm about to say, but that's fine. Because I made a promise to my daughter that if no one else talked about what happened on Friday, that I would.

About 12:30, August 3rd we were downloading, and the canister didn't download, but the rigging came all the way down. There were gross errors on the part of two individuals. There were gross errors on the part of two, two individuals, the operator, and the rigger, that are inexplicable.

So what we have is is a canister that could have fallen 18 feet. That's a bad day. That happened. And you haven't heard about it. And that's not right.

My friend here is right, public safety should be first. And I've been around nuclear for many years. It's not. Behind that gate, it's not.

Here's a few things that I've observed in the three months I've been here. SCWE, um, the Safety Conscious Work Environment, where people are constantly given encouragement to raise concerns. It's not repeatedly or even, I've never even received SCWE training since I've been on site. That's not standard for a nuclear site.

Operational experience is not shared. That problem had occurred before, but it wasn't shared with the crew that was working.

We're undermanned. We don't have the the proper personnel to get things done safely.

And certainly undertrained. Many of the experienced supervisors, what we call CLS's, Cask Load Supervisors, once they understand the project and how everything works, are often sent away, and we get new ones that don't understand as well as even the craft, basic construction craft. And a lot of them who haven't been around nuclear before are performing these tasks - not technicians, not highly trained, not thorough briefs.

This is an engineering problem. What happened is, inside of that cask there's a guide ring about four feet down. And it's to guide that canister down correctly to be centered in the system. Well, it actually caught that. And from what I understand, it was hanging by about a quarter inch.

So, obviously, the point is clear. As people said, Edison is not forthright about what's going on. I'm sure they'll tell you that they were going to bring this out once it was analyzed, et cetera, et cetera. I'm sure they're preparing what they would answer if it comes out.

I came here tonight to see if this event would be shared with the community. And I was, I was disappointed to see that it was not.

And I want to thank the community of San Clemente. It's a beautiful, wonderful community with amazing people. You've been great to me. My family's here with me for the month.

Unless Edison and Holtec commit to defining success on this project as safety, and I'm not, I'm not talking about any of the concerns voiced today, I'm just talking about downloading – getting the fuel out of the building safely.

Are we going to address what would have happened to that canister if it would have fallen? Even if the shell wasn't penetrated, now will, will they take it in a repository site?

The question is, will, will Edison and Holtec commit to defining success primarily in terms of nuclear safety. And there will there be transparency, commitment to safety, and the financial commitment to make sure that it's done successfully. Thank you.

RCE / MPC DOWNLOAD:

MRC General Comments:

01 – Procedures without noun names e.g. multiple instances HSP-35 should include PROCEDURE FOR FIELD CONDITION REPORTS AND PROCEDURE FIELD CHANGE NOTICES FOR ALL SITE WORK., or have a separate attachment with noun names,

02 – General readability issues.

ANALYSIS:

CAUSE	ACTION	FTO RESTRAINT	COMMENTS
RC Holtec Management failed to recognize the complexity and risks associated with fuel transfer operation while using a relatively new system design (UMAX) when performing a long duration campaign and thus did not implement necessary program improvements.	**CAPR-2 *** Evaluate the SCE EOB charter and propose necessary changes to SCE to improve the effectiveness of the EOB. The evaluation should look at: 1. current make-up of the EOB; 2. frequency of occurrence of the EOB; 3. specific agenda topics	Due: **Before Restart** Owner: P. Chaudhary	As written this is not a SMARTS CAPR as it describes performing an evaluation. This should read the EOB Charter will be enforced to the Charter as currently written. The problem was Execution of the EOB was not effective.
RC	**CA-34** Revise HSP-42 (Project Manager's Desk Top Guide for Site Services Pool to Pad Projects) to incorporate the following: 1. Provide a definition for long term PTP campaigns 2. Within the procedure incorporate the following for long term PTP campaigns: a. Identification of a Project Corrective Action Coordinator b. Identification of an Employee Concerns Program Coordination	Due: 11/20/18 Owner: S. Soler	No QA Management presence on-site, the quarterly trips of a QA Representative is not sufficient. Not a direct link to re-start of FTO, however further discussion focused on the Root Cause Corrective Actions should be completed prior to re-start of FTO.

	c. PM to work with the Quality Department to determine oversight surveillance schedule 3. Define method to vet potential contracted employees 4. Defining expectations for Project Managers with regard to oversight of project activities		
CC1 Inadequate content in procedures to recognize special conditions related to a relatively new equipment system (UMAX).	**CA-8 *** Incorporate the use of engineering features to verify MPC movements during the downloading process including the following: 1. Tell Tale Monitoring 2. Camera Indication 3. Load Monitoring using alternate devices	Due: **Before Restart** Owner: A. Fecht	MRC stated this is more appropriately placed in Root Cause section of the matrix. Chairman stated during operations we relied on alarms and interlocks and it would be desirable to have an underload Alarm/Interlock
CC2 Design review process did not ensure that unintended consequences of design features were captured.	**CA-13** HSP-191 is being revised to incorporate an enhanced review process. In summary, the following enhancements were made: 1. Incorporation of Holtec experts independent of the design process to evaluate and challenge the design for all products that have a significant impact on heavy load handling or significant effects on nuclear and industrial safety. Two sets of reviews are now required. The initial Product Development Team (Red team) must now include members from site	Complete	MPR Representative identified this was discussed as a design review process issue that was identified, and Holtec reviewed the Design Change Process to identify additional vulnerabilities. This significant effort is not captured here. NRA/NOD Manager stated Holtec should take credit for the review of their Design Changes, as described starting on page 54 of the RCE.

	services and manufacturing as well as applicable technical disciplines. A separate Independent Challenge Team (Blue team) will also perform an independent review for new designs as well as design changes with an elevated potential consequence profile. 2. Incorporation of additional checklists which will drive reviews to evaluate for unintended consequences. 3. The use of a Blue team review is also included for actionable documents including where heavy load handling is involved.		
EFFECTIVENESS REVIEW:			
Effectiveness Review	**EFR -1** Perform assessments to verify effectiveness of the CAPRs and a CAs. 1. No adverse trends in handling or lifting activities. 2. No adverse trends in the assignment of untrained or unqualified personnel to tasks. 3. No similar handling or lifting events. +Interim evaluation completed 60 days after restart.	Due: 3/1/19+ Owner: M. Soler	Discussed need to be more preventative than reactive. Unclear as to date and alignment with 60 days after restart (3/1/19 date would infer a 1/1/19 restart date). This EFR should be required prior to going into Dual Unit Operation.

OPERATING EXPERIENCE:			
Document Number: SOER 06-1 Title: Rigging, Lifting, and Material Handling Date: 05/22/2008	Missed Opportunity: _x__ Yes ___ No		Discussed, in general the OE responses were not clearly stated as to how the missed opportunity would be addressed for specific events. CA is focused on capture of future OE.

OVERALL REVIEW COMMENTS:
01 – Readability issues, 02 – Executive Summary not Brief, 03 – Based on Quorum comments RCE was approved with the comments documented herein 04 – MRC Approved the Holtec RCE with comments.

Draft Rev 0
October 15, 2018

I. SUMMARY

Following the August 3, 2018 spent fuel canister downloading event, SCE has stopped work involving movement of spent fuel into the Holtec UMAX Independent Spent Fuel Storage Installation (ISFSI) pending a thorough review and analysis of the causes of the event and the actions to prevent recurrence. Additionally, the NRC has commissioned a Special Inspection Team to review the event and SCE's Corrective Actions (CAs).

Holtec and SCE have conducted thorough and detailed analyses of the event, and identified the causal factors and the CAs required prior to restart of the spent fuel transfer operations (FTO). MPR has reviewed and concurred with both the Holtec and SCE analyses. The Nuclear Oversight Board (NOB) has reviewed both analyses and concluded they were sufficient.

The following is an outline of the plan SCE will use to review the completion of all the required CAs and ensure Holtec and SCE are ready to resume spent fuel transfer operations. The NOB and MPR provided input to the plan. The required CAs are being incorporated into a master schedule and the necessary actions will be included in the schedule as well.

II. SUMMARY OF RESTART PLAN REVIEWS AND APPROVALS:

1. Holtec Corrective Actions
    a. Revise procedures to provide adequate detail
    b. Implement a revised training program to ensure personnel are adequately trained on UMAX system operations
    c. Increase site staffing to ensure adequate management staffing and support
    d. Implement additional load monitoring capability, including cameras and load alarm functions
    e. A low threshold for entries into the corrective action system to ensure potential issues are identified and resolved. This includes better use of SONGS and Holtec's Operating Experience (OE)

2. SCE Corrective Actions
    a. ISFSI project management personnel changes
    b. Revise training for oversight personnel to ensure they are adequately trained on UMAX system operation and oversight role
    c. Provide more effective management oversight of ISFSI loading activities and oversight personnel effectiveness

3. Completion of SCE NRC Commitments
    a. Complete any SCE NRC commitments required prior to resuming FTO

4. Validation of Corrective Action Completion by SCE Nuclear Oversight Division (NOD)
    a. SCE NOD personnel will review completed CAs for adequacy

5. MPR Review of Completed Corrective Actions Required for FTO to Restart
    a. MPR will provide a 3rd party review of completed corrective actions and NRC commitments

6. SCE Readiness Review Challenge Boards
    a. SCE will hold specific readiness review challenge boards to confirm readiness for the FTO evolution
    b. The challenge board will include members of the NOB and MPR
    c. Challenge boards will focus on the causal factors: adequate staffing, training, supervision, and procedures

7. Successful Completion of Canister Downloading Practice Runs
    a. Demonstration of adequacy of revised procedures
    b. Demonstration of adequacy of revised training
    c. Demonstration of adequacy of improved load monitoring instrumentation and alarms
    d. Demonstration of SCE Oversight effectiveness
    e. Practice runs will be observed by SCE, MPR, and industry personnel

8. SCE/Holtec Executive Oversight Board (EOB) Review of Readiness
    a. Review of results of CA assessments
    b. Review of results of challenge boards
    c. Review of results of practice runs

9. Independent Assessment of Readiness and Report to CNO
    a. Team composed of utility and industry personnel to assess readiness for resuming FTO
    b. Composition: SONGS senior manager; MPR; Nuclear Oversight Board member; retired industry nuclear utility managers; Callaway representative with UMAX experience

10. Confirmation that NRC has no Issues with Restart
    a. Discussion with NRC Special Inspection Team
    b. Confirmation with NRC Regional Administrator

11. SCE INMG Meeting to review restart readiness and provide concurrence to resume FTO operations

DRAFT

DOCUMENTS NEEDED FOR THE SEPTEMBER 10, 2018 NRC
SPECIAL INSPECTION AT SONGS
72-41/18-01

The following is an initial list of information and documents needed for the September 10, 2018 NRC Special Inspection at SONGS. Electronic documents available on a CD/DVD, the use of Certrec IMS, or paper copies are all acceptable means to fulfill this document request. All documents and CDs provided to us will be shredded after the inspection report is issued.

NRC was last onsite at the SONGS ISFSI for the UMAX ISFSI preoperational and first loading inspection on January 22-31, 2018 (NRC IR 05000206/2017-003, 05000361/2017-003, 05000362/2017-003, AND 07200041/2017-001).

For the current inspection, please make the following available to us on or prior to our arrival onsite:

1. A list of the names and titles of all individuals (SCE, Holtec, and other contractors or individuals that may have been present) that were on shift or were involved with the August 3 downloading "near miss" event.
2. Southern California Edison's Root Cause Evaluation of August 3, 2018 "near miss" event at SONGS
3. Holtec International's Root Cause Evaluation of August 3, 2018 "near miss" event at SONGS
4. Original Cask Loading Procedures – Outside Operations (400 series?), pre-incident
    a. Review a copy of the filled out procedure from August 3, 2018
5. Holtec's *Enhanced* Cask Loading Procedures – Outside Operations, post event revision
6. Copy of new scripted briefing materials to downloading crew.
    a. Verify attendance sheets and records for all Holtec and SCE oversight who have been trained in new outside operations.
7. Holtec's Engineering Evaluation of MPC canister involved in "near miss" event, and /or Holtec's Inspection Plan for the MPC canister involved in the "near miss" event.
8. Procedure for MPC-37 and VVM divider shell damage inspection/inspection plan related to "near miss" event.
9. SCE Procedure that discusses NRC Reportability Requirements for events during Dry Cask Storage Operations
10. Holtec: How different are the divider shells between SONGS and Callaway – they are obviously visually different. How deep to the differences go? Materials? Design?
11. What are the training requirements for a Holtec Cask Loading Supervisor?
12. Please provide Cask Loading Supervisors Training Materials for Outside Operations:
    a. Is On the Job Training required?

b. Training procedures
c. Training modules
d. Training Content

13. Documentation that shows how Cask Loading Supervisor qualifications verified and kept up to date.

14. What are the training requirements for Holtec VCT operators at SONGS.
    a. Documentation showing VCT operator qualifications at SONGS

15. How are VCT operator qualifications verified and maintained up to date?
    a. Documentation that describes the tracking process of VCT operator qualifications.

16. Please provide VCT Operator Training Materials
    a. Is On the Job Training required?
    b. Training Procedures
    c. Training Modules
    d. Training Content

17. What re the training requirements for spotters/riggers at SONGS?

18. Please provide spotter/rigger training materials for outside operations:
    a. Is On the Job Training required?
    b. Training procedures
    c. Training modules
    d. Training content

19. How are /spotterrigger qualifications maintained up to date?

20. *Request - Holtec Drop Analysis for MPC-37 canister.*

21. Request - Purchase Specification of Slings used for downloading MPC-37 at SONGS.

22. A listing of Dry Fuel Storage related Holtec Field Condition Reports and SCE Action Requests written from January 2018 to present with a short description.
    a. We will request selected full ARs or FCRs from the list.

23. Training records for all members of loading crew involved in event, including those no longer working for Holtec.

24. Training records for all VCT operators who have worked in DFS at SONGS.

25. Training records for all spotter/iggers at SONGS.
    a. Power Points for Outside Operations
    b. On the Job Training desciptions
    c. Procedures/Programs for Outside Operations
    d. What it takes to get qualified

26. VCT maintenance records.

27. VCT operational daily check records.
28. Annual sling inspection records.
29. Most Recent ANSI N16.5 Test Records for Special Lifting Devices used Outside at SONGS:
    a. MPC lift cleats
    b. HI-TRAC Lugs
    c. VCT lift links
    d. VCT Pulleys
30. Provide Southern California Edison's (SCE) policy regarding Safety Conscious Work Environment (SCWE).
31. Provide documentation of SCE's SCWE policy addresses contractors such as Holtec.
32. Provide SCWE training records documenting training attendance by Holtec personnel.
33. Documentation of SCE's whistle-blower protection program.
    a. Does this apply to contractors, such as Holtec?
34. How does SCE make their workers and contractors aware of NRC protected activities, such as raising safety concerns?
    a. Please provide training records for Holtec's crew.
35. Documentation of Holtec staffing requirements for MPC downloading operations?

DOCUMENTS NEEDED FOR THE SEPTEMBER 10, 2018 NRC
SPECIAL INSPECTION AT SONGS
72-41/18-01

The following is an initial list of information and documents needed for the September 10, 2018 NRC Special Inspection at SONGS. Electronic documents available on a CD/DVD, the use of Certrec IMS, or paper copies are all acceptable means to fulfill this document request. All documents and CDs provided to us will be shredded after the inspection report is issued.

NRC was last onsite at SONGS for the UMAX ISFSI preoperational and first loading inspection on January 22-31, 2018 (NRC IR 05000206/2017-003, 05000361/2017-003, 05000362/2017-003, AND 07200041/2017-001).

For the current inspection, please make the following available to us on or prior to our arrival onsite:

1. A list of the names and titles of all individuals (SCE, Holtec, and other contractors or individuals that may have been present) that were on shift or were involved with the August 3 downloading "near miss" event.
2. Southern California Edison's Root Cause Evaluation of the "near miss" event at SONGS.
    a. Or SCE's acceptance document of Holtec's Root Cause Evaluation and list of comments provided for previous drafts.
3. Holtec International's Root Cause Evaluation of the "near miss" event at SONGS.
4. Original cask loading procedures in use on August 3, 2018– Outside Operations (400 series?), pre-incident.
    a. Provide a copy of the filled out procedure from August 3, 2018 used during the event.
5. Any revisions to Holtec's Cask Loading Procedures – Outside Operations post-event.
    a. SCE's acceptance review of any revised Holtec procedures, per 10 CFR 72.48.
6. Copy of *new or revised* briefing materials, training materials, and attendance records of training for Holtec and SCE oversight staff related to Outside Operations.
7. Holtec's Engineering Evaluation of the MPC canister involved in the "near miss" event, and /or Holtec's Inspection Plan for the MPC canister involved in the "near miss" event.
8. Holtec's Engineering Evaluation of the UMAX ISFSI VVM divider shell damage or Holtec's Inspection Plan for examining VVM divider shell damaged during the event.
    a. Include pictures and documentation of examinations already performed.
9. SCE Procedure that discusses NRC Reportability Requirements for events during Dry Cask Storage Operations.
10. Radiation Protection procedures for downloading operations and Outside Operations.

11. Copy of the design drawing for the *SONGS UMAX Version B divider shell* and a copy of the design drawing for the *UMAX Version A divider shell*.

12. Copy of the procedure or program that describes the training requirements for Holtec Cask Loading Supervisors

13. Provide *unrevised pre-event* Cask Loading Supervisors Training Materials for Outside Operations:
    a. On the Job Training requirements
    b. Training procedures
    c. Training modules
    d. Training Content
    e. Procedure or documentation that shows how Cask Loading Supervisor qualifications are verified and kept up to date.

14. Procedures or documents that describe the training requirements for Holtec VCT operators at SONGS.

15. Provide *unrevised pre-event* VCT Operator Training Materials
    a. On the Job Training required
    b. Training Procedures
    c. Training Modules
    d. Training Content
    e. Procedures or documentation that verifies VCT operator qualifications are maintained up to date

16. Procedures or documents that show the training requirements for SCE oversight of Holtec outside operations at SONGS

17. Provide *unrevised pre-event* SCE oversight training materials for Outside Operations:
    a. On the Job Training required
    b. Training procedures
    c. Training modules
    d. Training content
    e. Documents that track the SCE oversight qualifications maintained up to date

18. Procedure or documents that show the training requirements for Holtec spotters/riggers at SONGS

19. Provide unrevised pre-event spotter/rigger training materials for Outside Operations:
    a. On the Job Training required
    b. Training procedures
    c. Training modules
    d. Training content
    e. Documents that track the spotter/rigger qualifications are maintained up to date

20. Provide Holtec Drop Analysis for MPC-37 canister and MPC-32 canister.

21. Provide Purchase Specification of Slings used for downloading MPC-37 at SONGS.

22. Provide a listing of Dry Fuel Storage related Holtec Field Condition Reports and SCE Action Requests written from January 2018 to present with a short description.

23. Copies of Training records for all members of loading crew (CLS, VCT operator, and riggers) involved in event, including those no longer working for Holtec or SCE.

24. VCT annual maintenance records.

25. VCT operational daily check record for August 3, 2018.

26. Latest annual sling inspection records.

27. Most Recent ANSI N14.6 Test Records for Special Lifting Devices used Outside at SONGS (quarterly and annual):
    a. MPC lift cleats
    b. HI-TRAC Lugs
    c. HI-TRAC Lift Links

28. Provide Southern California Edison's (SCE) policy regarding Safety Conscious Work Environment (SCWE).

29. Documentation of Holtec and SCE staffing requirements for MPC downloading operations.

SOUTHERN CALIFORNIA
EDISON
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Thomas J. Palmisano
Vice President Decommissioning &
Chief Nuclear Officer

SCE-CEP-LTR-081618

August 16, 2018

Dear Community Engagement Panel members,

I am writing to provide you with an update on the spent fuel canister loading incident that was discussed at the August 9 CEP meeting. As you are aware, the matter was raised by a contractor employee who questioned why specific details of the incident were not shared during my presentation.

On Friday, Aug. 3, Holtec experienced an issue while lowering a loaded Multi-Purpose Canister (MPC) into the Independent Spent Fuel Storage Installation (ISFSI) structure. The MPC was eventually placed into the structure safely and successfully, however, this is a significant incident and not acceptable.

This was the 29th canister being placed in the ISFSI and similar to the other canisters, the MPC was loaded with 37 spent fuel assemblies, welded shut and filled with helium. It had been transported from the spent fuel pool to the UMAX ISFSI structure to be lowered into its storage location. As the Holtec crew lowered the spent fuel canister into the Cavity Enclosure Container (CEC) on the dry cask storage pad, the canister got lodged on an inner ring that helps to guide it into place. There is a very snug fit in the CECs, and it is not unusual for it to take the loading team a few adjustments to get the canister aligned appropriately. The crew performing this work did not initially recognize that the canister had stalled while lodged on the inner ring and continued to lower the rigging. Supervision and SCE's oversight team determined the canister was not seated properly, and within one hour, made adjustments and lowered the canister safely onto the bottom of the CEC.

I have attached a non-proprietary graphic from Holtec of the MPC and the CEC to help illustrate where the inner ring is located and where the canister was lodged.

The significance of the event is that during the short period of time, the MPC was lodged on the inner ring and was not fully supported by the rigging. Although unlikely due to the position of the MPC on the inner ring, the canister could have fallen approximately 18 feet to the bottom of the CEC. If this had occurred, it would not have created a hazard to the public or employees since the MPC, as part of its robust design, is built and analyzed for a drop greater than 18 feet without breaching the canister.

P.O. Box 128
San Clemente, CA 92674
(949) 368-6575
Fax: (949) 368-6183
tom.palmisano@sce.com

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Immediately after this, SCE stopped all canister loading activities, and safety stand-down meetings were conducted with the fuel handling and loading teams to understand the incident and communicate lessons learned. Additional actions and training were added to the loading processes, which is a part of SCE's ongoing efforts to continuously improve its work practices. SCE does this routinely to ensure it is continuously evaluating its performance, and that of its contractors, communicating with the crews and incorporating best practices.

All spent fuel downloading activities remain halted until SCE is satisfied with Holtec's corrective actions.

SCE informed the Nuclear Regulatory Commission (NRC) inspectors of the issue and performance concerns, and have had several follow up phone calls with NRC personnel to provide additional information. SCE continues to update the NRC regularly on its actions.

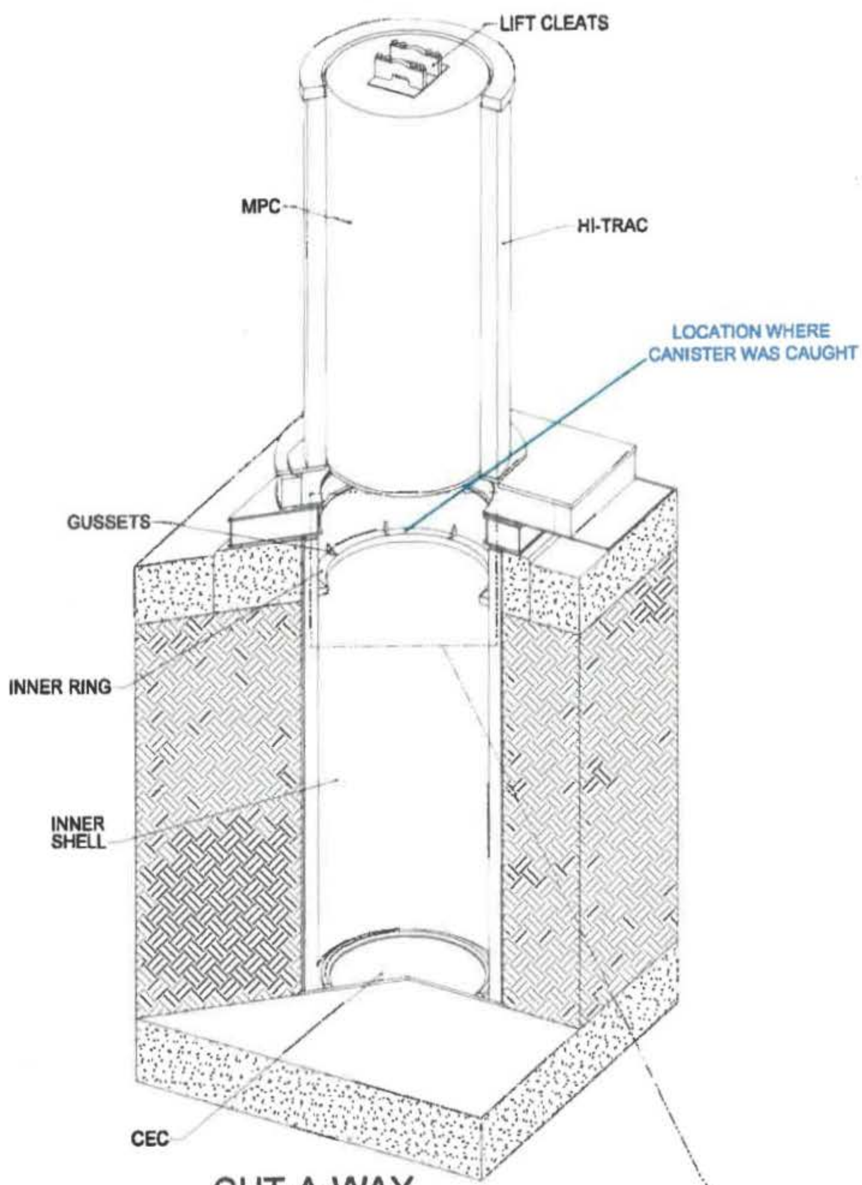
The contractor employee who raised his concerns over this event during the CEP meeting acted in accordance with our commitment to a Safety Conscious Work Environment, and I commend him for his willingness to speak up. I want to reassure you that SCE and its contractors have no tolerance for retaliation and welcome the feedback and concerns expressed by all employees. This is a fundamental part of the industry's nuclear safety culture.

SCE is committed to protecting the safety of the public and takes these incidents very seriously as it progresses through the decommissioning process. I will provide you further updates as we complete our actions.

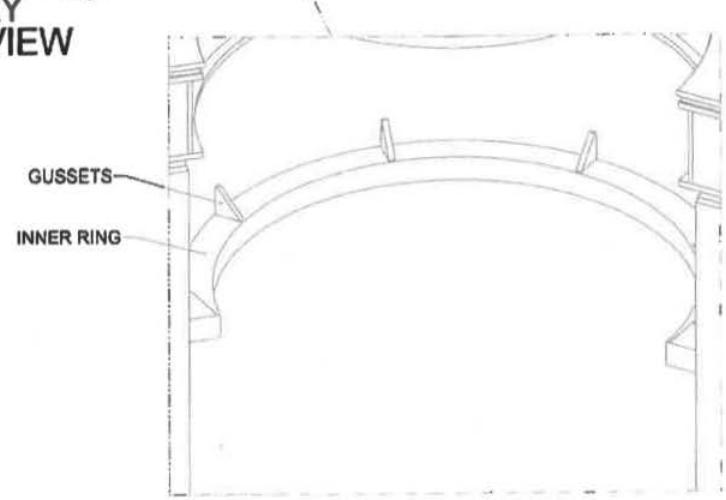
Sincerely,

ACM/jm

Attachment: SONGS UMAX Isometric Diagram



CUT-A-WAY ISOMETRIC VIEW



DETAIL VIEW

Union of Concerned Scientists

Dry Storage Issue at San Onofre

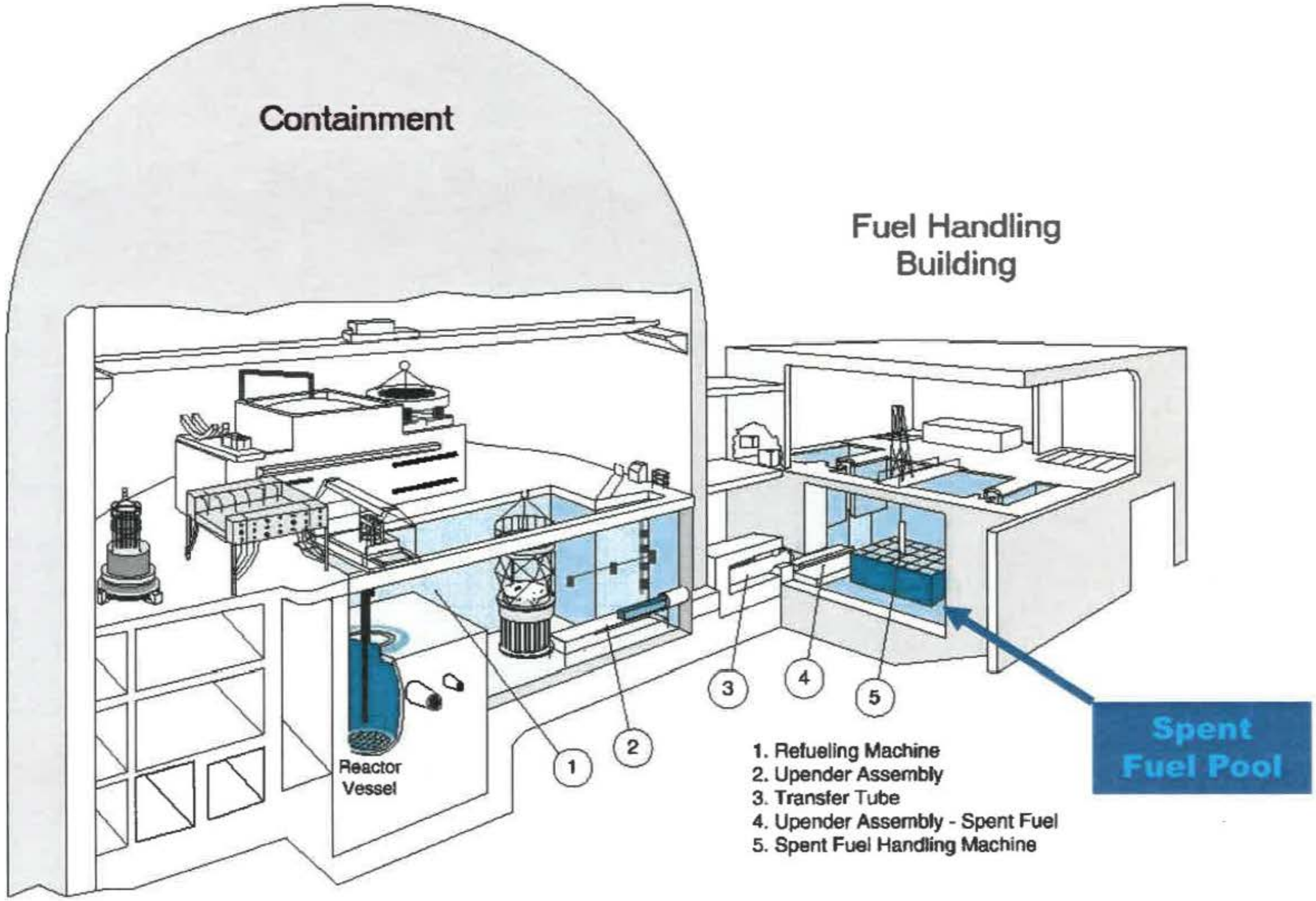
David Lochbaum
Director, Nuclear Safety Project
dlochbaum@ucsusa.org
www.ucsusa.org

August 2018

Top Line

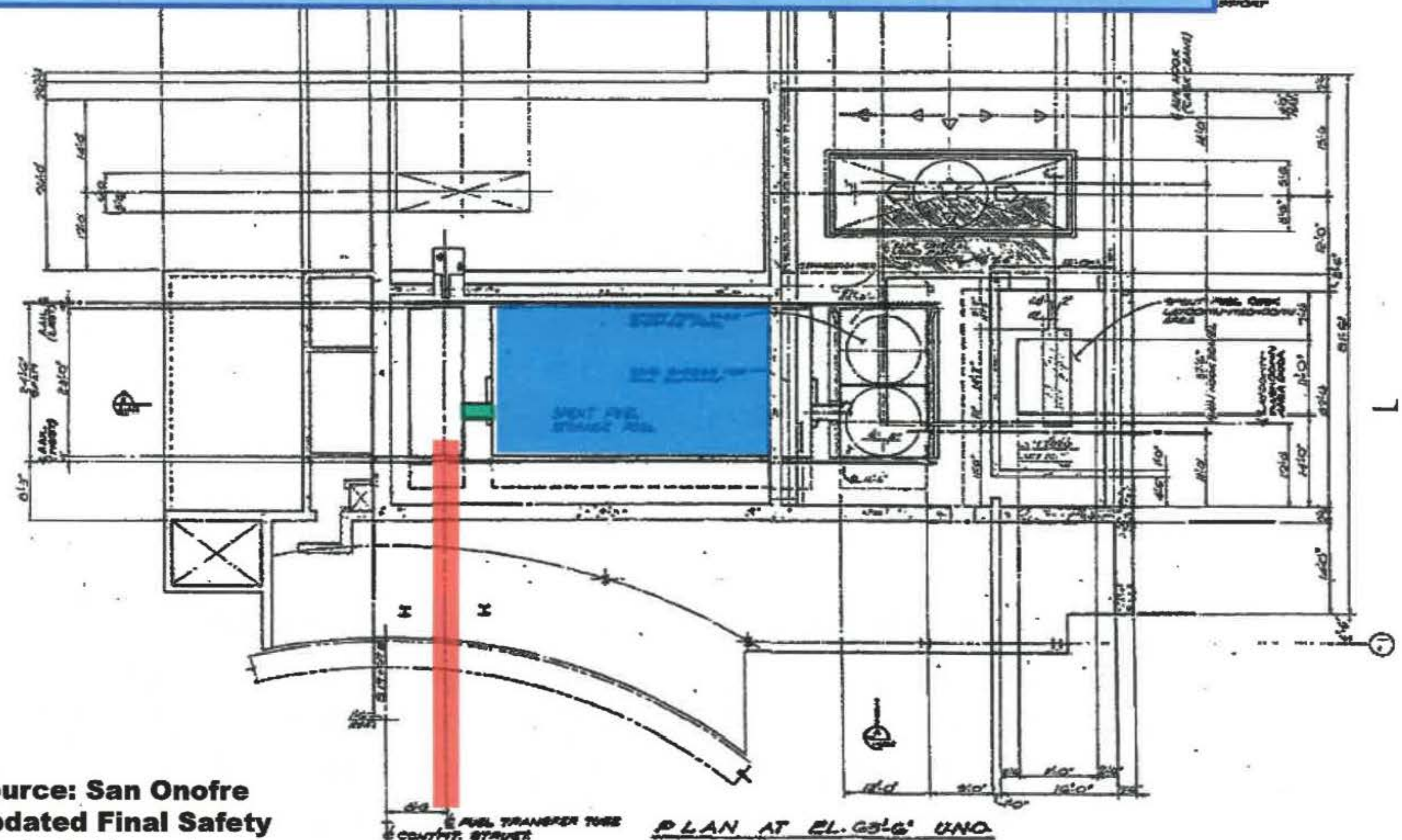
During the August 9, 2018, Community Engagement Panel meeting, a worker revealed that a spent fuel canister could have been dropped on August 3rd due to poor performance by two workers.

Background



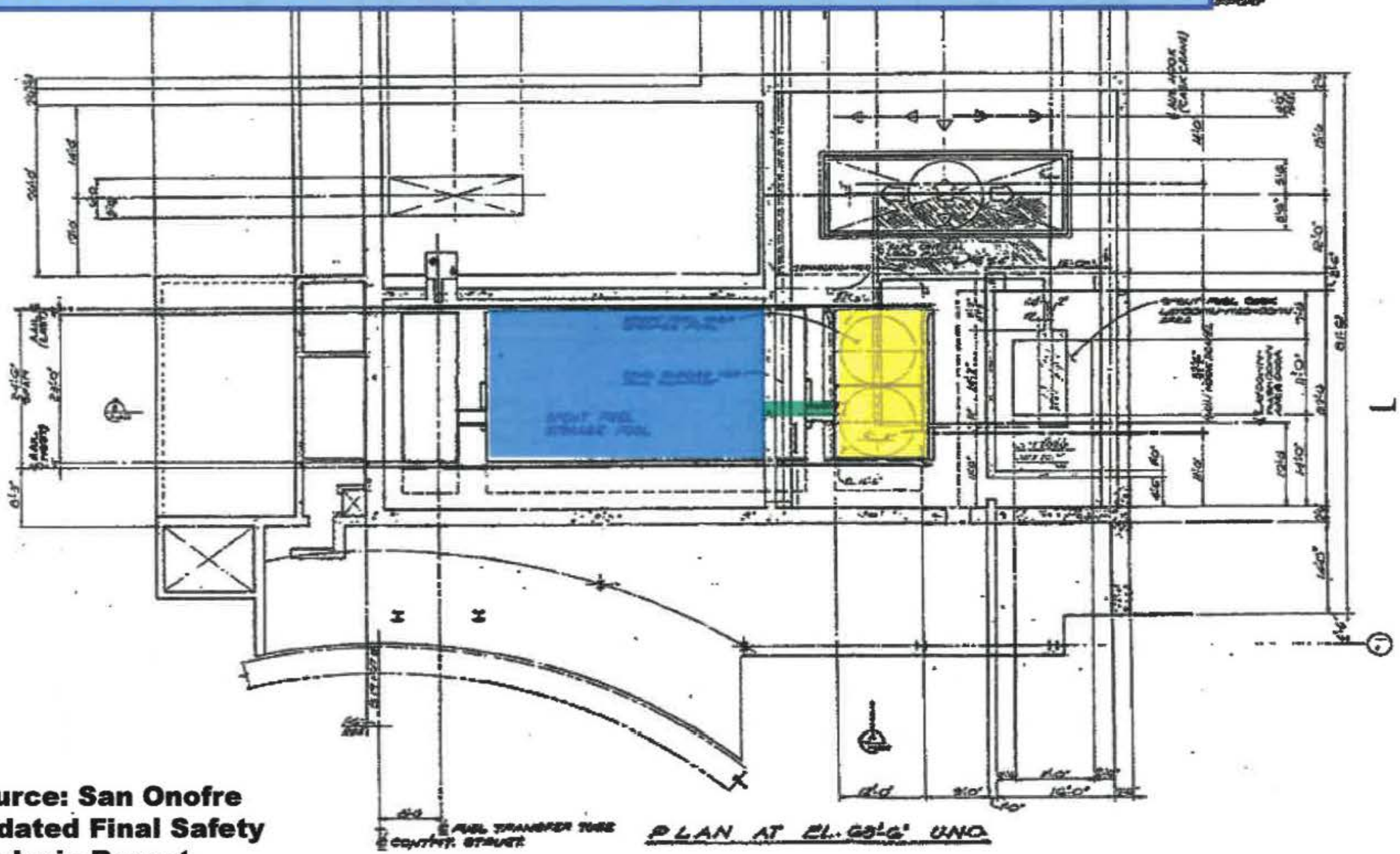
Irradiated fuel was transferred from the reactor vessel (left) inside Containment through the horizontal transfer tube (3) to the Fuel Handling Building where it was placed in storage racks within the Spent Fuel Pool.

Looking down at the Fuel Handling Building: Irradiated fuel moved through the horizontal transfer tube (red) into the Upender region of the Spent Fuel Pool (blue). The Upender rotated the irradiated fuel to the vertical position so the fuel handling platform could transport it underwater through a channel (green) into a rack in the Spent Fuel Pool.



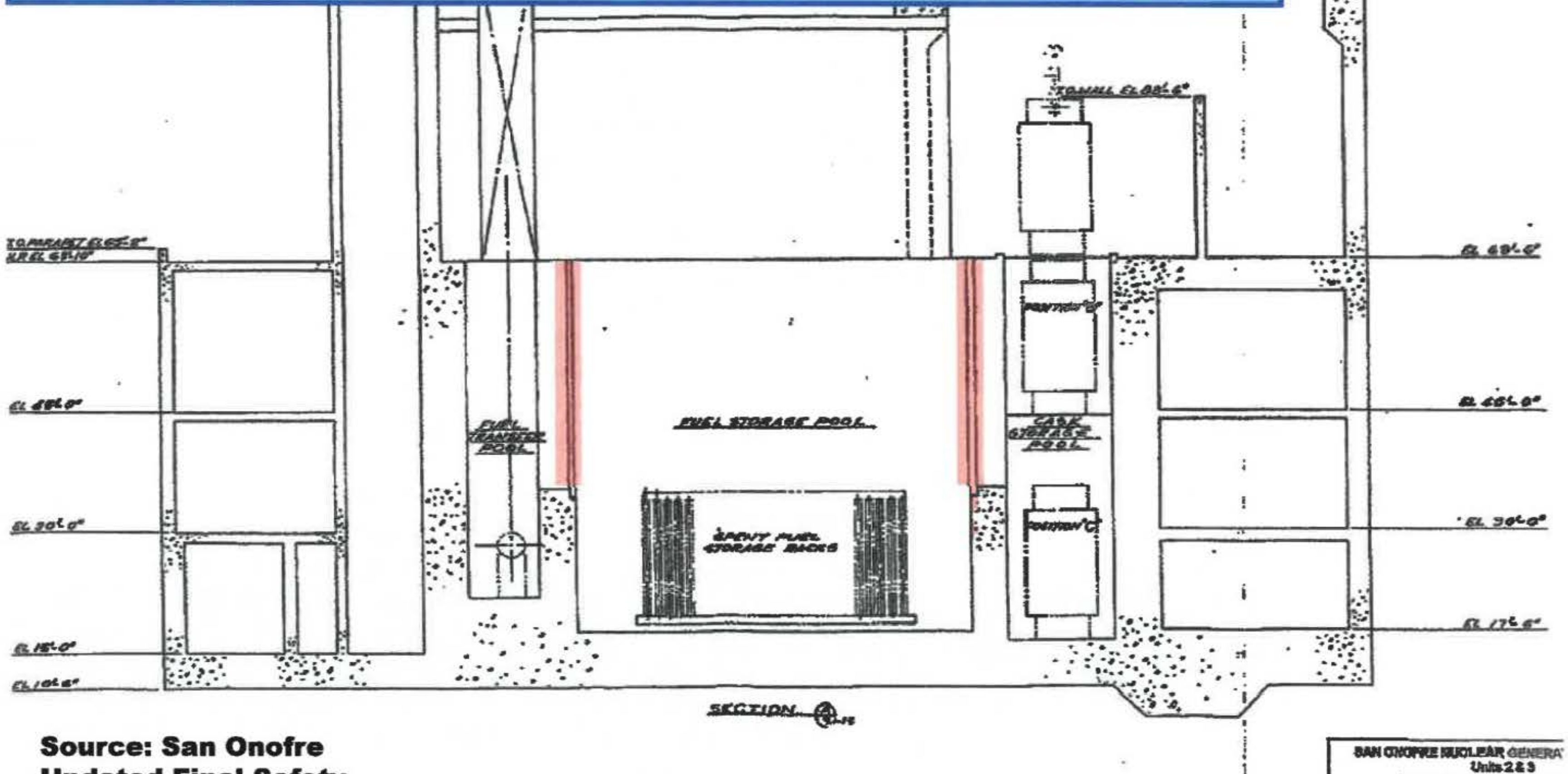
Source: San Onofre Updated Final Safety Analysis Report

Looking down at the Fuel Handling Building: Irradiated fuel is moved through another channel (green) into the Spent Fuel Cask Storage Pool (yellow) where it is placed within a Multi-Purpose Canister (MPC). The two circles within the Spent Fuel Cask Storage Pool represent two different positions for the MPCs within the Spent Fuel Cask Storage Pool.



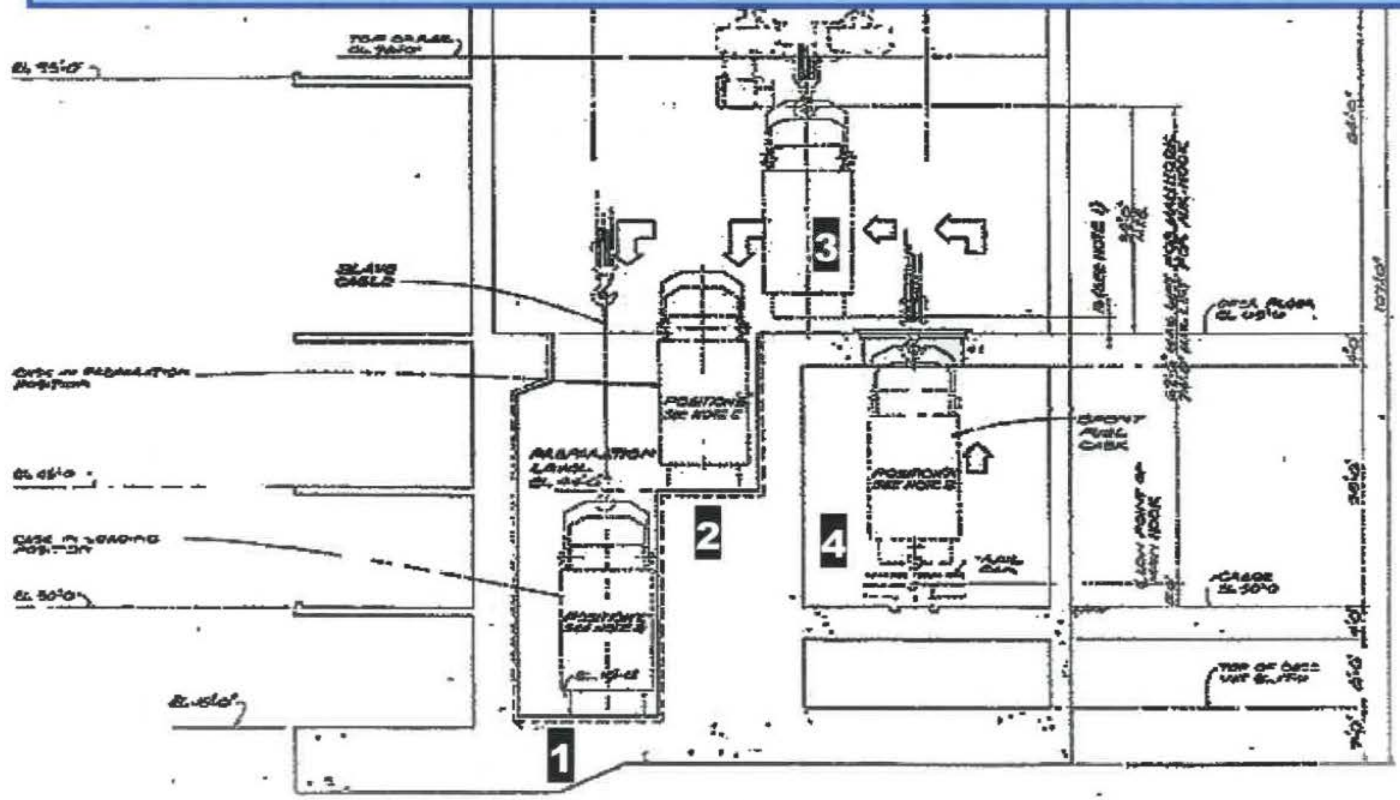
Source: San Onofre Updated Final Safety Analysis Report

Looking at the Fuel Handling Building profile: The Upender region is on the left side, the Spent Fuel Pool in the center, and the Spent Fuel Cask Storage Pool on the right. These water-filled regions are connected by channels. Gates (red) are placed in the channels when transfers are not taking place to prevent leakage from the Upender region or Spent Fuel Cask Storage Pool from draining the Spent Fuel Pool.



Source: San Onofre Updated Final Safety Analysis Report

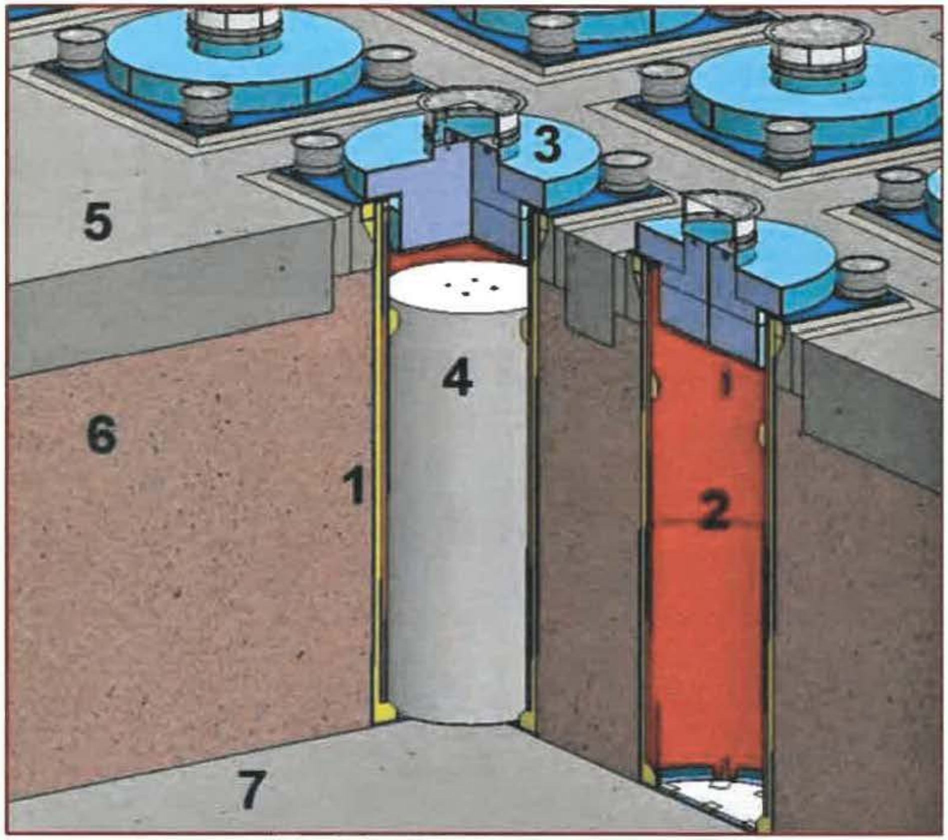
Looking at the Fuel Handling Building profile: The Spent Fuel Cask Storage Pool has two elevations. An MPC is placed in the lower elevation (1) to be loaded with irradiated fuel. An MPC is lifted to the "step" (2)to secure its lid. The MPC is then lifted to the refueling floor (3). The MPC is lowered to the ground-level truck bay (4) for transport to the onsite storage pad.



Source: San Onofre Updated Final Safety Analysis Report

The storage pad, or Independent Spent Fuel Storage Installation, is located north of the plant. The spent fuel for Unit 1 is housed in horizontal vaults (1). The MPC containing spent fuel for Units 2 and 3 are being placed in underground vaults (2) (each white circle marks an MPC storage location.)

Source: SCE Slides
November 2, 2017

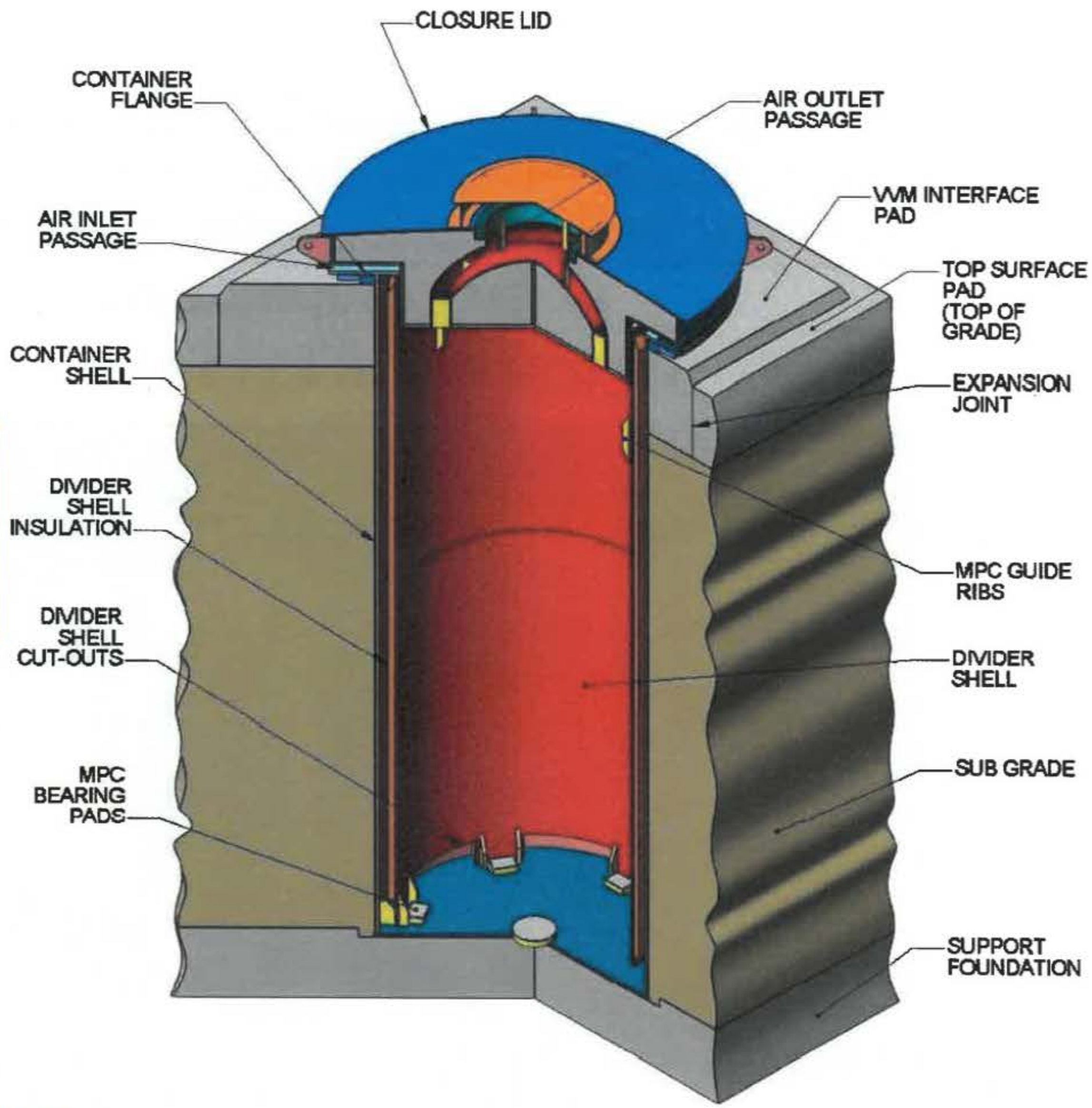


#	Component
1	Cavity Enclosure Container (CEC)
2	Divider Shell
3	Closure Lid
4	MPC-37 Multi-Purpose Canister
5	ISFSI Pad
6	Self-Hardening Engineered Subgrade (SES)
7	Support Foundation Pad (SFP)

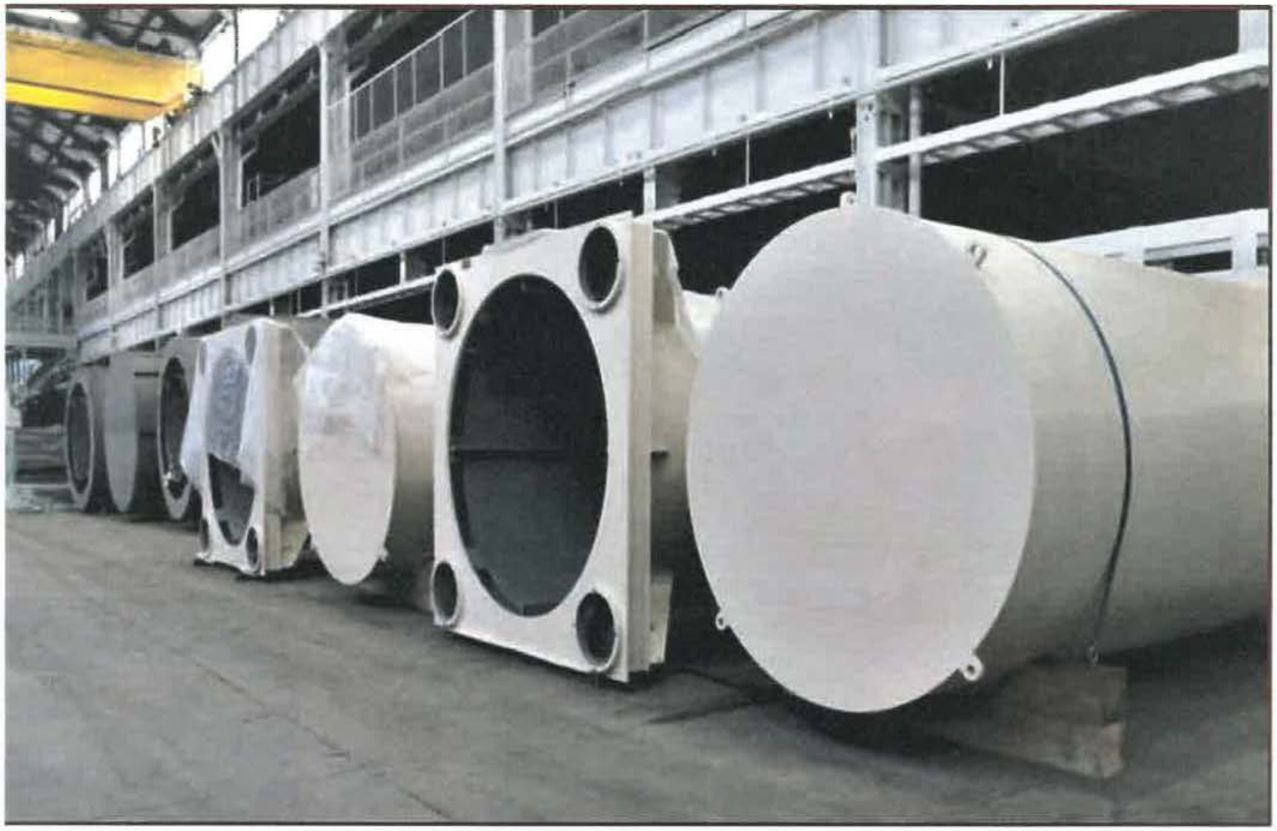
Cross-section view of the underground storage area: MPCs (4) are lowered into metal Cavity Enclosure Containers (1) solidly placed in the concrete block (6). The Closure Lid (3) is placed on the Cavity Enclosure Container.

Source: Holtec International

Cross-section view of a single underground storage unit before an MPC is placed in it.



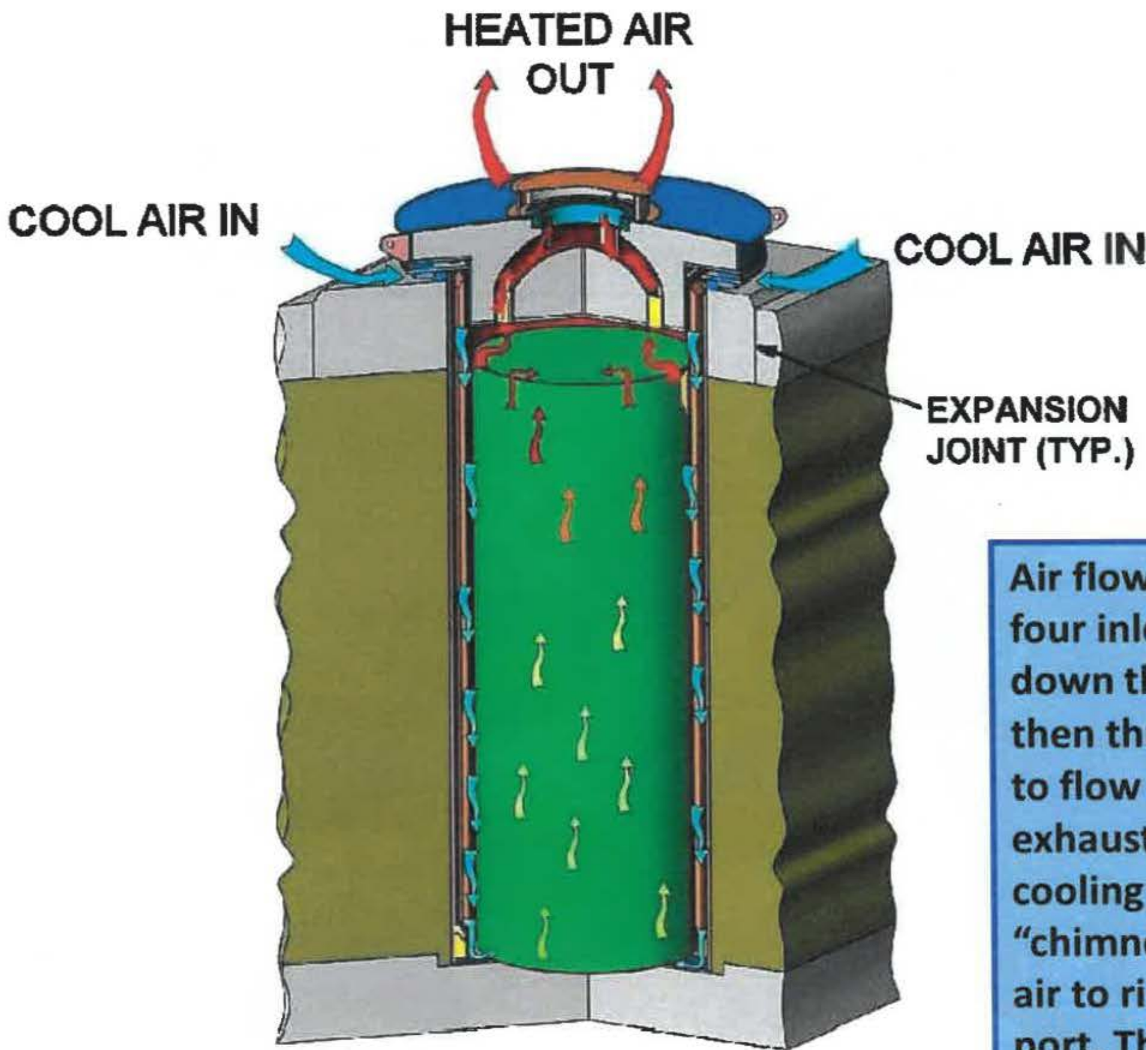
Source: Holtec International



Fabricated CECs at the HOLTEC Manufacturing Division

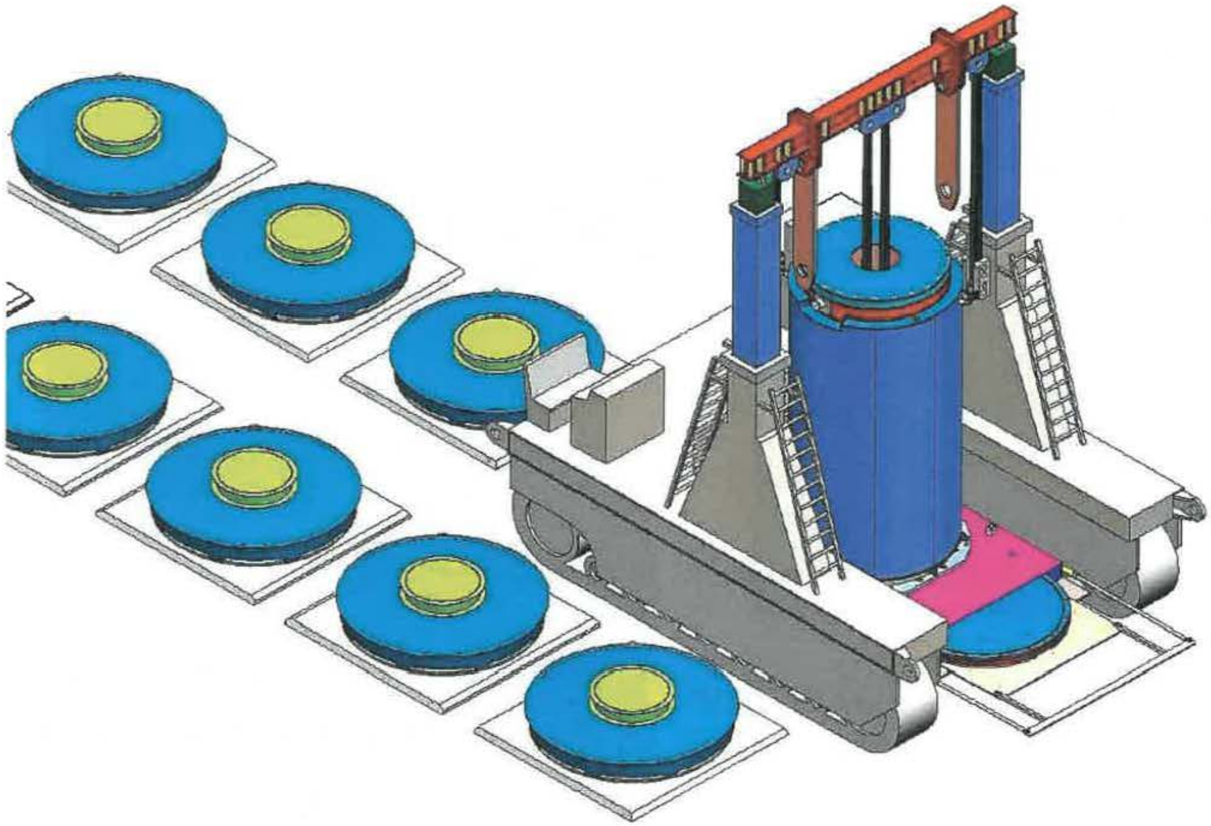
Row of Cavity Enclosure Containers (CECs). The CEC on the right has its bottom end facing the camera. The next CEC has its top end showing. The four openings on the corners allow cooling air to flow into the unit.

Source: Holtec International



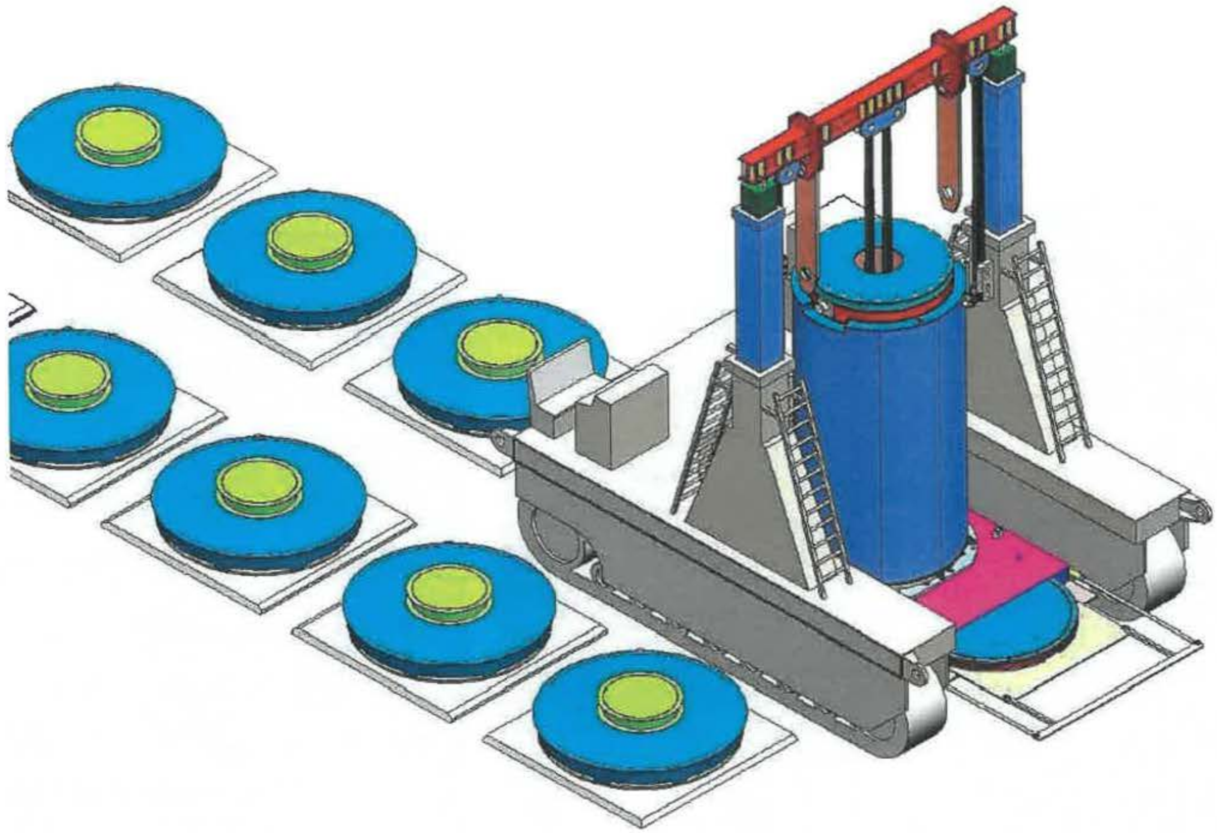
Source: Holtec International

Air flows into the unit through the four inlets in the container flange, down the annulus region and then through ports at the bottom to flow upward and out the exhaust port. This is passive cooling through convection. The "chimney effect" causes warmed air to rise and leave the exhaust port. The leaving warm air pulls cool air in through the four inlets.



A loaded MPC weighs about 45 tons. A special transport rig is used to move the loaded MPC from the Fuel Handling Building to the Independent Spent Fuel Storage Installation. This rig is used to lower the MPC into the Cavity Enclosure Container.

Source: Holtec International



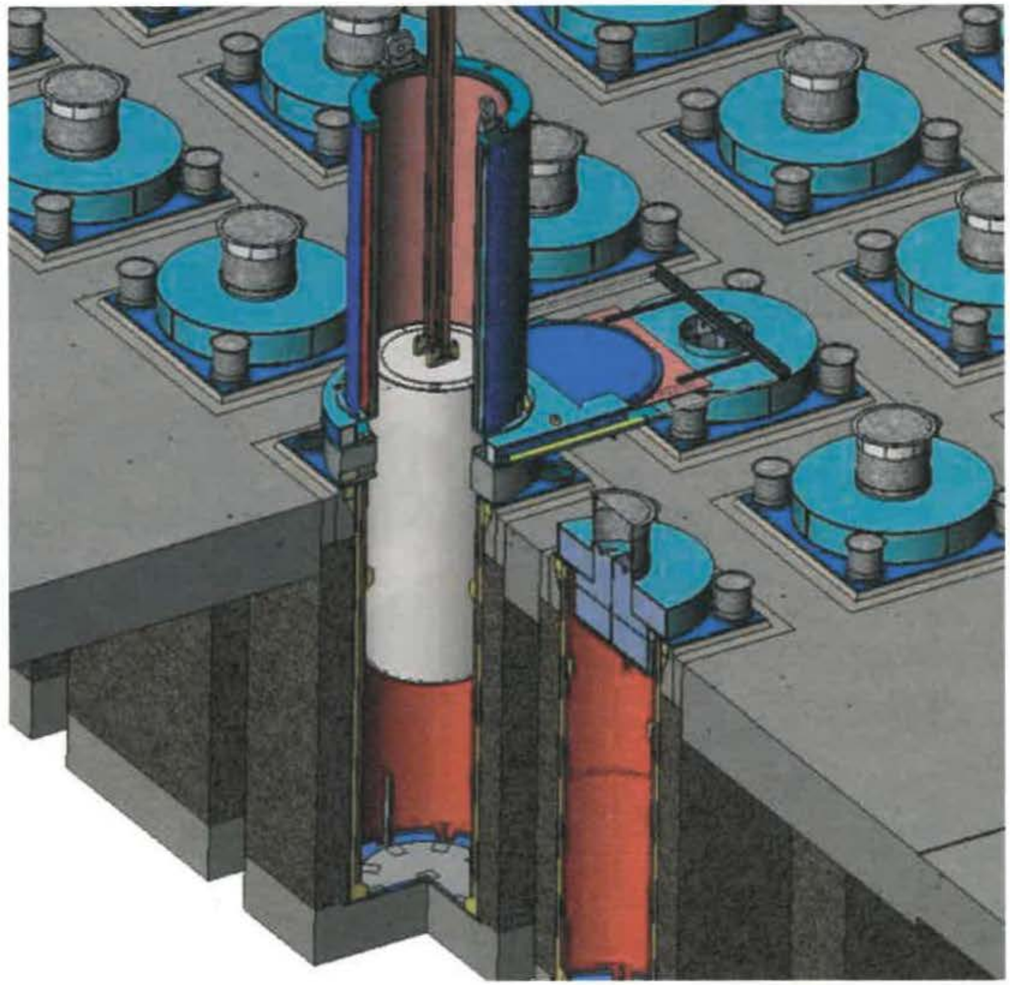
The MPC contains highly radioactive spent fuel. The Cavity Enclosure Containers and concrete vaults shield workers and the environment. During transport, the MPC is within a transport sleeve that shields workers from radioactive emissions. The red top of an MPC and its blue closure lid are peeking out from the top of a purple transport sleeve.

S

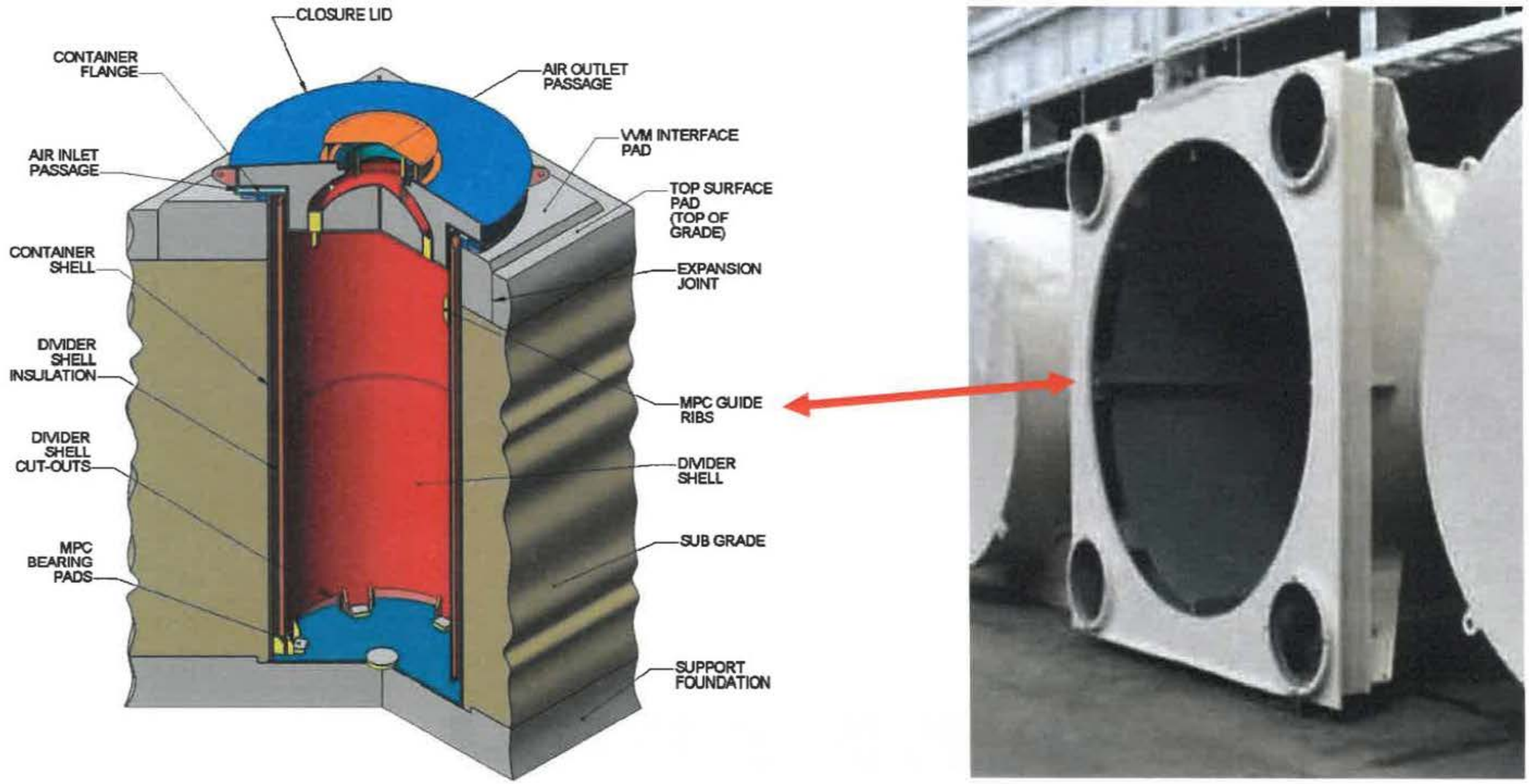
The special transport rig is "invisible" in this graphic to show an MPC being lowered into a Cavity Enclosure Container (CEC).

At this point, the MPC is more than halfway out of the transport sleeve into the CEC.

It takes about a minute for an MPC to be fully lowered into a CEC.



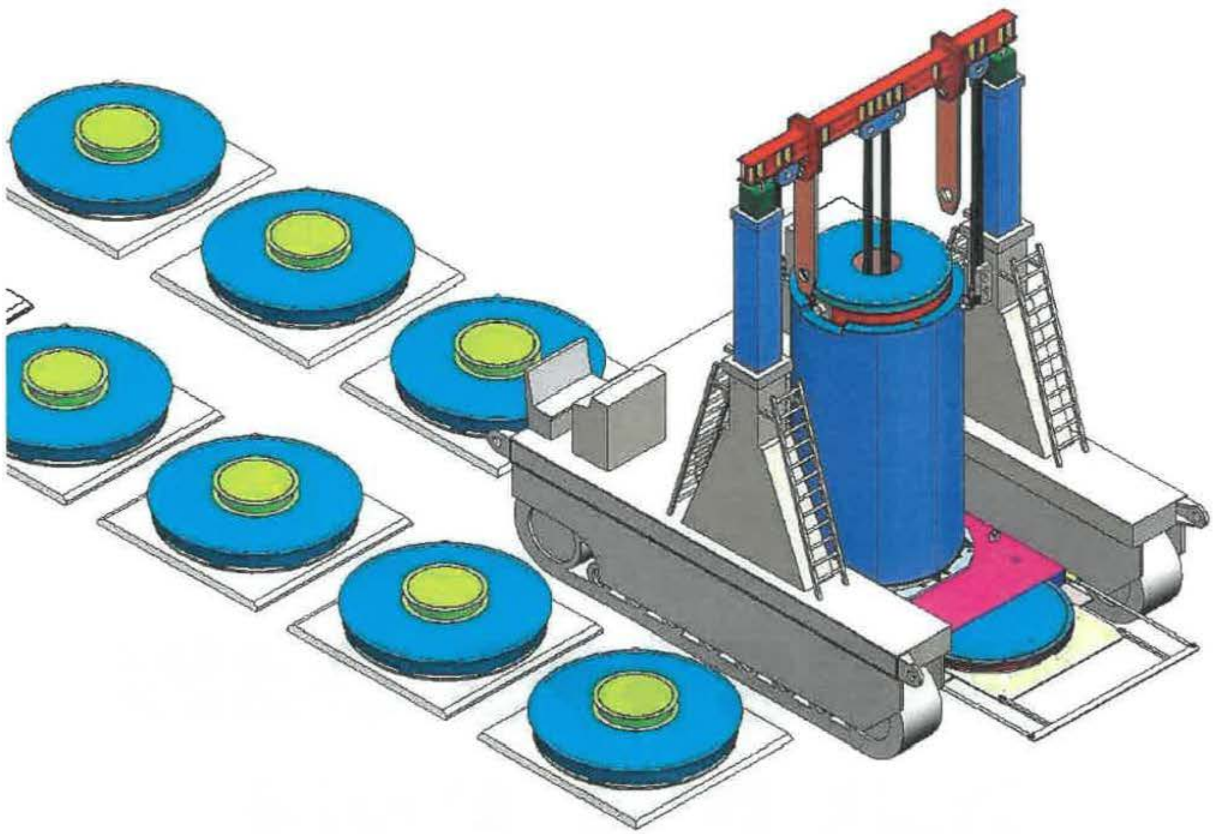
Source: SCE Slides
November 2, 2017



The MPC fits into the CEC like a hand in glove, except in this case the glove is rigidly made from steel. Guide ribs help align the MPC over the CEC and guide its lowering into place.

Source: Holtec International

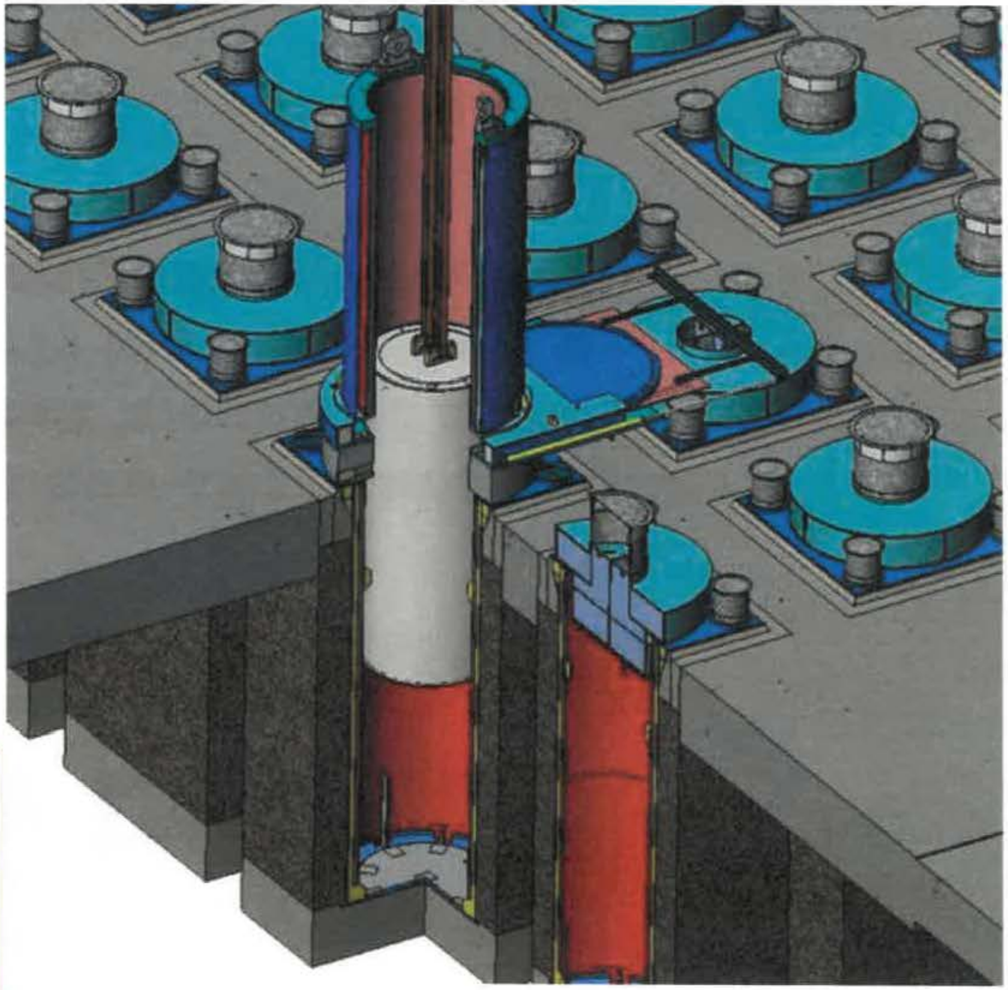
Foreground



On August 3, 2018, an MPC was not properly aligned for placement into the CEC. As workers manipulated controls on the special transport rig to lower the MPC, the rigging lowered. But the MPC got stuck and stopped moving. During the Community Engagement Panel meeting on August 9, 2018, a worker stated that the rigging was lowered another 18 feet before the MPC's non-movement was noticed.

Source: Holtec International

How Did the MPC Get Stuck?



The bottom end of the MPC got caught on an edge with the CEC instead of sliding smoothing into it. Consequently, the rigging kept lowering but the stuck MPC did not.

Source: SCE Slides
November 2, 2017

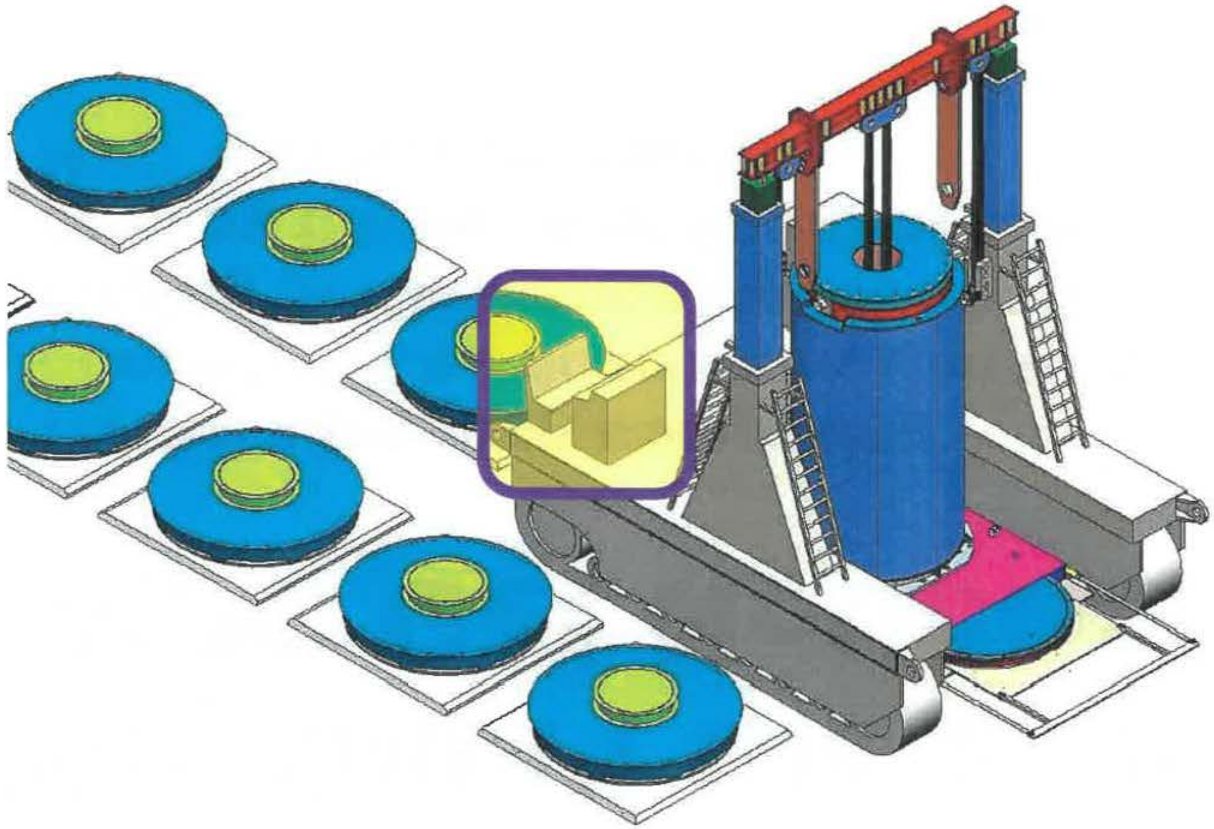
How Did the MPC Get Stuck?

Not exactly a case of square peg in a round hole, but a case of a round peg not properly inserting into a round hole of only slightly larger diameter.

Why Didn't the Stuck MPC Get Noticed?

Two workers were assigned to monitor the MPC being lowered into the CEC. The worker at the controls (left) could toggle between indications of the MPC movement and the rigging alignment. Another worker was tasked with visually monitoring the top of the MPC as it was lowered into the CEC.

Source: Holtec International



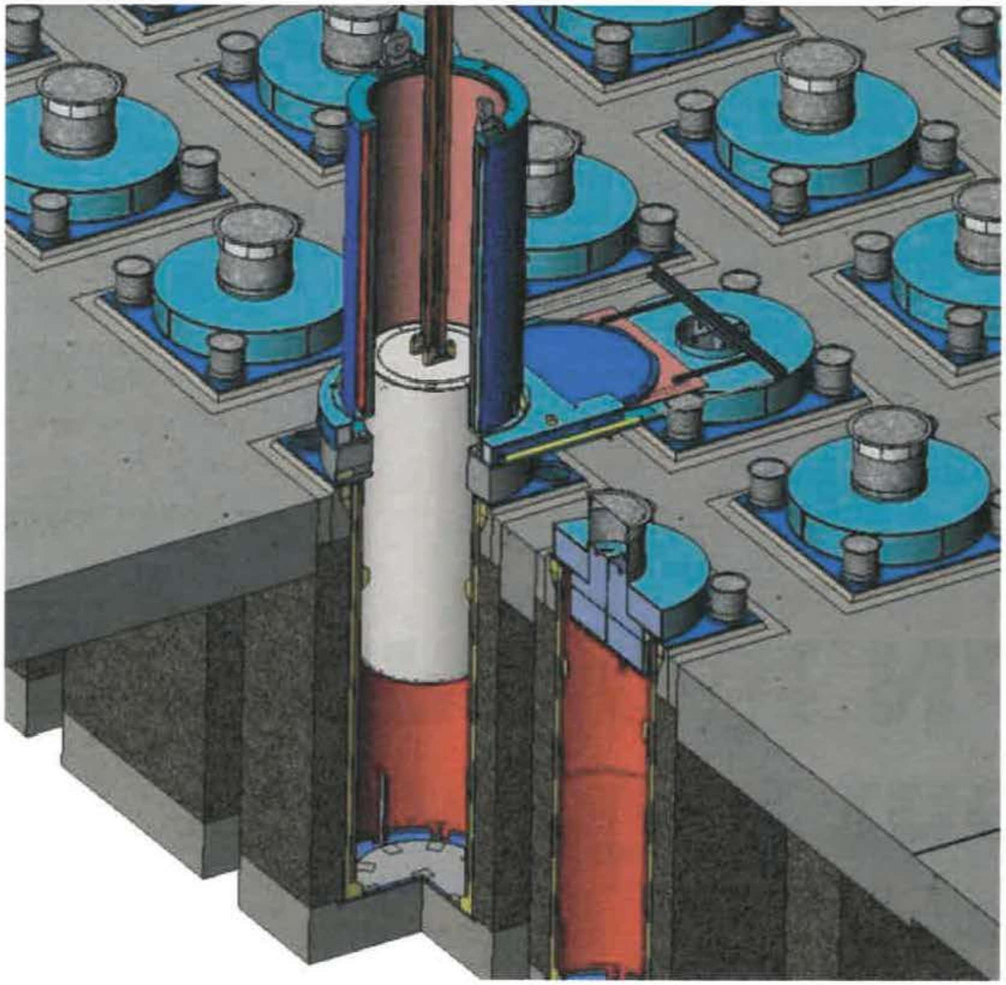
Once the MPC began moving, the "eyeball" worker retreated to a safer distance to reduce radiation dose. The worker at the controls fixated on ensuring both sides of the rigging remained level. After about 30 seconds, the worker saw that the MPC was not moving, but mistakenly thought the indication meant it had reached the bottom of the CEC. It had not.

Source: [Holtec International]

Why Didn't the Stuck MPC Get Noticed?

Workers juggling competing concerns (i.e., dose reduction and rigging performance) let the ball drop by failing to notice that the MPC was <u>not</u> dropping.

How Did the Stuck MPC Get Noticed?



A Radiation Protection technician surveyed the Cavity Enclosure Container and detected radiation levels higher than expected for a properly loaded MPC.

A worked looked into the transport sleeve and observed the top of the MPC at a higher level than desired.

About 20 minutes after being noticed in the wrong position, the MPC was unstuck and lowered fully into the CEC.

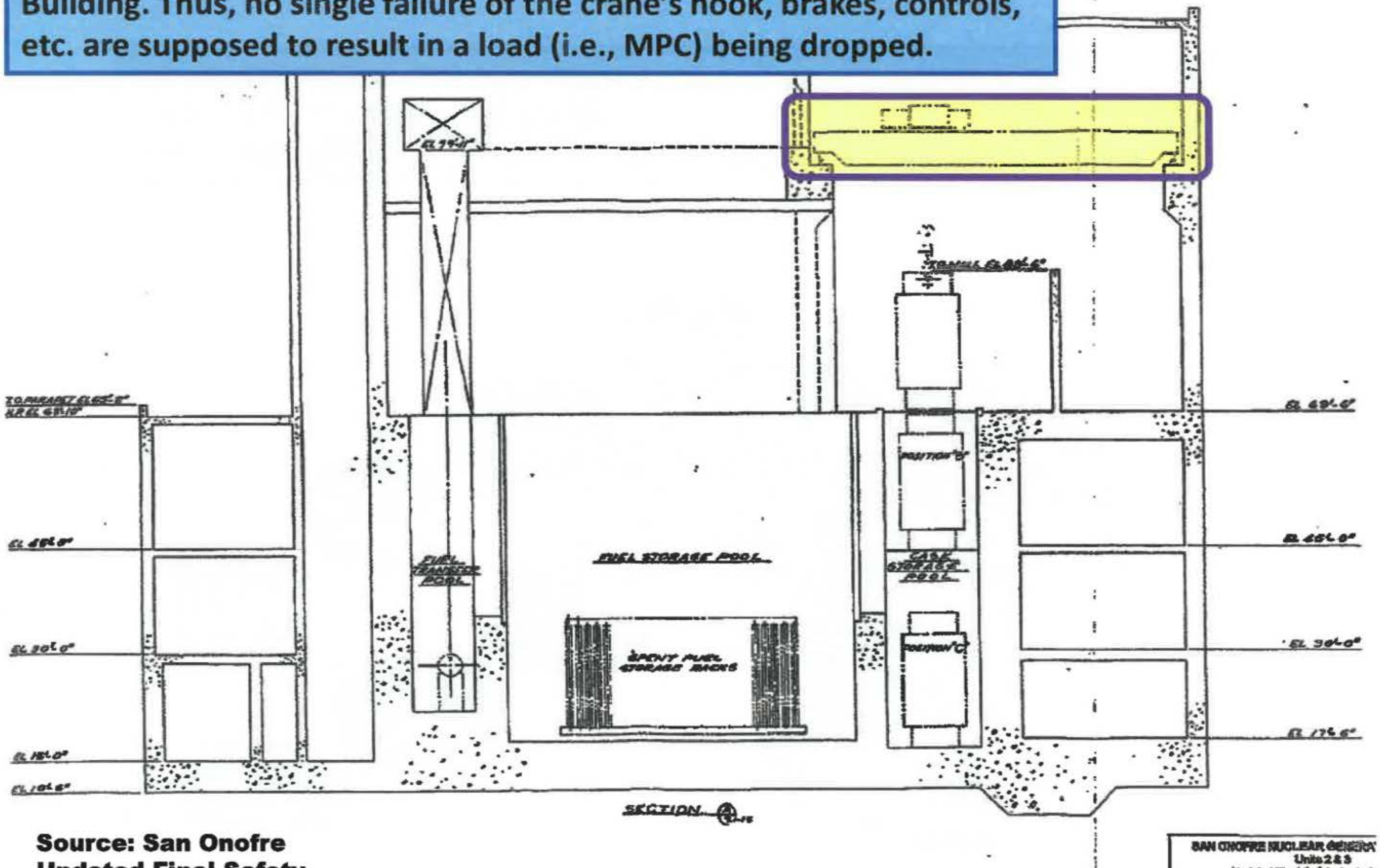
Source: SCE Slides
November 2, 2017

How Did the Stuck MPC Get Noticed?

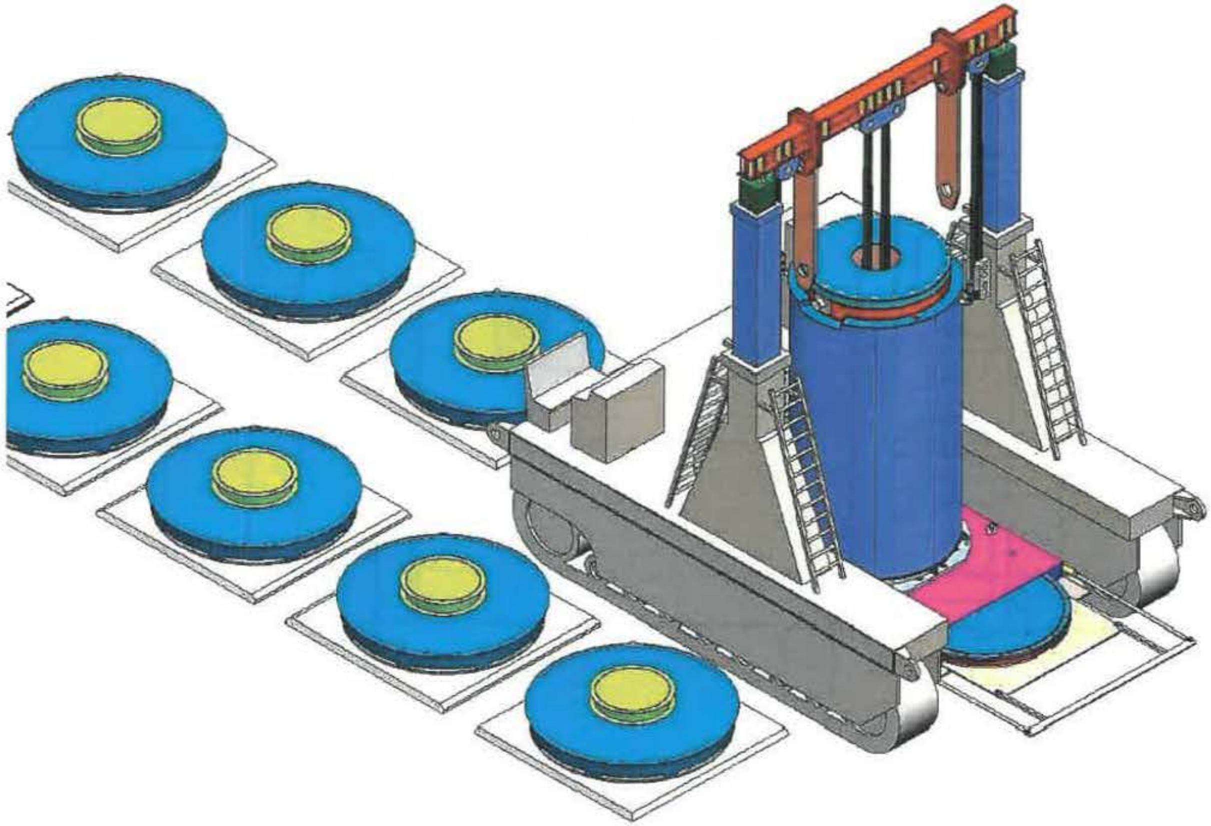
By procedure, Radiation Protection surveyed the area after the MPC was thought to have been placed in the CEC. Unexpectedly high radiation readings lead to the stuck MPC being noticed.

Could the MPC have been dropped?

San Onofre uses a single-failure proof crane in the Fuel Handling Building. Thus, no single failure of the crane's hook, brakes, controls, etc. are supposed to result in a load (i.e., MPC) being dropped.



Source: San Onofre Updated Final Safety Analysis Report



The special transport rig can only lift a MPC a few feet off the ground and is also single-failure proof. The farthest that a rig could conceivably drop the MPC would be less than 30 feet into a Cavity Enclosure Container.

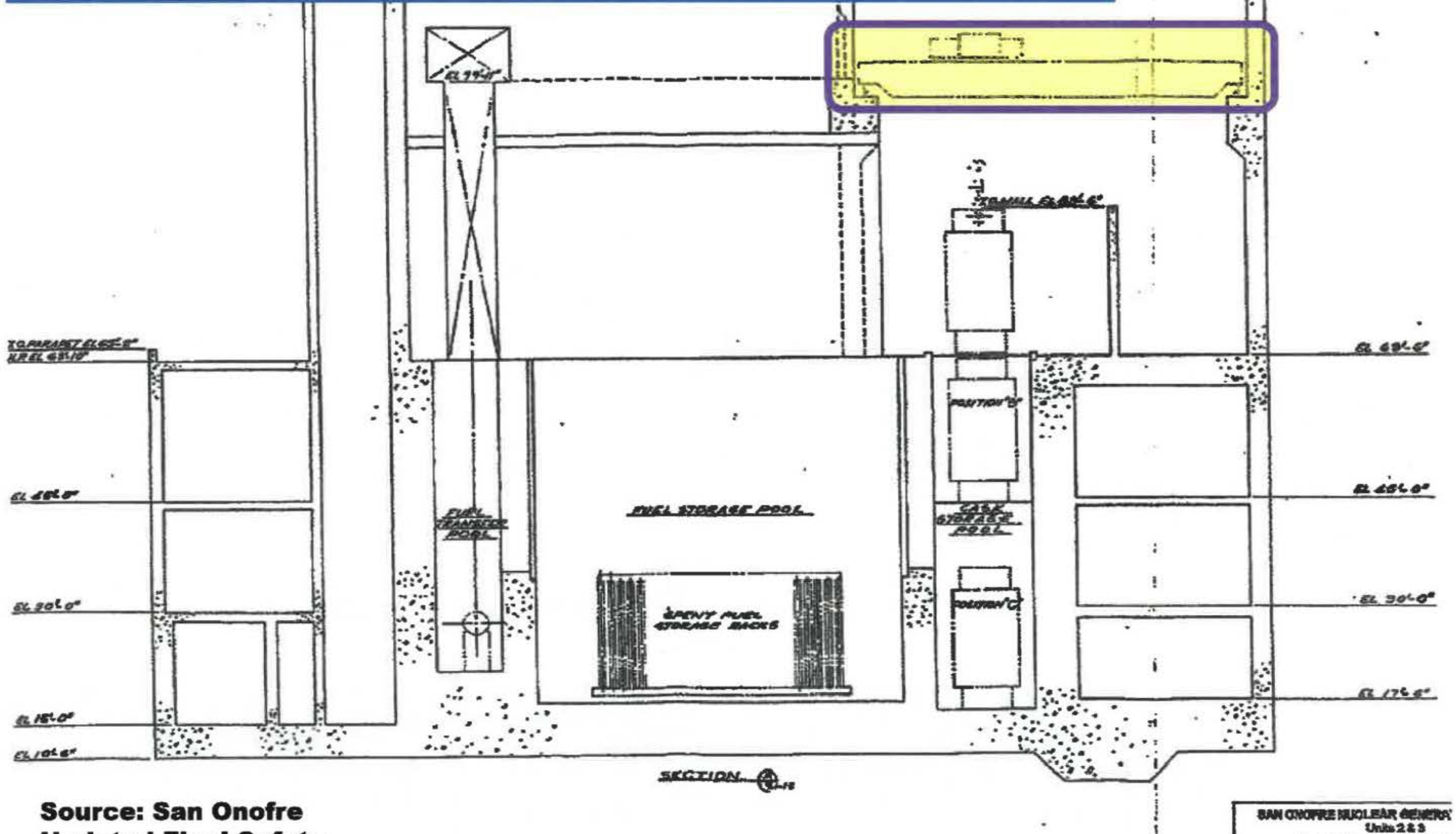
Source: Holtec International

Could the MPC have been dropped?

An MPC is not likely to be drop in the Fuel Handling Building due to its single-failure proof crane. An MPC cannot be dropped over 30 feet from the special transport rig.

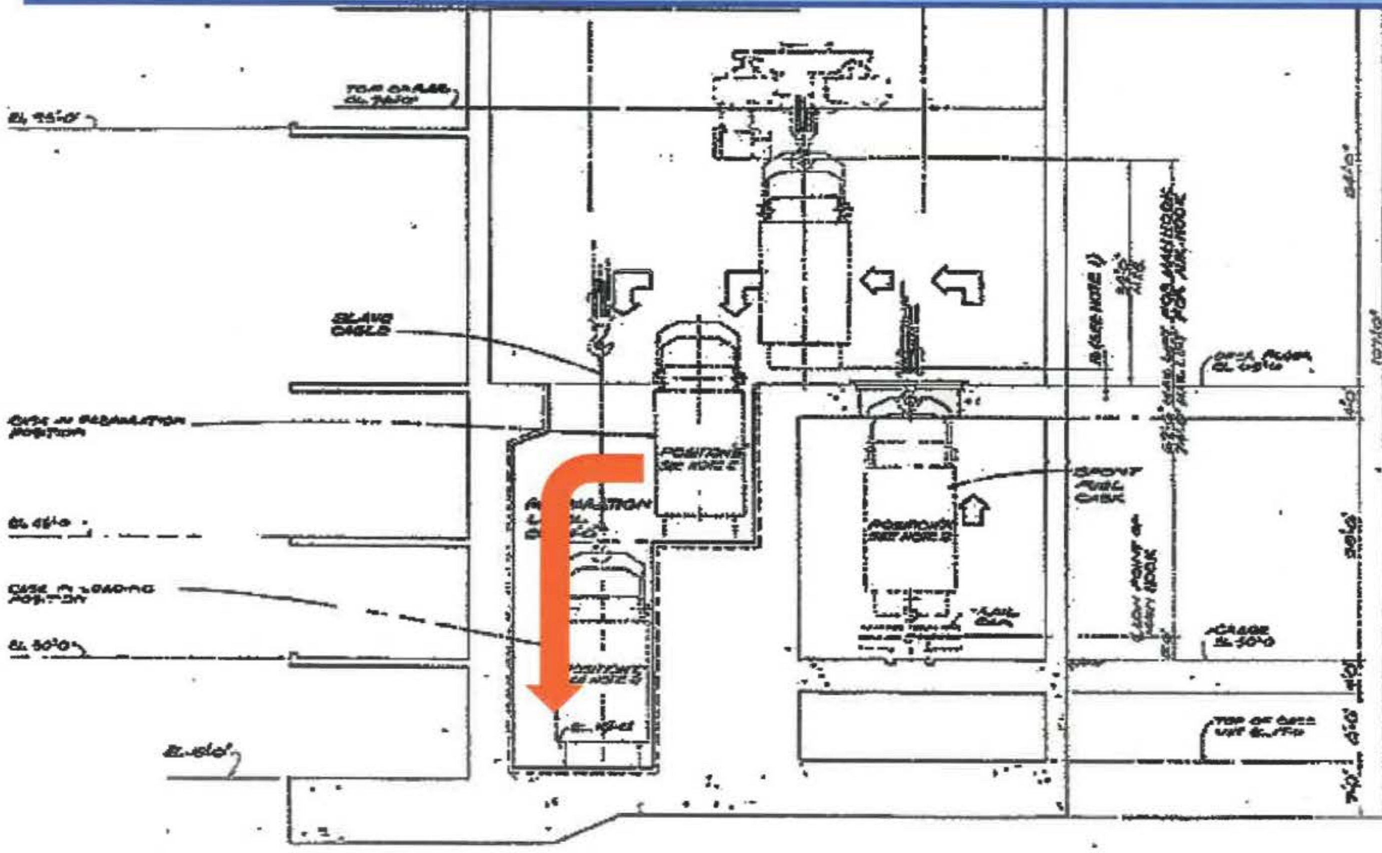
What if the MPC had been dropped?

An MPC cannot be moved over the spent fuel pool. The overhead crane cannot reach that area within the Fuel Handling Building. So, a MPC drop into the spent fuel pool was ruled out at San Onofre.



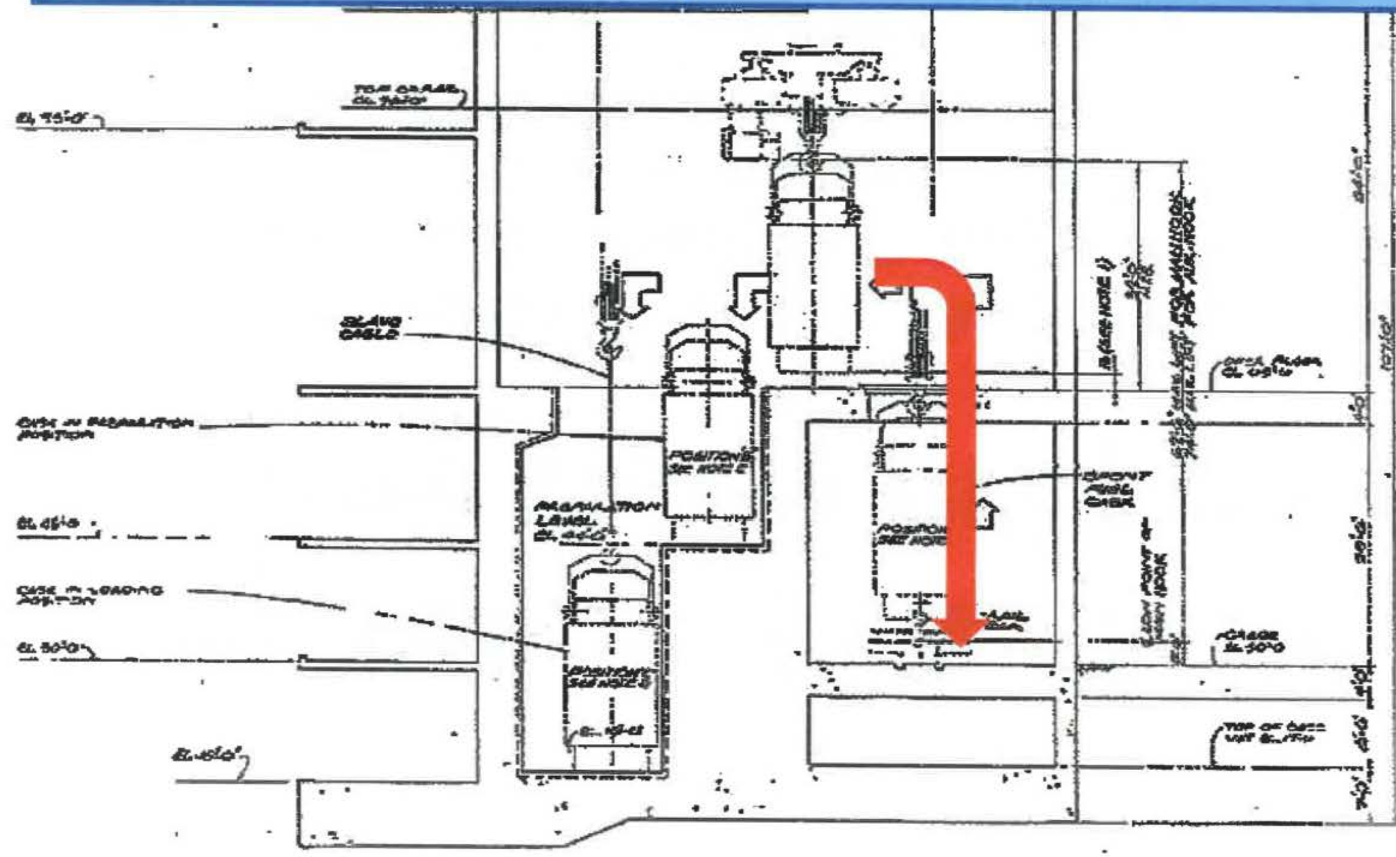
Source: San Onofre Updated Final Safety Analysis Report

An earthquake could shake an MPC off the "step" in the Spent Fuel Cask Storage Pool. An analysis of a drop from the "step" concluded that irradiated fuel inside the MPC might be damaged, but the MPC would remain intact. No radioactivity would be released into the Fuel Handling Building.



Source: San Onofre Updated Final Safety Analysis Report

The 30-foot drop of an MPC onto a flat surface (not likely to still be flat after impact from the 45-ton MPC) was also evaluated. Again, irradiated fuel inside the MPC might be damaged, but the MPC would remain intact to prevent any release of radioactivity.



Source: San Onofre Updated Final Safety Analysis Report

What if the MPC had been dropped?

Evaluations for San Onofre indicate that a dropped MPC might result in damage to irradiated fuel inside, but the MPC would remain intact to prevent the release of radioactivity.

Bottom Line

- There were redundant measures in place to ensure that the MPC was properly lowered into the CEC.
- Both measures failed for different reasons.
- The MPC could have fallen about 18 feet.
- The fall most likely would not have breached the MPC and released radioactivity.

Leticia 89216

DOCUMENTS REQUESTED FOR THE SEPTEMBER 10 – 14, 2018 INSPECTION

Rogelio –

The following is a list of items requested by the NRC to support the September 2018 Special Inspection at SONGS.

Wifi DA-NRC

Inspection Procedures to be used:

1. IP 93812, Special Inspection

Inspectors:

1. Eric Simpson, Region IV, Lead Inspector
2. Marlone Davis, Inspection and Operations Branch (HQ),
3. Chris Smith, Region IV
4. Janine Katanic, Region IV, Branch Chief
5. Troy Pruett, Region IV, Division Director
6. Patty Silva, Inspection and Operations Branch (HQ), Branch Chief

	Document	Responsible	Comments / Format (pdf or Hard Copy)	Due Date/Status
1	A list of the names and titles of all individuals (SCE, Holtec, and other contractors or individuals that may have been present) that were on shift or were involved with the August 3 downloading "near miss" event.	(b)(7)(C)		Complete
2A	Southern California Edison's Root Cause Evaluation of the "near miss" event at SONGS, OR		Use this to track the SCE ACE.	To Be Provided
2B	SCE's acceptance document of Holtec's Root Cause Evaluation and list of comments provided for previous drafts.			To Be Provided
3	Holtec International's Root Cause Evaluation of the "near miss" event at SONGS.			To Be Provided
4	Original cask loading procedures in use on August 3, 2018– Outside Operations (400 series?), pre-incident.			Complete
4A	Provide a copy of the filled out procedure from August 3, 2018 used during the event.			Complete
5	Any revisions to Holtec's Cask Loading Procedures – Outside Operations post-event.		Will provide draft when available	9/19
5A	SCE's acceptance review of any revised Holtec procedures, per 10 CFR 72.48.		To be provided	9/19

6	**Copy of *new or revised* briefing materials, training materials, and attendance records of training for Holtec and SCE oversight staff related to Outside Operations.**			N/A
New 6A	Briefing and training materials	(b)(7)(C)		Complete
6B	Attendance Records			Complete
7A	Holtec's Engineering Evaluation of the MPC canister involved in the "near miss" event, AND /OR		Section 4.3 of HI-2188261	Complete
7B	Holtec's Inspection Plan for the MPC canister involved in the "near miss" event.		Consideration being given to inspection as part of inspection and maintenance program.	N/A
8	**Holtec's Engineering Evaluation of the UMAX ISFSI VVM divider shell damage** **OR** **Holtec's Inspection Plan for examining VVM divider shell damaged during the vent.**			Complete
8A	Include pictures and documentation of examinations already performed			Complete
9	SCE Procedure that discusses NRC Reportability Requirements for events during Dry Cask Storage Operations.			Complete
10	Radiation Protection procedures for downloading operations and Outside Operations.			Complete
11A	Copy of the design drawing for the *SONGS UMAX Version B divider shell* AND			Complete

11B	A copy of the design drawing for the *UMAX Version A divider shell.*	(b)(7)(C) [redacted]		Complete
12	Copy of the procedure or program that describes the training requirements for Holtec Cask Loading Supervisors	[redacted]	HSP-34, Section 7.5	Complete
13	**Provide *unrevised pre-event* Cask Loading Supervisors Training Materials for Outside Operations for the following areas:**	N/A		N/A
13A	On the Job Training requirements	(b)(7)(C) [redacted]	There are no specific OJT requirements for Supervisors, unless performed to become a technician.	N/A
13B	Training Procedures	[redacted]	See Item 12, Section 7.5	N/A
13C	Training Modules	[redacted]		Complete
13D	Training Content	[redacted]	See Item 13c LP-HOL-07 which includes two presentations on Supervisor requirements and SOER 10-2.	N/A
13E	Procedure or documentation that shows how Cask Loading Supervisor qualifications are verified and kept up to date.	[redacted]		9/5
14	Procedures or documents that describe the training requirements for Holtec VCT operators at SONGS.	[redacted]	See Item 12, HSP-34, Section 7.4.3.2	Complete
15	**Provide *unrevised pre-event* VCT Operator Training Materials for the following areas:**	N/A		N/A
15A	On the Job Training required	(b)(7)(C) [redacted]		Complete

(b)(7)(C)

86745

15B	Training Procedures	(b)(7)(C)	See Item 12, HSP-34, Section 7.4.3.2	N/A
15C	Training Modules			Complete
15D	Training Content			Complete
15E	Procedures or documentation that verifies VCT operator qualifications are maintained up to date.			Complete
16	Procedures or documents that show the training requirements for SCE oversight of Holtec outside operations at SONGS			Complete
17	**Provide *unrevised pre-event* SCE oversight training materials for Outside Operations for the following areas:**	N/A		N/A
17A	On the Job Training required	(b)(7)(C)		Complete (b)(7)(C)
17B	Training Procedures			Complete
17C	Training Modules	(b)(7)(C)		Complete
17D	Training Content			Complete
17E	Documents that track the SCE oversight qualifications are up to date			Complete
18	Procedure or documents that show the training requirements for Holtec spotters/riggers at SONGS		SSMMCL section SSMM-07 for riggers. Item 18.3, MNTTLMM, to be provided	One document to be provided
19	**Provide *unrevised pre-event* spotter/rigger training materials for Outside Operations:**	N/A		N/A

Still need

19A	On the Job Training required	(b)(7)(C)		To be provided
19B	Training Procedures			To be provided
19C	Training Modules			To be provided
19D	Training Content			To be provided
19E	Documents that track the Spotter/Rigger qualifications are maintained up to date			To be provided
20	Provide Holtec Drop Analysis for MPC-37 canister and MPC-32 canister.			MPC-32 - Complete MPC-37 – Complete
21	Provide Purchase Specification of Slings used for downloading MPC-37 at SONGS.			Complete
22	Provide a listing of Dry Fuel Storage related Holtec Field Condition Reports and SCE Action Requests written from January 2018 to present with a short description			FCRs – complete ARs - Complete
23	Copies of Training records for all members of loading crew (CLS, VCT operator, and riggers) involved in event, including those no longer working for Holtec or SCE.			Holtec – Complete SCE – Complete
24	VCT annual maintenance records.			Item 24.3 to be provided
25	VCT operational daily check record for August 3, 2018.			Complete
26	Latest annual sling inspection records.			Complete

27	**Most Recent ANSI N14.6 Test Records for Special Lifting Devices used Outside at SONGS (quarterly and annual):**	N/A		N/A
27A	MPC lift cleats	(b)(7)(C)		Complete
27B	HI-TRAC Lugs			Complete
27C	HI-TRAC lift links			Complete
28	Provide Southern California Edison's (SCE) policy regarding Safety Conscious Work Environment (SCWE).			Complete
29	Documentation of Holtec and SCE staffing requirements for MPC downloading operations.		Holtec briefing sheet Updated org charts	Complete

9/12/18
Silva

DOCUMENTS REQUESTED FOR THE SEPTEMBER 10 – 14, 2018 INSPECTION

The following is a list of items requested by the NRC to support the September 2018 Special Inspection at SONGS.

Inspection Procedures to be used:

1. IP 93812, Special Inspection

Inspectors:

1. Eric Simpson, Region IV, Lead Inspector
2. Marlone Davis, Inspection and Operations Branch (HQ),
3. Chris Smith, Region IV
4. Janine Katanic, Region IV, Branch Chief
5. Troy Pruett, Region IV, Division Director
6. Patty Silva, Inspection and Operations Branch (HQ), Branch Chief

	Document	Responsible	Comments / Format (pdf or Hard Copy)	Due Date/Status
1	A list of the names and titles of all individuals (SCE, Holtec, and other contractors or individuals that may have been present) that were on shift or were involved with the August 3 downloading "near miss" event.	(b)(7)(C)		Complete
2A	Southern California Edison's Root Cause Evaluation of the "near miss" event at SONGS, OR		Use this to track the SCE ACE.	To Be Provided
2B	SCE's acceptance document of Holtec's Root Cause Evaluation and list of comments provided for previous drafts.			To Be Provided
3	Holtec International's Root Cause Evaluation of the "near miss" event at SONGS.			To Be Provided
4	Original cask loading procedures in use on August 3, 2018– Outside Operations (400 series?), pre-incident.			Complete
4A	Provide a copy of the filled out procedure from August 3, 2018 used during the event.			Complete
5	Any revisions to Holtec's Cask Loading Procedures – Outside Operations post-event.		Will provide draft when available	To be Provided
5A	SCE's acceptance review of any revised Holtec procedures, per 10 CFR 72.48.			To Be Provided

6	**Copy of *new or revised* briefing materials, training materials, and attendance records of training for Holtec and SCE oversight staff related to Outside Operations.**			N/A
6A	Briefing and training materials	(b)(7)(C)		Complete
6B	Attendance Records			Complete
7A	Holtec's Engineering Evaluation of the MPC canister involved in the "near miss" event, AND /OR		Section 4.3 of HI-2188261	Complete
7B	Holtec's Inspection Plan for the MPC canister involved in the "near miss" event.		Consideration being given to inspection as part of inspection and maintenance program.	N/A
8	**Holtec's Engineering Evaluation of the UMAX ISFSI VVM divider shell damage** **OR** **Holtec's Inspection Plan for examining VVM divider shell damaged during the vent.**			Complete
8A	Include pictures and documentation of examinations already performed			Complete
9	SCE Procedure that discusses NRC Reportability Requirements for events during Dry Cask Storage Operations.			Complete
10	Radiation Protection procedures for downloading operations and Outside Operations.			Complete
11A	Copy of the design drawing for the *SONGS UMAX Version B divider shell* AND			Complete

11B	A copy of the design drawing for the *UMAX Version A divider shell.*	(b)(7)(C)		Complete
12	Copy of the procedure or program that describes the training requirements for Holtec Cask Loading Supervisors		HSP-34, Section 7.5	Complete
13	**Provide *unrevised pre-event* Cask Loading Supervisors Training Materials for Outside Operations for the following areas:**	N/A		N/A
13A	On the Job Training requirements	(b)(7)(C)	There are no specific OJT requirements for Supervisors, unless performed to become a technician.	N/A
13B	Training Procedures		See Item 12, Section 7.5	N/A
13C	Training Modules			Complete
13D	Training Content		See Item 13c LP-HOL-07 which includes two presentations on Supervisor requirements and SOER 10-2.	N/A
13E	Procedure or documentation that shows how Cask Loading Supervisor qualifications are verified and kept up to date.			9/5
14	Procedures or documents that describe the training requirements for Holtec VCT operators at SONGS.		See Item 12, HSP-34, Section 7.4.3.2	Complete
15	**Provide *unrevised pre-event* VCT Operator Training Materials for the following areas:**	N/A		N/A
15A	On the Job Training required	(b)(7)(C)		Complete

15B	Training Procedures	(b)(7)(C) [redacted]	See Item 12, HSP-34, Section 7.4.3.2	N/A
15C	Training Modules			Complete
15D	Training Content			Complete
15E	Procedures or documentation that verifies VCT operator qualifications are maintained up to date.			Complete
16	Procedures or documents that show the training requirements for SCE oversight of Holtec outside operations at SONGS			Complete
17	**Provide *unrevised pre-event* SCE oversight training materials for Outside Operations for the following areas:**	N/A		N/A
17A	On the Job Training required	(b)(7)(C) [redacted]		Complete
17B	Training Procedures			Complete
17C	Training Modules			Complete
17D	Training Content			Complete
17E	Documents that track the SCE oversight qualifications are up to date			Complete
18	Procedure or documents that show the training requirements for Holtec spotters/riggers at SONGS		SSMMCL section SSMM-07 for riggers. Item 18.3, MNTTLMM, to be provided	Complete
19	**Provide *unrevised pre-event* spotter/rigger training materials for Outside Operations:**	N/A		N/A

Not

19A	On the Job Training required	(b)(7)(C)		Complete
19B	Training Procedures			Complete
19C	Training Modules			Complete
19D	Training Content			Complete
19E	Documents that track the Spotter/Rigger qualifications are maintained up to date			Complete
20	Provide Holtec Drop Analysis for MPC-37 canister and MPC-32 canister.			MPC-32 - Complete MPC-37 – Complete
21	Provide Purchase Specification of Slings used for downloading MPC-37 at SONGS.			Complete
22	Provide a listing of Dry Fuel Storage related Holtec Field Condition Reports and SCE Action Requests written from January 2018 to present with a short description			FCRs – complete ARs - Complete
23	Copies of Training records for all members of loading crew (CLS, VCT operator, and riggers) involved in event, including those no longer working for Holtec or SCE.			Holtec – Complete SCE – Complete
24	VCT annual maintenance records.			Complete
25	VCT operational daily check record for August 3, 2018.			Complete
26	Latest annual sling inspection records.			Complete

27	**Most Recent ANSI N14.6 Test Records for Special Lifting Devices used Outside at SONGS (quarterly and annual):**	N/A		N/A
27A	MPC lift cleats	(b)(7)(C)		Complete
27B	HI-TRAC Lugs			Complete
27C	HI-TRAC lift links			Complete
28	Provide Southern California Edison's (SCE) policy regarding Safety Conscious Work Environment (SCWE).			Complete
29	Documentation of Holtec and SCE staffing requirements for MPC downloading operations.		Holtec briefing sheet Updated org charts	Complete

NRC Special Inspection Issues

Updated 9/13/2018 2:29 PM

Item #	Issue	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
1	Are there any design changes to the shield ring assembly planned for SONGS?	E. Simpson M. Davis	(b)(7)(C)	9/12/2018	Closed	9/11/2018 No 9/11/18 - NRA comment - Put into RCE Report. (b)(7)(C) discussed w/ NRC 9/12/2018 1430.	(b)(7)(C)
2	What were SCE's evaluation criteria?	C. Smith		9/11/2018	Closed	9/10/18 - Explain the interaction between Holtec's RCE and SCE's ACE. (b)(7)(C) discussed w/ NRC.	
3	SLD inspection out of tolerance - see Lift Link inspection sheet. Previously identified CAP issue of mis-marked documents? If YES, provide corrected document.	C. Smith		9/12/2018	Closed	(b)(7)(C) email 9/12/2018 1316. Discussion w/ C. Smith.	
4A	Why aren't we inspecting the canister (specifically the contact point of the base plate to the shield ring and the MPC lid to the HI-TRAC)?	J. Katanic T. Pruett		9/13/2018		From discussion between (b)(7)(C) & J. Katanic on 9/12/2018 AM. See (b)(7)(C) email 9/12/2018 1550 to (b)(7)(C).	
4B	Are any compensatory measures needed or being considered in absence of an inspection (ie. additional RP surveys needed, air samples, etc)?	J. Katanic T. Pruett		9/13/2018		From discussion between (b)(7)(C) & J. Katanic on 9/12/2018 AM. See (b)(7)(C) email 9/12/2018 1550 to (b)(7)(C).	
4C	If you're not going to inspection now, what is the threshold for triggering an inspection?	J. Katanic T. Pruett		9/13/2018		From discussion between (b)(7)(C) & J. Katanic on 9/12/2018 AM. See (b)(7)(C) email 9/12/2018 1550 to (b)(7)(C)	
5	If we are not inspecting, the analysis needs to be more comprehensive to address the worst case potential for damage on the base plate and the MPC lid (where contact is made).	J. Katanic T. Pruett		9/13/2018 NOON		On initial review it was noted that the value for the possible dent in the MPC Baseplate may not be conservative. Holtec is preparing a SMDR (with 72.48) to address the worst case damage potential in both locations) – Due mid-day 9/13 (b)(7)(C)	

NRC Special Inspection
Issues

Item #	Issue	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
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NRC Special Inspection Questions

Updated 9/13/2018 2:30 PM

Item #	Question	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
1	What information is displayed on the 3 VCT screens used by the VCT Operator? **SEE ITEM 4.**		(b)(7)(C)	9/11/2018	Closed	9/10/2018 - Partial information shared with NRC. Additional followup questions for (b)(7)(C) may be part of interview tomorrow (he can also provide contact information for the appropriate person if necessary).	(b)(7)(C)
2	Was the canister lifted to full MPC height?			9/11/2018	Closed	9/10/2018 - MPC29 was lifted to its full tower height before resuming downloading during MPC#29 recovery. Need to share answer with NRC.	
3	NOT USED	NA	NOT USED	NOT USED	NA	NOT USED	NA
4	Verify / validate the weight on towers, is it 70,000 lbs., total (for both towers) or each individual tower? **SEE ITEM 1.**		(b)(7)(C)	9/11/2018	Closed	9/11/18 - Each tower carries 1/2 load. Associated HMI screen sees the "full weight." In this case, approximately ~70,000#. Need to share the answer with the NRC.	(b)(7)(C)
5	Are there any design changes to the shield ring assembly planned? **MOVED TO ISSUES ITEM 1.**			9/12/2018	**SEE ISSUES ITEM 1.**	9/10/2018 - None in process but under consideration. Need to share answer with NRC.	
6	What were SCE's evaluation criteria? **MOVED TO ISSUES ITEM 2.**	C. Smith		9/11/2018	**SEE ISSUES ITEM 2.**	9/10/18 - Explain the interaction between Holtec's RCE and SCE's ACE.	
7	Who do each of the people involved in the event work for? **MOVED TO DOCUMENT REQUEST 11.**	J. Katanic		9/11/2018	**SEE DOC REQUEST 11.**	9/11/18 - Are any of the Holtec personnel subcontracted? If so, to whom? Requested by (b)(7)(C) email to (b)(7)(C) 9/11/18 10:41.	
8	What are indicators of loss-of-load or slack in the rigging described in training materials and procedures and pre-job briefs (as of 8/3)?	J. Katanic		9/13/2018		Requested 9/11/2018 1430. (b)(7)(C) email to (b)(7)(C) 9/13/2018 0623.	

NRC Special Inspection Questions

Item #	Question	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
9	Was MPC evaluated to land on only one gusset?	J. Katanic	(b)(7)(C)	9/13/2018 AM		Requested 9/11/2018 1400. Calc in review process as of 9/12/2018 PM.	(b)(7)(C)
10	Looking at Engineering drawings, looks like shield ring on Callaway divider shell is approx. 20 inches deeper into cavity. Holtec to explain difference.	E. Simpson		9/12/2018	Closed	Requested by email 9/11/2018 1630. Provided response by email from (b)(7)(C) 9/12/2018 1335.	
11	SCE Exit Review Board - Would like info on process or procedure. Is it applicable to Holtec? If not, does Holtec have a similar process/procedure?	P. Silva		9/12/2018	Closed	Requested 9/11/2018 1700. Holtec uses SCE process. Get from SCE HR (b)(7) Provided by email from (b)(7)(C) 9/12/2018	
12	PTP Oversight - Do the negative comments collected by PTP Oversight relate/equate to the OpE collected? Would like to see the OpE/negative comments for MPC download, including dry runs.	P. Silva		9/12/2018 1300	Complete	Requested 9/11/2018 1700. Include Daily Updates, dry runs, production runs. Email from (b)(7)(C) to NRC 9/12/2018 1803.	
13	What are the quals to wear orange vest? Significance of orange vest? Responsibilities of person wearing orange vest? Is this in a document/policy/procedure/training? **Please provide.** Was Peter Estrada qualified to wear orange vest?	J. Katanic		9/12/2018	Closed	Requested 9/11/2018 1700. Email from (b)(7)(C) to NRC 9/12/18 1444. Orange Vest is Signal Person.	
14	In both drop scenarios, MPC-32 and MPC-37, what is the condition of the spent fuel assemblies inside of the MPC after the postulated drop event? Will that be analyzed?	E. Simpson		9/13/2018		Requested 9/12/2018 1727.	

Item #	Question	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
15	What process drove Holtec to perform the drop evaluation? Did Holtec or SCE consider the event to be in an unanalyzed condition (i.e., suspended on the shield ring gussets with slacked slings)?	M. Davis	(b)(7)(C)	9/13/2018		Email to (b)(7)(C) from (b)(7)(C) 9/12/2018 1812. NRA Notes - Review AR and discuss w/ SCE Ops (b)(7)(C) for 8/3-8/6/2018.	(b)(7)(C)
16	MT740a, 'Advanced Rigging,' section 6.7.2.1.3, states, 'at sling angles > 80° from vertical, <u>each</u> sling should have a rated capacity at least three times greater than the load.' Does this apply to the slings on the MPC?	C. Smith		9/13/2018		Email to (b)(7)(C) from (b)(7)(C) 9/12/2018 1829. Email from (b)(7)(C) to (b)(7)(C) 9/13/2018 0959.	
17	In the Monday presentation, a low dose waiting area was hatch-marked in an image. RWP 18-2-520, Task 7, it notes to ensure low dose waiting areas are posted. On 8/3/18, was the low dose waiting area posted? If so, how was it posted? Also, provide a map of the ISFSI pad area with the low dose waiting area indicated for 8/3/18.	J. Katanic		9/13/2018		Email to (b)(7)(C) & (b)(7)(C) from (b)(7)(C) 9/12/2018 1818.	
18	Procedure HPP-2464-600, Responding to Abnormal Conditions. What entry conditions would lead to Section/Step 7.1, MPC Damage?	J. Katanic		9/13/2018	Complete	Email to (b)(7)(C) & (b)(7)(C) from (b)(7)(C) 9/13/2018 1139. Email to NRC from (b)(7)(C) 9/13/2018 1407.	

Item #	Question	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
19	MPC-37 Drop Analysis: 1. What does the shell finite element mesh look like in the region of the shell to baseplate connection? 2. Are the shell elements using reduced integration or full integration? 3. How many integration points are there through the shell thickness?	P. Silva	(b)(7)(C)	9/13/2018	Complete	Email from (b)(7)(C) to (b)(7)(C) 9/13/2018 1209. Email to NRC from (b)(7)(C) 9/13/2018 1358.	(b)(7)(C)
20	A) What is expected dose rate @ 30 cm as MPC is being downloaded w/ source drawer open? When MPC is past mating drawer? B) Provide analysis or data. C) If there are expected dose rates / dose rate ranges @ other distances, provide that data. D) Provide isodose maps for ISFSI MPC download where MPC is transiting through open source drawer.	J. Katanic		9/13/2018		Email from (b)(7)(C) to (b)(7)(C) (b)(7)(C) 9/13/2018 1212 w/ attached pdf for request & sketch.	
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NRC Special Inspection
Document Requests

Item #	Document	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
1	Provide copy of operator logs	M. Davis	(b)(7)(C)	9/11/2018	Complete	9/10/2018	(b)(7)(C)
2	Provide a drawing of the VCT / High track / slings in stack-up?	J. Katanic		9/11/2018	Complete	9/10/2018 - Preliminary Drawing shown to NRC. Updated drawing to follow - 9/11/2018 PM. Provided to NRC by (b)(7)(C) email 9/12/2018 1337.	
3	Provide an updated contact & response team list.	J. Katanic		9/11/2018	Complete	9/10/2018	
4	Provide a copy of presentation materials from the Cause Evaluation Summary provided 9-10-18	J. Katanic		9/11/2018	Complete	9/10/2018 - Determine whether draft/confidential materials may be given to NRC. 9/11/2018 1350 - Pdf of Presentation w/ (b)(7)(C) - provided to NRC.	
5	Provide a drawing showing the clearances between the canister and the high track, and the divider shell.	C. Smith		9/11/2018	Complete	9/10/2018	
6	Does Holtec have non-proprietary images, photos and drawings that the NRC can use to convey information to the public?	J. Katanic		9/12/2018		9/10/18 - (b)(7)(C) to determine exactly what NRC needs (Note: Per (b)(7) Holtec has provided SCE with Non-proprietary information. He offered to share that information with the NRC if needed). 9/11/2018 1330 - (b)(7)(C) has 1 non-proprietary figure to share w/ NRC. **Holtec start w/ Marketing manual.**	
7	Provide 2464 series procedures -005, -006, -008, -009, -600	M. Davis		9/11/2018	Complete		
8	Provide any additional pictures of shield ring/gusset indications	J. Katanic		9/11/2018	Complete	9/11/2018 (b)(7)(C) has these to give to NRC.	
9	Provide Drafts of RCE and ACE.	T. Pruett		9/12/2018	Complete	Drafts by 9/12/2018 PM.	

Item #	Document	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
10	Provide a detailed view of drawing 9989 near Fabrication Notes 6 and 7.	C. Smith	(b)(7)(C)	9/11/2018	Complete	NRC in interested in zoomed view of gusset/shield ring gap. 9989 document appears to show no gap. 9/11/2018 1300 - Zoomed-in view w/ (b)(7)(C) provided to NRC.	(b)(7)(C)
10A	**Discussion of Callaway OE**	C. Smith		9/12/2018		Callaway's fillet weld approach.	
11	Provide list of involved personnel and associated documentation for "pre-cursor" event on 7/22. Who do each of the people involved in the 8/3 event work for?	J. Katanic		9/12/2018	Complete	**For both 7/22 and 8/3 events.** List of key personnel emailed to NRC from (b)(7)(C) (b)(7)(C) 9/12/2018 1003. Additional list emailed 9/12/2018 1313.	
12	SDS Organization Charts	E. Simpson		9/11/2018	Complete	Current Approved Version is April 2018. (b)(7)(C) delivered to NRC.	
13	Neutron Energy Study Report for FTO. Rev 1 in progress - should be available by Thursday 9/13.	E. Simpson				**REQUESTED 9/11/2018 - NOT INSPECTION RELATED.**	
14	A) Provide Production Traveler for 7/22/18 downloading of MPC. B) Was there a Production Traveler for the 8/3/18 MPC downloading? If so, provide. C) Provide all production travelers for ISFSI activities. D) What is the procedure/policy for generating production travelers? Provide.	J. Katanic		9/13/2018		**Canisters 11 thru 24 to be provided.**	
15	Provide copy of Pre-Job Briefs for day of event (August 3, 2018) and the date of July 22, 2018, both day and night shifts.	E. Simpson		9/12/2018	Complete	Requested 9/11/2018 1700. Email to NRC from (b)(7)(C) 9/12/2018 1448. **Todd to provide follow-up info.**	
16	Provide current SONGS CAP procedure and current Holtec CAP procedure.	M. Davis		9/12/2018	Complete	Requested 9/11/2018 1800.	

Item #	Document	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
17	MPC 37 Drop Analysis - Provide Holtec Procedure HSP-320, a reference in Structural Evaluation of the handling event at SONGS, page 14 of 18.	J. Katanic	(b)(7)(C)	9/12/2018 1030	Complete	Requested 9/11/2018 1700. Provided by (b)(7)(C) email 9/12/2018 1036.	(b)(7)(C)
18	Provide cask/canister loading plans for MPCs loaded on 7/22 and 8/3/2018. (MPCs #26 and #29?).	P. Silva		9/12/2018 1400	Complete	Requested 9/12/2018 AM. (b)(7)(C) provided to (b)(7)(C). Provided to NRC by (b)(7)(C) email 9/12/2018 1329.	
19	Provide VCT Diagram w/ hydraulic schematic	C. Smith		9/12/2018 1200	Complete	Requested 9/12/2018. Provided by email 9/12/2018 1140.	
20	Provide copy of HSP-35 and HSP-1005, which are referred to in HSP-34.	M. Davis		9/12/2018	Complete	Requested 9/12/2018. Provided by email 9/12/2018 1049.	
21	Provide Holtec RP procedure HPP-2464-031 re: Surveys.	J. Katanic		9/12/2018	Complete	Requested 9/12/2018.	
22	A) Accumulated individual dose records (Jan 1 thru Aug 2, 2018) for: DeBold, Jasper, Martinez, Estrada, Clenard, Marley, Columbo. B) RP procedures for MPC downloading operation (Work Control Plan). C) ALARA plan for MPC-29.	E. Simpson		9/12/2018	Complete	Requested 9/12/2018 1000. Provided 9/12/2018 1200.	
23	Calibration record for the HMI screen, particularly the pressure/load screen. Is there any such document? If so, provide copy.	C. Smith		9/12/2018 1530		Requested 9/12/2018 1320. Email response from (b)(7) 9/12/2018 1345 - HMI display is not a calibrated item. Not sent to NRC as of 1645.	
24A	FCR-2464-CON-176 ISFSI Pad Flatness Deviation	J. Katanic				From discussion between (b)(7) & J. Katanic on 9/12/2018 AM. See (b)(7) email 9/12/2018 1454 to (b)(7)(C). Not yet provided to NRC.	

NRC Special Inspection
Document Requests

Item #	Document	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
24B	The verticality records for the installation of the CECs at VVM Locations 22 and 23:	J. Katanic	(b)(7)(C)				
25	Copy of HPP-2464-008R6	J. Katanic					
26							
27							
28							
29							
30							
31							

NRC Special Inspection
Document Requests

Item #	Document	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
1	Provide copy of operator logs	M. Davis	(b)(7)(C)	9/11/2018	Complete	9/10/2018	(b)(7)(C)
2	Provide a drawing of the VCT / High track / slings in stack-up?	J. Katanic		9/11/2018	Complete	9/10/2018 - Preliminary Drawing shown to NRC. Updated drawing to follow - 9/11/2018 PM. Provided to NRC by (b)(7)(C) email 9/12/2018 1337.	
3	Provide an updated contact & response team list.	J. Katanic		9/11/2018	Complete	9/10/2018	
4	Provide a copy of presentation materials from the Cause Evaluation Summary provided 9-10-18	J. Katanic		9/11/2018	Complete	9/10/2018 - Determine whether draft/confidential materials may be given to NRC. 9/11/2018 1350 - Pdf of Presentation w/ (b)(7)(C) - provided to NRC.	
5	Provide a drawing showing the clearances between the canister and the high track, and the divider shell.	C. Smith		9/11/2018	Complete	9/10/2018	
6	Does Holtec have non-proprietary images, photos and drawings that the NRC can use to convey information to the public?	J. Katanic		9/13/2018		9/10/18 - (b)(7)(C) to determine exactly what NRC needs (Note: Per (b)(7)(C) Holtec has provided SCE with Non-proprietary information. He offered to share that information with the NRC if needed). 9/11/2018 1330 - (b)(7)(C) has 1 non-proprietary figure to share w/ NRC. **Holtec to start w/ Marketing manual.**	
7	Provide 2464 series procedures -005, -006, -008, -009, -600	M. Davis		9/11/2018	Complete		
8	Provide any additional pictures of shield ring/gusset indications	J. Katanic		9/11/2018	Complete	9/11/2018 - (b)(7)(C) has these to give to NRC.	

NRC Special Inspection
Document Requests

Item #	Document	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
9	Provide Drafts of RCE and ACE.	T. Pruett	(b)(7)(C)	9/12/2018	Complete	Drafts by 9/12/2018 PM.	(b)(7)(C)
10	Provide a detailed view of drawing 9989 near Fabrication Notes 6 and 7.	C. Smith		9/11/2018	Complete	NRC in interested in zoomed view of gusset/shield ring gap. 9989 document appears to show no gap. 9/11/2018 1300 - Zoomed-in view w/ (b)(7)(C) provided to NRC.	
10A	**Discussion of Callaway OE. How did Callaway reduce the gap?**	C. Smith		9/13/2018		NRA Notes - Callaway's fabrication dwg & implementation.	
11	Provide list of involved personnel and associated documentation for "pre-cursor" event on 7/22. Who do each of the people involved in the 8/3 event work for?	J. Katanic		9/12/2018	Complete	**For both 7/22 and 8/3 events.** List of key personnel emailed to NRC from (b)(7 (b)(7)(C) 9/12/2018 1003. Additional list emailed 9/12/2018 1313.	
12	SDS Organization Charts	E. Simpson		9/11/2018	Complete	Current Approved Version is April 2018. (b)(7)(C) delivered to NRC.	
13	Neutron Energy Study Report for FTO. Rev 1 in progress - should be available by Thursday 9/13.	E. Simpson		when SCE determines ready		**REQUESTED 9/11/2018 - NOT INSPECTION RELATED.**	
14	A) Provide Production Traveler for 7/22/18 downloading of MPC. B) Was there a Production Traveler for the 8/3/18 MPC downloading? If so, provide. C) Provide all production travelers for ISFSI activities. D) What is the procedure/policy for generating production travelers? Provide.	J. Katanic		9/12/2018 1800	Complete	Canisters 11 thru 24 to be provided. Email to NRC from (b)(7)(C) 9/12/2018 1759. No procedural guidance for Production Travelers.	

NRC Special Inspection
Document Requests

Item #	Document	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
15	Provide copy of Pre-Job Briefs for day of event (August 3, 2018) and the date of July 22, 2018, both day and night shifts.	E. Simpson	(b)(7)(C)	9/13/2018 for add'l info	Complete	Requested 9/11/2018 1700. Email to NRC from (b)(7)(C) 9/12/2018 1448. (b)(7)(C) **to provide follow-up info.**	(b)(7)(C)
16	Provide current SONGS CAP procedure and current Holtec CAP procedure.	M. Davis		9/12/2018	Complete	Requested 9/11/2018 1800.	
17	MPC 37 Drop Analysis - Provide Holtec Procedure HSP-320, a reference in Structural Evaluation of the handling event at SONGS, page 14 of 18.	J. Katanic		9/12/2018 1030	Complete	Requested 9/11/2018 1700. Provided by (b)(7)(C) email 9/12/2018 1036.	
18	Provide cask/canister loading plans for MPCs loaded on 7/22 and 8/3/2018. (MPCs #26 and #29?).	P. Silva		9/12/2018 1400	Complete	Requested 9/12/2018 AM. (b)(7)(C) provided to (b)(7)(C). Provided to NRC by (b)(7)(C) email 9/12/2018 1329.	
19	Provide VCT Diagram w/ hydraulic schematic	C. Smith		9/12/2018 1200	Complete	Requested 9/12/2018. Provided by email 9/12/2018 1140.	
20	Provide copy of HSP-35 and HSP-1005, which are referred to in HSP-34.	M. Davis		9/12/2018	Complete	Requested 9/12/2018. Provided by email 9/12/2018 1049.	
21	Provide Holtec RP procedure HPP-2464-031 re: Surveys.	J. Katanic		9/12/2018	Complete	Requested 9/12/2018.	
22	A) Accumulated individual dose records (Jan 1 thru Aug 2, 2018) for: DeBold, Jasper, Martinez, Estrada, Clenard, Marley, Columbo. B) RP procedures for MPC downloading operation (Work Control Plan). C) ALARA plan for MPC-29.	E. Simpson		9/12/2018	Complete	Requested 9/12/2018 1000. Provided 9/12/2018 1200.	

NRC Special Inspection
Document Requests

Item #	Document	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
23	Calibration record for the HMI screen, particularly the pressure/load screen. Is there any such document? If so, provide copy.	C. Smith	(b)(7)(C)	9/12/2018 1530	Complete	Requested 9/12/2018 1320. Email from (b)(7)(C) 9/12/2018 1345 that HMI display is not a calibrated item. Provided to NRC in 9/12/2018 1500 Debrief.	(b)(7)(C)
24	A) FCR-2464-CON-176 ISFSI Pad Flatness Deviation + supporting documentation. B) The verticality records for the installation of the CECs at VVM Locations 22 and 23.	J. Katanic		9/12/2018	Complete	From discussion between (b)(7)(C) & J. Katanic on 9/12/2018 AM. See (b)(7)(C) email 9/12/2018 1454 to (b)(7)(C). Email to NRC from (b)(7)(C) 9/12/2018 1808.	
25	Copy of HPP-2464-008R6	J. Katanic		9/12/2018	Complete	From discussion between (b)(7)(C) & J. Katanic on 9/12/2018 AM. See (b)(7)(C) email 9/12/2018 1454 to (b)(7)(C). Email to NRC from (b)(7)(C) 9/12/2018 1808.	
26	Qualifications and certifications for the 7/22 crew and 8/3 crew on the pad.	P. Silva		9/13/2018	Complete	Provided training records for the 8/3 crew, although different from a qual card. Haven't provided anything for the 7/22 crew. Email from (b)(7)(C) to (b)(7)(C) 9/12/2018 1824. Emails to NRC from (b)(7)(C) 9/13/2018 1143 & 1147.	
27	Provide HSP-57 Cavity Enclosure Container Site Receiving, Offload, Upend, and Installaton. How is verticality measured?	J. Katanic		9/13/2018	Complete	Email to NRC from (b)(7)(C) 9/13/2018 1135.	
28	Provide latest version of Holtec 72.212 Report.	M. Davis		9/13/2018			

NRC Special Inspection
Document Requests

Item #	Document	NRC Inspector	Owner	Due Date & Time	Status	Comments	NRA Contact
29	SONGS Procedure for RWPs (SDS-RP2-PGM-2000)	E. Simpson	(b)(7)(C)	9/13/2018	Complete	Email request from Simpson to (b)(7)(C) 9/13/2018 1141. Email to NRC from (b)(7)(C) 9/13/2018 1402 w/ Rev 5 (current today). Email to NRC from (b)(7)(C) 9/13/2018 1403 w/ Rev 3 (current for 8/3/18).	
30	RWP information on three Fuel Transfer Operations: 1. FTO29 - VVM22 - Download date: 8/3/18 2. FTO28 - VVM58 - Download date: 7/31/18 3. FTO26 - VVM23 - Download date: 7/22/18	E. Simpson		9/13/2018	Complete	Verbal request from Simpson to (b)(7)(C) 9/13/2018 AM. Email to NRC from (b)(7)(C) 9/13/2018 1349.	
31							
32							
33							
34							
35							

NRC Special Inspection

Monday, September 10, 2018 through Friday, September 14, 2018

Decommissioning
San Onofre
Nuclear Generating Station

- **NRC TEAM:**
    - Eric Simpson, NRC Inspector, Region IV
    - Marlone Davis, NRC Headquarters
    - Chris Smith, NRC Headquarters
    - Janine Katanic, Branch Chief, Region IV
    - Troy Pruett, Division Director, Region IV
    - Patty Silva, Branch Chief, NRC Headquarters

- **SONGS TEAM:**
    - **Inspection Response Team**
        - (b)(7)(C) [redacted]
    - **Inspection Response Team Responsibilities:**
        - Prepare inspection material, previous Inspection Reports, and referenced Inspection Procedures
        - Conduct Pre-Job Brief
        - Conduct Entrance Meeting
        - Conduct Exit Meeting
        - Conduct Daily Summary meetings, if requested
        - Track NRC issues and requests
    - **Additional Organization Points of Contact (OPOCs)**
        - (b)(7)(C) [redacted]
    - **OPOC responsibilities:**
        - Attend Pre-job brief
        - Attend Entrance meeting
        - Attend Debrief meeting
        - Assumes ownership for inspection issues for their organization. Interfaces with NRA to ensure issues are addressed.

NRC Special Inspection

Monday, September 10, 2018 through Friday, September 14, 2018

- **NRC Identified Inspection Procedure:**
  - 93812 – Special Inspection

INSPECTION MEETING SCHEDULE

- **Pre-job brief**
  - Required attendees: Station Sponsor, Inspection Response Team, OPOCs
    Optional Attendees: SONGS SLT
  - **Date: Thursday, September 6, 2018**
  - **Time: 10:00 AM**
  - **Location: D1 Conference Room**
  - Purpose: Review inspection procedure and management expectations. Address questions / concerns identified by SONGS team.
- **Entrance Meeting:**
  - Required Attendees: SONGS SLT, Station Sponsor, Inspection Response Team, OPOCs
  - **Date: Monday, September 10, 2018**
  - **Time: 10:00 AM**
  - **Location: D1 Conference Room**
  - Purpose: NRC Inspector will discuss scope of review and will provide any information / documentation requests.
- **Involved Personnel Interviews**
  - As requested, Monday/Tuesday
- **Daily Debrief**
  - Required Invitees: Select SCE/HOLTEC Project personnel.
  - **Date: Tuesday/Wednesday/Thursday**
  - **Time: 3:00 PM**
  - **Location: AWS D1**
  - Purpose: Obtain feedback from inspectors on observations/potential findings
- **Team Action Review**
  - Required Invitees: To be determined based on Debriefs
  - **Date: Tuesday Wednesday/Thursday**
  - **Time: following the debrief**
  - **Location: AWS D1**
  - Purpose: Ensure NRC issues and requests resolved in a timely manner
- **Exit Meeting:**
  - Required Attendees: SONGS SLT, Station Sponsor, Inspection Response Team, OPOCs
  - **Date: Friday September 14, 2018**
  - **Time: 3:00 PM**
  - **Location: AWS D1**
  - Purpose: NRC Inspector will summarize his preliminary inspection results.

San Onofre Organization Points of Contact
Special Inspection

(b)(7)(C)

Daniel Terry

	Name	Position	Company
8/3/2018	(b)(7)(C) [redacted]		Self-Contractor
			Sonic
			Williams
			Williams
			Williams
			Williams
			BHI
			Sonic
			Williams
			Williams
			BHI
			Hitech
			Williams
			Williams
			BHI
			BHI
			Williams
			Williams
			BHI
7/22/2018			Hitech
			Hitech
			Williams
			Williams
			Williams
			Williams
			BHI
			Williams
			Williams
			BHI
			Williams
			Williams
			Williams
			BHI
			BHI
			BHI
			BHI
			BHI
			Williams

<u>Strawman Document Request and Questions to be answered at SONGS based on the SONGS Special Inspection Charter</u>

General Questions to be Answered:

1. Callaway seems to have enhanced the design of its CEC inserts to facilitate MPC downloading. Why wasn't the OE from Callaway divider shell utilized on the SONGS design or was it?
2. How different at the divider shells between SONGS and Callaway – they are obviously visually different. How deep to the differences go? Materials? Design?
3. What are the training requirements for a Holtec CLS?
4. How are CLS qualifications verified and kept up to date?
5. What are the training requirements for Holtec VCT operators at SONGS.
6. How are VCT operator qualifications verified and maintained up to date?
7. What re the training requirements for riggers at SONGS?
8. How are rigger qualifications maintained up to date?

General Records/Document Request:

1. Cask Loading Supervisors – Training? High turnover rates?
2. *Request - Holtec letter 2253-C2015-46R2, "Revision to Holtec Letter 2253-C2012-04: Safety Classification Summary of All Equipment to be Delivered under Specification M-2020, Revision 1"*, dated July 1, 2015 – For discussion of 25-foot drop analysis – From Callaway Programs Review (*Tapp*)
3. Request - Purchase Specification (we already have this) of Slings used for downloading MPC-37 at SONGS.
4. A listing of Dry Fuel Storage related Holtec Field Condition Reports and SCE Action Requests written from January 2018 to present with a short description.
   a. We will request selected full ARs or FCRs from the list.
5. Training records for all Holtec Cask Loading Supervisors who have worked at SONGS, including dry runs, and those no longer working for Holtec.
6. Training records for all VCT operators who have worked in DFS at SONGS.
7. Training records for all riggers at SONGS.
8. Downloading procedures in use at SONGS from before and after the event of August 3, 2018.
9. VCT maintenance records.
10. VCT operational check records.
11. Sling inspection records.
12. Annual Test Records for Special Lifting Devices (SLDs) in use at SONGS:
    a. Hi-TRAC lift links

b. Lift Yokes
c. Lift Yoke Extensions (no longer in use, likely)
d. MPC lift cleats
e. HI-TRAC trunnions

Requests based specifically on the Special Inspection charter:

1. Determine if the inspection should be elevated to an AIT and promptly notify regional management of any recommendation to escalate the special inspection to an AIT.
    a. *Daily*, sit down with the SIT and go through the deterministic criteria and see where the level of inspection rigor lands based on your current understanding of the event.
        i. Reaffirm that a SI is the correct decision.
        ii. Reject the SI decision and initiate an Augmented Inspection.

2. Identify and review all pertinent records, documents, and procedures related to the licensee's downloading operations at the ISFSI pad including but not limited to: worker training and qualifications; rigging equipment qualification, testing, and preventative maintenance; and lifting equipment qualification, testing, and preventative maintenance. Evaluate the adequacy of the above noted procedures, worker training and equipment testing and preparation.
    a. Training Requests:
        i. Training records for Holtec ask loading supervisors (CLS) at SONGS.
        ii. What are the training requirements for Holtec CLS at SONGS?
        iii. Training records for VCT operators at SONGS.
        iv. What are the training requirements for VCT operators at SONGS?
        v. Training records for spotters and riggers at SONGS.
        vi. What are the training requirements for spotters and riggers at SONGS?
    b. Lifting Equipment Qualifications
        i. Annual tests for Special Lifting Devices in use at SONGS
        ii. Tests verifying VCT purchase specifications for all VCTs in use at SONGS.
            1. VCT preoperational checklists (just a few examples)
            2. Any VCT maintenance (preventative or routine) records performed during current dry cask loading campaign.
        iii. Downloader sling testing documentation for all downloader slings used at SONGS.

3. Review the licensee's root cause investigation results, to determine whether the review thoroughly identified all contributing factors and that final corrective actions will be adequate to prevent reoccurrence. Evaluate whether prior operational experience (OE) relating to complications or issues associated with canister downloading operations was identified and considered as part of the licensee's root cause investigation and corrective action development.
    a. Request:
        i. Southern California Edison's Root Cause Evaluation of "near miss" event at SONGS
        ii. Holtec International's Root Cause Evaluation of "near miss" event at SONGS
    b. Evaluate:

i. Will the recommended corrective actions fix the problem and prevent recurrence?
ii. Was OE evaluated or condidered?

4. Interview personnel associated with the event to develop a timeline to ensure the licensee's investigation contained all necessary information to identify all contributing factors and develop adequate corrective actions. Interviews with personnel involved in the ISFSI loading operations should be conducted to evaluate licensee and contractor communications between crane/VCT operators, rigging and spotting staff, cask loading supervisors, radiation protection staff, and licensee oversight personnel. Evaluate the adequacy of pre-job briefings that may have taken place prior to fuel loading operations.
   a. **Request (involved in incident):**
      i. Interview of Holtec Cask Loading Supervisor (CLS)
      ii. Interview Holtec Riggers
      iii. Interview Holtec/SCE
      iv. RP Technicians
      v. Interview SCE Oversight
   b. **Questions for those involved in event:**
      i. What was your role during the downloading evolutions?
      ii. When did you notice that something wasn't right?
         1. What was your next move?
      iii. Why didn't you realize that the MPC was not being lowered?
      iv. How does the procedure have you monitor MPC downloading progress?
      v. What was your understanding of your role during this evolution?
      vi. How were you trained?
      vii. Whose decision was it to have RP perform a survey?
      viii. What notifications did you make?
         1. Was this by procedure?
      ix. Has this ever happened before? When? Where is the CR or FCR?
         1. If not, why was one not written?
      x. Have you ever initiated a CR or FCR?
         1. What was the issue?
      xi. When there is an unexpected outcome, how are/were you trained to respond?
   c. **Request Interviews with random Holtec workers:**
      i. Interview various/random Holtec CLSs
      ii. Interview various/random Holtec Riggers
      iii. Interview various/random Holtec/SCE RP Technicians
      iv. Interview other members of SCE Oversight of Cask Loading Operations
   d. **Questions for Holtec crew not involved in incident:**
      i. What is your role during the downloading evolutions?
      ii. Have you ever noticed difficulties in operations?
         1. When problems are identified, what is your next move?
      iii. Have you ever been involved in MPC downloading operations?
      iv. What was your role during this evolution?

v. How does the procedure have you monitor MPC downloading progress?
vi. How were you trained?
vii. During this evolution, when is RP directed to perform a survey?
viii. Has this (event) ever happened before onsite? When? Where is the CR or FCR?
    1. If not, why was one not written?
ix. Have you ever initiated a CR or FCR?
    1. What was the issue?
x. When there is an unexpected outcome, how are you trained to respond?

5. Evaluate the adequacy of the loading procedure(s) with respect to verification of MPC movement, centering the MPC over the ISFSI vault, lowering the MPC, and positioning the MPC within the ISFSI vault.
    a. Request:
        i. Cask Loading Procedures (pre-incident)
        ii. Cask Loading Procedures (post-incident revisions)

6. Review and evaluate the licensee's immediate corrective actions taken after the event for adequacy of notifications to the licensee and safety assessments performed immediately following the event. Review the licensee's inspection documentation and/or analysis to determine whether the vault's divider shell experienced any damage that would inhibit the component from performing its designed safety function.
    a. Request:
        i. SCE's Root Cause Evaluation
        ii. SCE's Action Requests (ARs) related to the "near miss" event
        iii. Holtec's Field Condition Report (FCR) related to the "near miss" event

7. Based on the review of procedures and interviews of personnel involved with loading operations, evaluate the adequacy of procedure adherence.
    a. See Items 4 and 5, above.
        i. Did/do the workers follow procedures?
        ii. Review the filled out procedure from August 3, 2018
            1. Circle and Slash?

8. Review the licensee's planned actions that will address the point loading condition that was experienced by the affected canister. If applicable, review the licensee's analysis that demonstrated the canister will continue to perform as designed for continued storage OR review licensee's inspection plan to safely remove or lift the canister from the vault to support inspection of the bottom of the canister to demonstrate the canister did not receive any damage that would inhibit the component from continuing to perform as designed.
    a. Request:
        i. Holtec's Engineering Evaluation of MPC canister
        ii. Holtec's Engineering Evaluation of UMAX VVM Divider Shell

   iii. SCE's Engineering Evaluation of MPC canister
   iv. SCE's Engineering Evaluation of UMAX VVM Divider Shell

9. Investigate the licensee's procedures for reportability to the NRC and determine if the licensee made the correct decision regarding notifications made to the NRC for this event.
   a. Request:
      i. SCE/Holtec Procedure that discusses NRC Reportability Requirements for Dry Cask Storage Operations
   b. Evaluate:
      i. SCE/Holtec's procedure
      ii. 10 CFR 72 Requirements

10. As directed by regional management, observe resumption of fuel loading operations to verify that corrective actions were effective in addressing deficiencies that contributed to the event. This should include evaluation of procedure and/or equipment enhancements; review or observation of training and briefings provided to riggers, crane operators, spotters and observers, supervisors and other personnel involved in fuel loading operations.
    a. Evaluate:
       i. SCE/Holtec Dry Run of newly revised downloading operations

11. Other Concerns:

    a. (1) "I have never even received SCWE training since I have been on site, and that's not standard for any nuclear site."
       i. Follow-up: Review SCE's policy regarding Safety Conscious Work Environment (SCWE). Did the licensee provide SCWE training to the site contractor? Was Holtec aware of any SCWE policies at SONGS? What is Holtec's policy regarding SCWE? Does Holtec have a whistle-blower protection program? Does Holtec make workers aware of NRC protected activities? What programs do Holtec have in place to prevent a chilling work environment? Are worker's encouraged to voice concerns over worker or nuclear safety?
    b. (2) "We're under-manned. We don't have the proper personnel to get things done safely. And certainly undertrained. Many of the experienced supervisors, what we call CLS's (Cask Load Supervisors). Once they understand the project and how everything works, were often sent away, and we get new ones. They don't understand it as well as even the craft, the basic construction craft, a lot of them that haven't been around nuclear before are performing these tasks...."
       i. See Charter item #2, above: We will look at staffing requirements as laid out by Holtec and SCE for downloading operations. NRC doesn't have any regulations related to staffing. We will certainly look at training as part of the overall SI.
    c. (3) "Operational experience (OE) is not shared. That problem [near miss incident] had occurred before, but it wasn't shared with the crew that was working."

i. NRC will be looking at all of the Holtec FCRs and SCE ARs for evidence that this type of event has happened before onsite.
ii. NRC will look at the Holtec's Corrective Action Program (CAP) for how it is set up to handle OE.
iii. NRC will look into the SCE CAP to see how OE is handles in its CAP.
iv. Will ask pointedly in interviews with Holtec and SCE oversight whether this is the first time this event has happened onsite.

Independent Spent Fuel Storage Installation	Event Number: 53605
Rep Org: SAN ONOFRE Licensee: SOUTHERN CALIFORNIA EDISON COMPANY Region: 4 City: SAN CLEMENTE State: CA County: SAN DIEGO License #: GL Agreement: Y Docket: 72-41 NRC Notified By: CHRIS DIMENTO HQ OPS Officer: PHIL NATIVIDAD	Notification Date: 09/14/2018 Notification Time: 16:00 [ET] Event Date: 08/03/2018 Event Time: 00:00 [PST] Last Update Date: 09/14/2018
Emergency Class: NON EMERGENCY 10 CFR Section: 72.75(d)(1) - SFTY EQUIP. DISABLED OR FAILS TO FUNCTION	Person (Organization): MARK HAIRE (R4DO) WILLIAM GOTT (IRD)

Event Text

SPENT FUEL CANISTER BECAME BOUND DURING DOWNLOAD INTO DRY STORAGE

"On Friday, August 3, [2018,] at approximately 1245 PST, Holtec International (a contractor for Southern California Edison (SCE)) was lowering a Multi-Purpose Canister (MPC) loaded with spent fuel into the Cavity Enclosure Container (CEC) of the SONGS Holtec UMAX Independent Spent Fuel Storage Installation (ISFSI) for purposes of dry storage. The canister was suspended from a Holtec Vertical Cask Transporter (VCT). During the download, the canister encountered an interference with the CEC divider shell and became bound in place. As a result, the downloader slings of the VCT became slack while the MPC was resting partially inside the CEC.

"Once Holtec became aware of the situation, the VCT towers were raised in order to restore tension in the rigging and to raise the MPC. The VCT was then adjusted, and the MPC was then safely lowered into the CEC and the rigging was disengaged.

"There was no effect on the integrity of the canister or release of radioactive material as a result of this event.

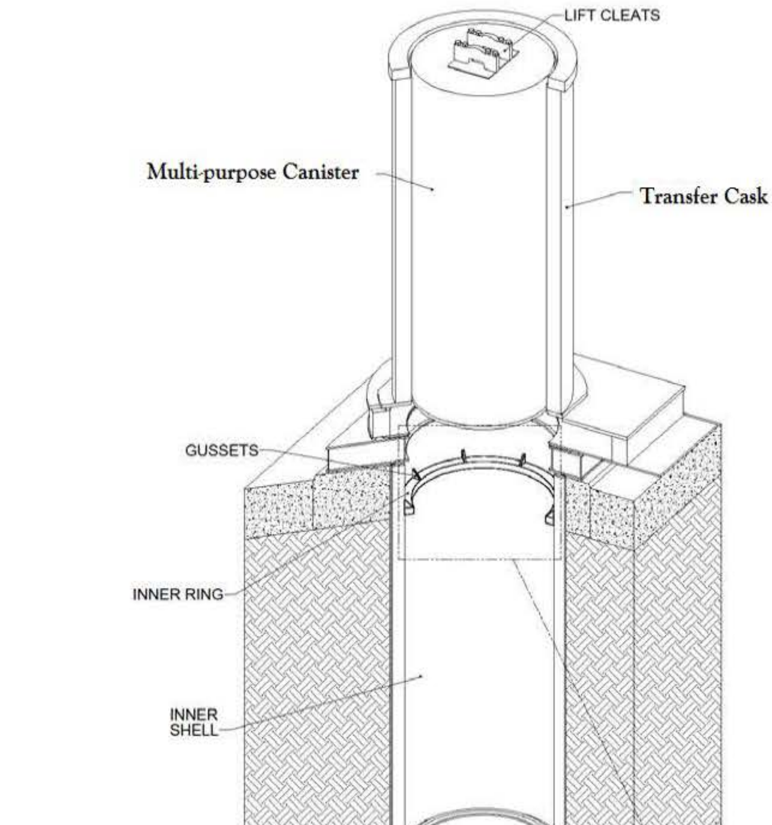
"This event meets the reporting criteria of 10CFR72.75(d)(1) in that the VCT, which is an important-to-safety component, was placed in a configuration which defeated its ability to perform its safety function. The VCT and associated rigging are described in Certificate of Compliance 1040, Technical Specification 5.2.c.3, which requires that lifting equipment shall have redundant drop protection features which prevent uncontrolled lowering of the load. By placing the VCT in the configuration of this event, the single-failure proof nature of the lifting devices was defeated. The VCT was no longer capable of mitigating the consequence of an accident, and there was no redundant equipment available and operable to perform the required safety function.

"SCE made an original determination that the event did not require a report. However, SCE contacted the NRC [Region IV] on Monday August 6th and again on Tuesday August 7th to provide details of the event.

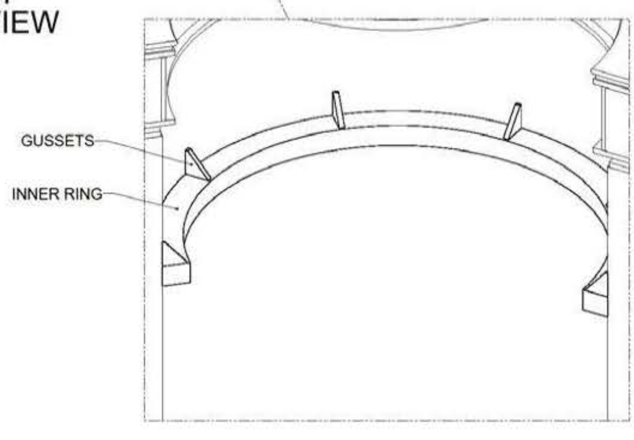
"It has now been determined that the event is reportable under 10CFR72.75(d)(1) and this late report is being made."

Licensee notified RIV (Simpson).

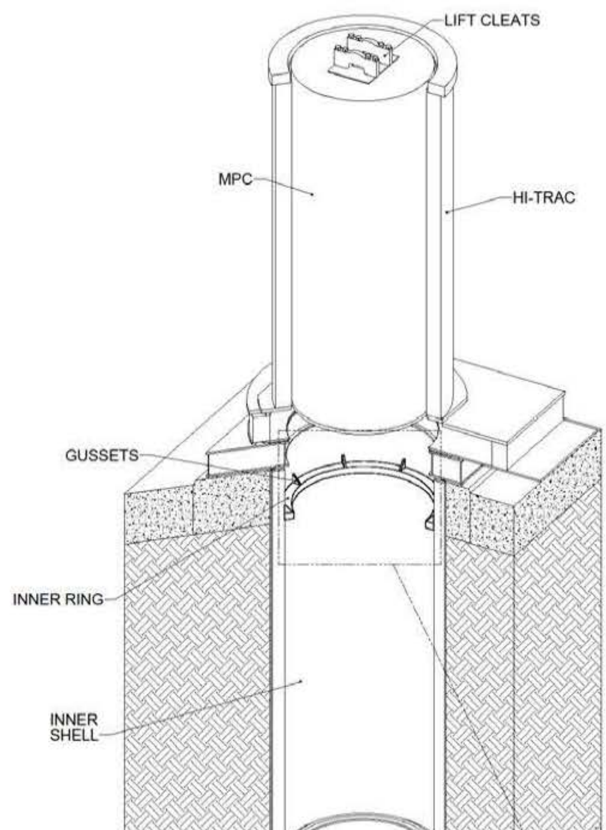
[*Source: Event Notification Reports on NRC Public Site. https://www.nrc.gov/reading-rm/doc-collections/event-status/event/2018/20180917en.html#en53605*]



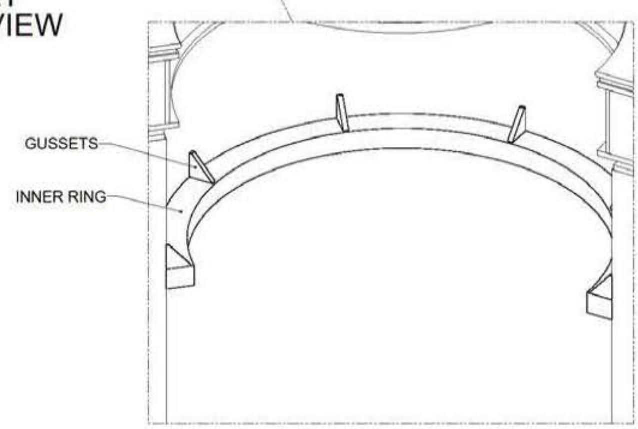
CUT-A-WAY
ISOMETRIC VIEW



DETAIL VIEW



CUT-A-WAY
ISOMETRIC VIEW



DETAIL VIEW

TRADITIONAL ENFORCEMENT PANEL WORKSHEET

EA: 18-155
Date of Panel: 10/25/18
Licensee: Southern California Edison
Facility/Location: San Clemente, CA
License Type: 10 CFR 72 General License
Docket No(s): 50-206; 50-361; 50-362; 72-041
License No(s): DPR-12; NPF-10; NPF-15
Inspection Report Number: 07200041/2018-001
Inspection Date(s): September 10-14, 2018
Date of Violation: August 3, 2018
OI Report Number / Date: N/A
Statute of Limitation:

PANEL MEMBERS:
Panel Chairman (SES Sponsor): Troy Pruett/Linda Howell
Responsible Branch Chief/Lead Inspector: Katanic/Simpson
RIV Enforcement Representative: Kramer/Vasquez
Other regional attendees: Chris Smith
Headquarters attendees:

A. Purpose of Panel:

To determine the appropriate enforcement actions for two apparent violations (AV) of NRC requirements. The AVs are related to the licensee's failure to: (1) handle spent fuel storage canisters according to the requirements of the Certificate of Compliance for its generally licensed Independent Spent Fuel Storage Installation and (2) make the proper notification to NRC of an event in which safety systems were disabled and would not have been available to mitigate the consequences of an accident when required.

Three other violations involving the licensee's ISFSI program were identified and are characterized as SL IV violations in accordance with the NRC Enforcement Policy. The SL IV violations are described in the attachment to this worksheet.

B. Background:

On August 3, 2018, San Onofre was engaged in operations involving movement of a loaded spent fuel storage canister into its underground Independent Spent Fuel Storage Installation (ISFSI) storage vault (Holtec HI-STORM UMAX storage system). This was canister number 29 of a planned 73 canisters to be loaded into the ISFSI. As the loaded spent fuel canister was being lowered into the storage vault using lifting and rigging equipment, the licensee's personnel failed to notice that the canister was misaligned and was not being properly lowered. The licensee continued to lower the rigging and lifting equipment until staff believed that the canister had been fully lowered to the bottom of the storage vault. However, a radiation protection technician identified radiation readings that were not consistent with a fully lowered canister. The licensee then identified that the loaded spent fuel canister was resting on a metal flange or metal gussets near the top of the storage vault, preventing it from being lowered, and that the rigging and lifting equipment was slack and no longer bearing the load of the canister.

In this circumstance, with the important-to-safety lifting equipment completely lowered and the connecting slings completely slack and incapable of suspending the load, the equipment was no longer capable of performing its designed safety function of holding and controlling the loaded canister from a potential canister drop condition. The licensee reported that they believed that the canister was resting on a metal flange (shield ring) within the storage vault.

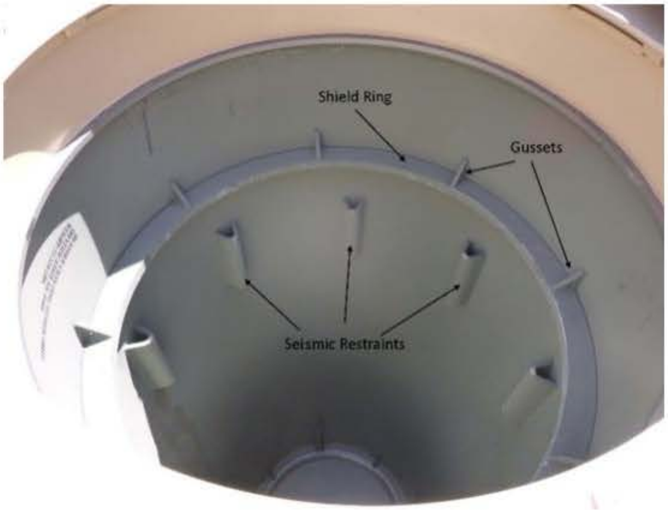


FIGURE 1 VAULT DIVIDER SHELL INTERNAL STRUCTURES

It was estimated that the canister could have experienced an approximately 18 foot drop into the storage vault if the canister had slipped off the metal flange or if the metal flange failed. This load drop accident is not a condition analyzed in the dry fuel storage system's Final Safety Analysis Report.

In response to the discovery that the canister was not fully lowered, the licensee's staff took immediate actions to restore the control of the load to the rigging and lifting devices. The estimated time the canister was in an unanalyzed drop condition was approximately 45 minutes to 1 hour. The staff regained control of the load, repositioned the canister, and lowered it into the storage vault. The licensee halted all dry fuel storage movement operations in order to fully investigate the incident and develop corrective actions to prevent recurrence.

Region IV staff was informed of the incident three days later, on August 6,2018, and held prompt discussions with the licensee at the staff and senior management levels. The Region discussed the licensee's plans for evaluation and follow-up for the incident and the status of fuel loading operations. The licensee agreed to suspend fuel loading and has made public statements to that effect. Region IV chartered a Special Inspection Team to review the incident, any relevant background information, causal and risk assessments conducted by the licensee, and proposed corrective actions (ML18229A203). The Special Inspection Team was onsite during September 10-14, 2018.

Southern California Edison agreed to suspend fuel loading operations until such time as their senior management is satisfied with all short term corrective actions, the NRC inspection is complete, and NRC has determined that corrective actions taken are sufficient to prevent a similar occurrence.

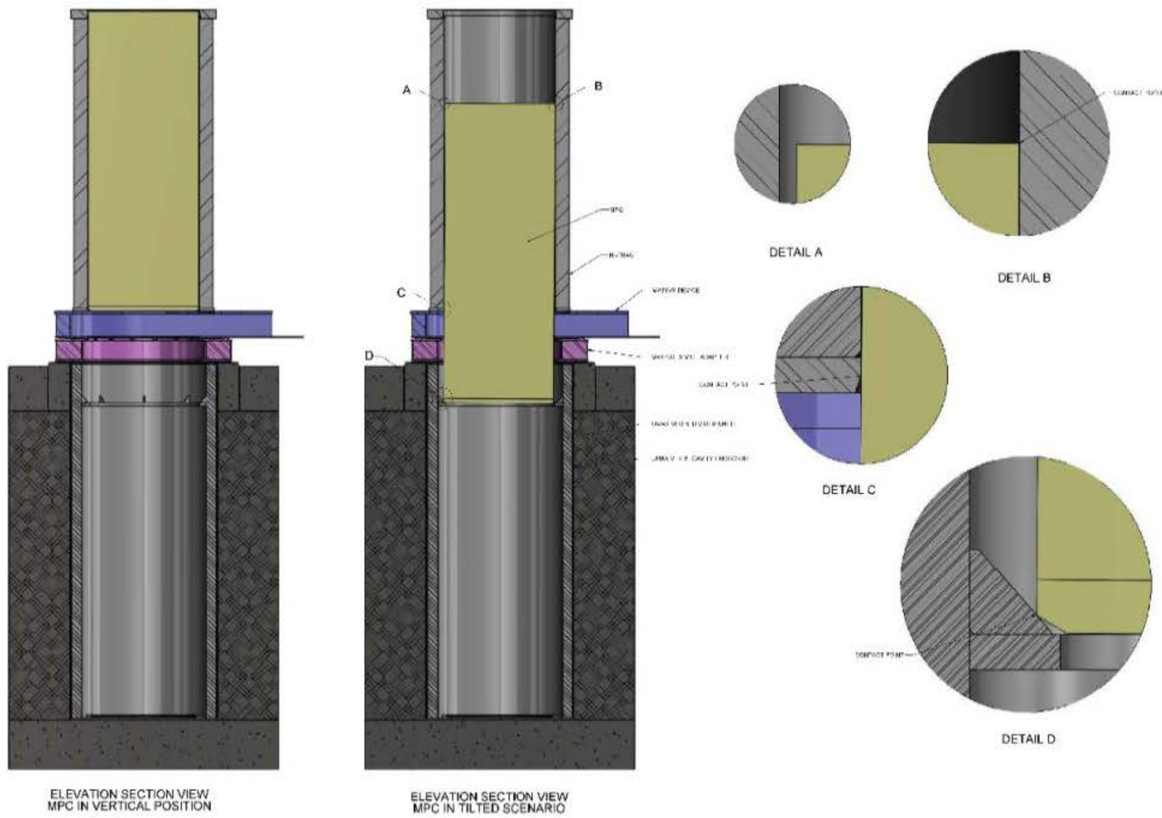


FIGURE 2 MPC DOWNLOADING W/ MPC STUCK ON DIVIDER SHELL SHIELD RING

C. Brief Summary of Issues / Potential Violations:

AV1:

10 CFR 72.212(b)(3) requires, in part, that each cask used by the general licensee conforms to the terms, conditions, and specifications of a Certificate of Compliance listed in 10 CFR 72.214.

10 CFR 72.214 included casts approved for storage of spent fuel under the conditions specified in Certificate of Compliance Number 1040.

Certificate of Compliance Number 1040, Amendment 2, Condition 4 "HEAVY LOADS REQUIREMENTS" requires, in part, that lifting operations outside of structures governed by 10 CFR Part 50 must be in accordance with Section 5.2 of Appendix A. Section 5.2 of Appendix A, step 5.2.c.3 requires, in part, that the transfer cask, when loaded with spent fuel, may be lifted to and carried at any height during multi-purpose canister (MPC) transfer provided the lifting equipment is designed with redundant drop protection features which prevent uncontrolled lowering of the load.

Contrary to the above, on August 3, 2018, during MPC transfer, when loaded with spent fuel, the licensee failed to ensure the lifting equipment was designed with redundant drop

protection features which prevent uncontrolled lowering of the load. Specifically, licensee personnel inadvertently disabled the important-to-safety vertical cask transporter cross beam and downloader slings when personnel lowered the vertical cask transporter cross beam to the fully seated position while the MPC was suspended by the metal shield ring or gusset in the stack-up position approximately 18 feet above the fully seated position in the vault.

AV2:

10 CFR 72.75(d)(1) requires, in part, that each licensee shall notify the NRC within 24 hours after the discovery of any of the following events involving spent fuel in which important to safety equipment is disabled or fails to function as designed when: (i) the equipment is required by certification of compliance to be available and operable to mitigate the consequences of an accident; and (ii) no redundant equipment was available and operable to perform the required safety function.

Contrary to the above, from August 6 to September 14, 2018, the licensee failed to notify the NRC within 24 hours after the discovery of any of the following events involving spent fuel in which important to safety equipment is disabled or fails to function as designed when: (i) the equipment is required by certification of compliance to be available and operable to mitigate the consequences of an accident; and (ii) no redundant equipment was available and operable to perform the required safety function. Specifically, the licensee failed to make the required 24-hour notification after discovery of an important-to-safety vertical cask transporter was disabled and failed to function as designed when required by license condition Technical Specification 5.2.c.3 to provide redundant drop protection features to prevent and mitigate the consequences of a drop accident and no redundant equipment was available and operable to perform the required safety function.

D Root Cause:
The causal factors will be described in detail in the Inspection Report. The root case can be attributed to the licensee management's failure to provide adequate oversight of licensed activities performed by a dry cask storage vendor at its ISFSI. The Special Inspection team identified causal factors that can be attributed to: adequacy of procedures used during canister downloading operations, adequacy of training and supervisory oversight, and deficiencies in implementing the licensee's Corrective Action program.

SCE apparent cause evaluation TBD.
Holtec International root cause evaluation TBD

E. Actual Consequences: None.

F. Potential Consequences: The inspection includes a review of the licensee's assessment of the potential impact on the loaded MPC (contact between the canister and the shield ring or gussets), as well as review of the licensee's analysis of potential impacts on the canister and fuel had the canister dropped. We have reviewed draft analyses from the licensee and the licensee's initial evaluations were deficient. Subject matter experts at NRC identified shortcomings in the licensee's analytical methods regarding the MPC-37 load drop such that SCE was required to perform a reanalysis. The revised calculation provided by the licensee shows that the canister would remain intact in the event of a load drop. We are currently evaluating the acceptability of the licensee's evaluation.

The licensee has not provided to NRC an assessment of the condition of the spent fuel assemblies stored within the MPC after a potential load drop. Our preliminary assessment indicates that any undamaged fuel assemblies inside the canister prior to the load drop would be damaged afterwards and would no longer meet the storage requirements of the Certificate of Compliance. As a result, the spent fuel assemblies within the MPC-37 canister following a potential load drop would require a license amendment to be allowed to remain in the SONGS ISFSI. Otherwise, the MPC-37 canister would need to be returned to the SONGS spent fuel pool where the spent fuel assemblies would be removed, assessed, and possibly repackaged into damaged fuel containers for storage in the SONGS ISFSI.

A potential load drop scenario also calls into question aging management concerns regarding long term MPC integrity due to possible stress induced corrosion cracking issues related to additional stresses imparted s to MPC confinement welds, as well and any scratches and gouging experienced by the MPC during the drop event.

We are awaiting receipt of the licensee's final analyses, including an assessment of the status of spent fuel assemblies within the MPC.

G. Potential for Impacting the Regulatory Process:

AV1:N/A

AV2

A more timely notification of the event provided to the Headquarters Operations Officer would have allowed for NRC to enter into the decision making process for a reactive inspection 4 days sooner.

A notification to the NRC Operations Center would have received a higher level of visibility of the event by the program office and NRC decision makers who would not have needed to be contacted by the Regional office, which was the case given the "courtesy notification" that Region IV received on Monday afternoon, August 6th.

H. Apparent Severity Level and Basis (based on factors E-G, *absent willfulness*):

AV1

This is an example of a Severity Level III violation based on the NRC Enforcement Policy, Section 6.3.c.1(a) and (b), "A system designed to prevent or mitigate a serious safety event has one of the following characteristics: (a) It is unable to perform its intended function under certain conditions, or (b) It is outside design specifications to the extent that a detailed evaluation would be required to determine its operability." In the Case of the August 3, 2018, event at SONGS, both conditions apply.

Two MPC downloader slings, each of which was capable to carry the full weight an MPC-37 canister, were the redundant drop protection features used to satisfy the license requirements at SONGS. The inadvertent disabling of both downloader slings was a serious safety event. This event allowed the MPC canister to enter into a potential accident scenario that was considered non-credible in the Holtec HI-STORM UMAX FSAR and the consequences of which were unanalyzed.

This event also meets the Enforcement Policy criteria for a Severity Level III violation under Section 6.1.c.4 in which a licensee fails to adequately oversee contractors, which results in the use of safety significant products or services that are defective or of indeterminate quality.

SCE, the licensee, was observing downloading operations being carried out by its contractor, Holtec, on August 3, 2018. The contractor's use of the Important to Safety Vertical Cask Transporter with the downloader slings disabled represents a defective use of a safety significant product. In this case both the licensee and its contractor failed to recognize that license required safety features had been disabled.

AV2

This is an example of a Severity Level III violation based on the NRC Enforcement Policy, Section 6.9.c.2(d), "Inaccurate and Incomplete Information or Failure to Make a Required Report," SL III violations involve "a withholding of information or a failure to make a required report occurs. If this information had been provided or the report been made, it would likely have caused the NRC to reconsider a regulatory position or undertake a substantial further inquiry [like chartering a Special Investigation]; or for a materials licensee, failure to make an immediate or 24-hour report or notification when required."

I. **Consideration of Willful Aspects, if any:** N/A

J. **Impact of Willful Consideration, if applicable:** N/A

K. **Application of Enforcement Policy Civil Penalty Assessment**

1. **Enforcement/Performance History:** None.
   There have been no escalated enforcement actions taken against the licensee within the last 2 years.

2. **Is Credit Warranted for Identification of the violation(s)? Explain:** N/A

3. **Is Credit Warranted for Corrective Actions? Explain:**

   AV1: TBD

   After the issue was identified, Holtec performed a Root Cause Evaluation and SCE performed an Apparent Cause Evaluation. Those items and the final corrective actions have not been finalized, however.

   AV2: TBD
   SCE did make a late notification to the NRC Headquarters Operations Center after they were prompted by the NRC and informed of a potential violation that was being considered by the Special Inspection Team. Although the notification was made, the NRC has not reviewed any changes to the licensee's notification procedures or other corrective actions to prevent recurrence.

4. **Based on the Enforcement Process, is a Civil Penalty Warranted?** TBD

L. For each violation subject to a civil penalty, should discretion be exercised to mitigate or escalate the sanction? N/A

M. Is action being considered against individuals? No.

N. Recommended Regional Enforcement Strategy:

Region IV recommends issuing a choice letter and inspection report identifying two (2) apparent violations (AVs) and issue three (3) SL IV violations in a Notice of Violation (NOV), with a written response required for the NOV. The choice letter would offer either a Predecisional Enforcement Conference (PEC) or Alternative Dispute Resolution (ADR).

O. Relevant Precedent/Non-routine Issues/Lessons Learned/Additional Information:
See below: (1) SLIV violations, (2) Licensee's procedures, etc.,

DRAFT NOVS FOR SEVERITY LEVEL IV VIOLATIONS

SLIV-1:

10 CFR 72.150, requires, in part, that, the licensee shall prescribe activities affecting quality by documented instructions or procedures of a type appropriate to the circumstances and must include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Contrary to the above, June 19 to September 14, 2018, the licensee failed to prescribe activities affecting quality by documented instructions or procedures of a type appropriate to the circumstances and include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished, as evidence by the following two examples:

1. Procedure HPP-2464-400, "MPC Transfer at SONGS," Rev. 15, step 7.6.23 did not include appropriate quantitative or qualitative acceptance criteria for determining when the download slings become slack prior to the MPC being in the full down position.

2. Procedure HPP-2464-400, step 7.6.25 did not include appropriate quantitative or qualitative acceptance criteria for verifying that the MPC has been fully downloaded.

SLIV-2:

10 CFR 72.190 requires, in part, that operation of equipment and controls that have been identified as important-to-safety in the Safety Analysis Report must be limited to trained and certified personnel or be under the direct visual supervision of an individual with training and certification in the operation.

Contrary to the above, on August 3, 2018, the licensee failed to assure that operation of equipment and controls that have been identified as important to safety in the Safety Analysis Report were limited to trained and certified personnel or were under the direct visual supervision of an individual with training and certification in the operation. Specifically, a rigger/spotter, who had not received any formal training in downloading operations, was responsible for making the determination that the important-to-safety canister had been fully downloaded and seated within the vault. In addition, the employee had never performed the MPC transfer evolution before and was unsure of what their exact role was in the process.

SLIV-3:

10 CFR 72.172 requires, in part, that, licensees shall establish measures to ensure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances, are promptly identified and corrected.

Contrary to the above, the licensee failed to establish measures to ensure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances, were promptly identified and corrected, as evidence by the following two examples:

1. On July 22, 2018, during MPC transfer, when the download slings did not support the full weight of the MPC numerous times such that a typical 15-minute evolution took approximately 90 minutes to perform, the licensee failed to enter the condition into the corrective action program.

2. From January 22 to August 3, 2018, during MPC transfer, the downloading activity often involved at a least moderate amounts of contact between the MPC and the divider shell assembly as the MPC is lowered for its final placement. The licensee failed to enter this condition into the corrective action program and perform an assessment to disposition the exterior conditions of all of the downloaded MPCs as being acceptable.

License, licensee's procedures, etc., attached

NRC FORM 651
(3-1999)
10 CFR 72

U.S. NUCLEAR REGULATORY COMMISSION

CERTIFICATE OF COMPLIANCE
FOR SPENT FUEL STORAGE CASKS
Supplemental Sheet

Certificate No. 1040
Amendment No. 2
Page 3 of 4

4. HEAVY LOADS REQUIREMENTS

Each lift of an MPC or a HI-TRAC VW transfer cask must be made in accordance to the existing heavy loads requirements and procedures of the licensed facility at which the lift is made. A plant-specific review of the heavy load handling procedures (under 10 CFR 50.59 or 10 CFR 72.48, as applicable) is required to show operational compliance with existing plant specific heavy loads requirements. Lifting operations outside of structures governed by 10 CFR Part 50 must be in accordance with Section 5.2 of Appendix A.

5. APPROVED CONTENTS

Contents of the HI-STORM UMAX Canister Storage System must meet the fuel specifications given in Appendix B to this certificate.

6. DESIGN FEATURES

Features or characteristics for the site or system must be in accordance with Appendix B to this certificate.

7. CHANGES TO THE CERTIFICATE OF COMPLIANCE

The holder of this certificate who desires to make changes to the certificate, which includes Appendix A (Technical Specifications) and Appendix B (Approved Contents and Design Features), shall submit an application for amendment of the certificate.

8. PRE-OPERATIONAL TESTING AND TRAINING EXERCISE

A dry run training exercise of the loading, closure, handling, unloading, and transfer of the HI-STORM UMAX Canister Storage System shall be conducted by the licensee prior to the first use of the system to load spent fuel assemblies. The training exercise shall not be conducted with spent fuel in the MPC. The dry run may be performed in an alternate step sequence from the actual procedures, but all steps must be performed. The dry run shall include, but is not limited to the following:

a. Moving the MPC and the transfer cask into the spent fuel pool or cask loading pool.

b. Preparation of the HI-STORM UMAX Canister Storage System for fuel loading.

c. Selection and verification of specific fuel assemblies to ensure type conformance.

d. Loading specific assemblies and placing assemblies into the MPC (using a dummy fuel assembly), including appropriate independent verification.

e. Remote installation of the MPC lid and removal of the MPC and transfer cask from the spent fuel pool or cask loading pool.

f. MPC welding, NDE inspections, pressure testing, draining, moisture removal (by vacuum drying or forced helium dehydration, as applicable), and helium backfilling. (A mockup may be used for this dry-run exercise.)

g. Transfer of the MPC from the transfer cask to the VVM.

CoC 1040 Appendix A Tech Spec 5.2.c.3

5.0 ADMINISTRATIVE CONTROLS AND PROGRAMS (continued)

5.2 Transport Evaluation Program

a. For lifting of the loaded MPC or TRANSFER CASK using equipment which is integral to a structure governed by 10 CFR Part 50 regulations, 10 CFR 50 requirements apply.

b. This program is not applicable when the TRANSFER CASK is in the FUEL BUILDING or is being handled by equipment providing support from underneath (i.e., on a rail car, heavy haul trailer, air pads, etc...).

c. The TRANSFER CASK when loaded with spent fuel, may be lifted to and carried at any height necessary during TRANSPORT OPERATIONS and MPC TRANSFER, provided the lifting equipment is designed in accordance with items 1, 2, and 3 below.

1. The metal body and any vertical columns of the lifting equipment shall be designed to comply with stress limits of ASME Section III, Subsection NF, Class 3 for linear structures. All vertical compression loaded primary members shall satisfy the buckling criteria of ASME Section III, Subsection NF.

2. The horizontal cross beam and any lifting attachments used to connect the load to the lifting equipment shall be designed, fabricated, operated, tested, inspected, and maintained in accordance with applicable sections and guidance of NUREG-0612, Section 5.1. This includes applicable stress limits from ANSI N14.6.

3. The lifting equipment shall have redundant drop protection features which prevent uncontrolled lowering of the load.

HI-STORM UMAX 1040 FSAR Rev 3 Glossary Terms

TAL is an acronym for the Tapped Anchor Location.

Thermal Capacity of the HI-STORM system is defined as the amount of heat the storage system, containing an MPC loaded with CSF stored in *uniform storage,* will actually reject with the ambient environment at the normal temperature and the peak fuel cladding temperature (PCT) at 400°C.

Thermo-siphon is the term used to describe the buoyancy-driven natural convection circulation of helium within the MPC fuel basket.

Top MPC Guides and Bottom MPC Guides mean the set of radial plates that are shaped to aid in the insertion and withdrawal of MPCs and serve to restrain the MPC's lateral movement during seismic events.

TOG is an acronym for top-of-the-grade of the ISFSI and identified by the by the riding surface of the cask transporter.

Traveler means the set of sequential instructions used in a controlled manufacturing program to ensure that all required tests and examinations required upon the completion of each significant manufacturing activity are performed and documented for archival reference.

Undamaged Fuel Assembly is defined as a fuel assembly without known or suspected cladding defects greater than pinhole leaks and hairline cracks, and which can be handled by normal means. Fuel assemblies without fuel rods in fuel rod locations shall not be classified as Intact Fuel Assemblies unless dummy fuel rods are used to displace an amount of water greater than or equal to that displaced by the fuel rod(s).

Under-grade is the space below the SFP.

Uniform Fuel Loading is a fuel loading strategy where any authorized fuel assembly may be stored in any fuel storage location, subject to other restrictions in the CoC, such as those applicable to non-fuel hardware, and damaged fuel containers.

Vertical Cask Transporter or VCT is the generic name for a device that has the ability to raise or lower a cask or a canister with the built-in safety of a redundant drop protection system. A VCT may be designed to be limited in its operation space to the ISFSI pad area and/or it may have the capability to translocate the cask over a suitably engineered haul path.

VVM is an acronym for Vertical Ventilated Module

ZPA is an acronym for zero period acceleration.

ZR means any zirconium-based fuel cladding material authorized for use in a commercial nuclear power plant reactor. Any reference to Zircaloy fuel cladding in this FSAR applies to any zirconium-based fuel cladding material.

HI-STORM UMAX 1040 FSAR Rev 3 Section 2.7 Safety Protection Systems

b. Cask Cooling

To ensure that an effective passive heat removal capability exists for long-term satisfactory performance, several thermal design features are incorporated in the storage system. They are as follows:

The MPC fuel basket is formed by a honeycomb structure of Metamic-HT plates which allows the unimpeded conduction of heat from the center of the basket to the periphery. The MPC cavity is equipped with the capability to circulate helium internally by natural buoyancy effects and transport heat from the interior region of the canister to the peripheral region (Holtec Patent 5,898,747).

The MPC confinement boundary ensures that the inert gas (helium) atmosphere inside the MPC is maintained during normal, off-normal, and accident conditions of storage and transfer. The MPC confinement boundary maintains the helium confinement atmosphere below the design temperatures and pressures stated in Table 2.3.7 and Table 2.3.5, respectively.

The MPC thermal design maintains the fuel rod cladding temperatures below the ISG-11 limits such that fuel cladding does not experience degradation during the long term storage period.

The HI-STORM UMAX is optimally designed, with multiple cooling passages and suitably sized flow annuli, which maximize air flow by ensuring a turbulent flow regime at Design Basis heat loads.

As shown in the licensing drawing package, cooling air to each MPC storage cavity is provided by four independent ducts. Thus, there is a significant level of redundancy in the cooling air delivery system for the HI-STORM UMAX.

As can be observed from the licensing drawings, the air inlet locations are separated from the outlet vent by a significant lateral and vertical distance. This design feature ensures that there is minimal mixing of cold and heated air in the storage system. Calculations summarized in Chapter 4 show that the heat rejection performance of the system is stable under varying wind speed.

2.7.3 Protection by Equipment and Instrumentation Selection

a. Equipment

The HI-STORM UMAX System may include use of ancillary or support equipment for ISFSI implementation. Ancillary equipment and structures utilized at the HI-STORM UMAX ISFSI may be broken down into two broad categories, namely Important-to-Safety (ITS) ancillary equipment and Not Important to Safety (NITS) ancillary equipment. NUREG/CR-6407 provides guidance for the determination of a component's safety classification [2.6.4].

The only ancillary equipment used in conjunction with the MPC loading at an ISFSI consists of the Mating Device (a patented design, see Table 1.3.2) and the load handling device such as the cask transporter.

The MPC transfer is carried out by actuating the Mating Device and moving the MPC vertically to the cylindrical cavity of the recipient VVM cavity. The mating device is actuated by removing the bottom lid of the HI-TRAC transfer cask. The device utilized to lift the HI-TRAC transfer cask to place it on the VVM and to vertically transfer the MPC may be of stationary or mobile

type, but it must have redundant drop protection features. The cask transporter can serve as the load handling device.

b. Instrumentation

As a consequence of the passive nature of the HI-STORM UMAX System, Important-to-Safety instrumentation is not necessary. No instrumentation is required or provided for HI-STORM UMAX storage operations, other than normal security service instruments and dosimeters.

However, in lieu of performing the periodic inspection of the HI-STORM UMAX VVM vent screens, temperature elements may be installed inside the VVM outlet duct and below the bottom of outlet screen to continuously monitor the air temperature. If the temperature elements and associated temperature monitoring instrumentation are used as the sole means of surveillance then they shall be designated as Important-to-Safety.

TRADITIONAL ENFORCEMENT PANEL WORKSHEET

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Three other violations involving the licensee's ISFSI program were identified and are characterized as SL IV violations in accordance with the NRC Enforcement Policy. The SL IV violations are described in the attachment to this worksheet.

B. Background:

On August 3, 2018, San Onofre was engaged in operations involving movement of a loaded spent fuel storage canister into its underground Independent Spent Fuel Storage Installation (ISFSI) storage vault (Holtec HI-STORM UMAX storage system). This was canister number 29 of a planned 73 canisters to be loaded into the ISFSI. As the loaded spent fuel canister was being lowered into the storage vault using lifting and rigging equipment, the licensee's personnel failed to notice that the canister was misaligned and was not being properly lowered. The licensee continued to lower the rigging and lifting equipment until staff believed that the canister had been fully lowered to the bottom of the storage vault. However, a radiation protection technician identified radiation readings that were not consistent with a fully lowered canister. The licensee then identified that the loaded spent fuel canister was resting on a metal flange or metal gussets near the top of the storage vault, preventing it from being lowered, and that the rigging and lifting equipment was slack and no longer bearing the load of the canister.

In this circumstance, with the important-to-safety lifting equipment completely lowered and the connecting slings completely slack and incapable of suspending the load, the equipment was no longer capable of performing its designed safety function of holding and controlling the loaded canister from a potential canister drop condition. The licensee reported that they believed that the canister was resting on a metal flange (shield ring) within the storage vault.

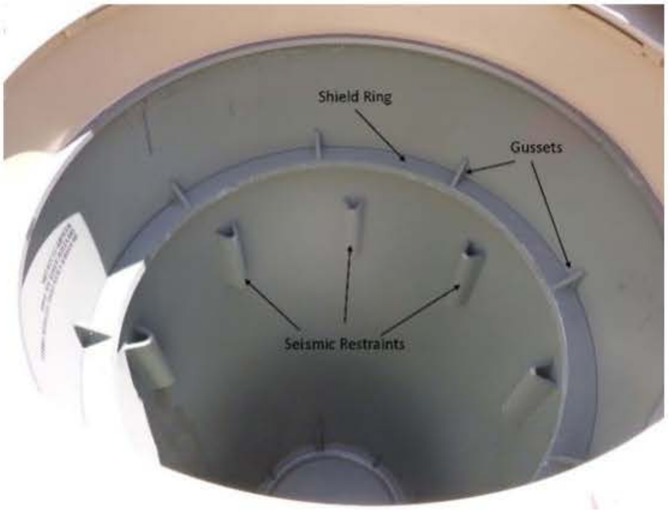


FIGURE 1 VAULT DIVIDER SHELL INTERNAL STRUCTURES

It was estimated that the canister could have experienced an approximately 18 foot drop into the storage vault if the canister had slipped off the metal flange or if the metal flange failed. This load drop accident is not a condition analyzed in the dry fuel storage system's Final Safety Analysis Report.

In response to the discovery that the canister was not fully lowered, the licensee's staff took immediate actions to restore the control of the load to the rigging and lifting devices. The estimated time the canister was in an unanalyzed drop condition was approximately 45 minutes to 1 hour. The staff regained control of the load, repositioned the canister, and lowered it into the storage vault. The licensee halted all dry fuel storage movement operations in order to fully investigate the incident and develop corrective actions to prevent recurrence.

Region IV staff was informed of the incident three days later, on August 6,2018, and held prompt discussions with the licensee at the staff and senior management levels. The Region discussed the licensee's plans for evaluation and follow-up for the incident and the status of fuel loading operations. The licensee agreed to suspend fuel loading and has made public statements to that effect. Region IV chartered a Special Inspection Team to review the incident, any relevant background information, causal and risk assessments conducted by the licensee, and proposed corrective actions (ML18229A203). The Special Inspection Team was onsite during September 10-14, 2018.

Southern California Edison agreed to suspend fuel loading operations until such time as their senior management is satisfied with all short term corrective actions, the NRC inspection is complete, and NRC has determined that corrective actions taken are sufficient to prevent a similar occurrence.

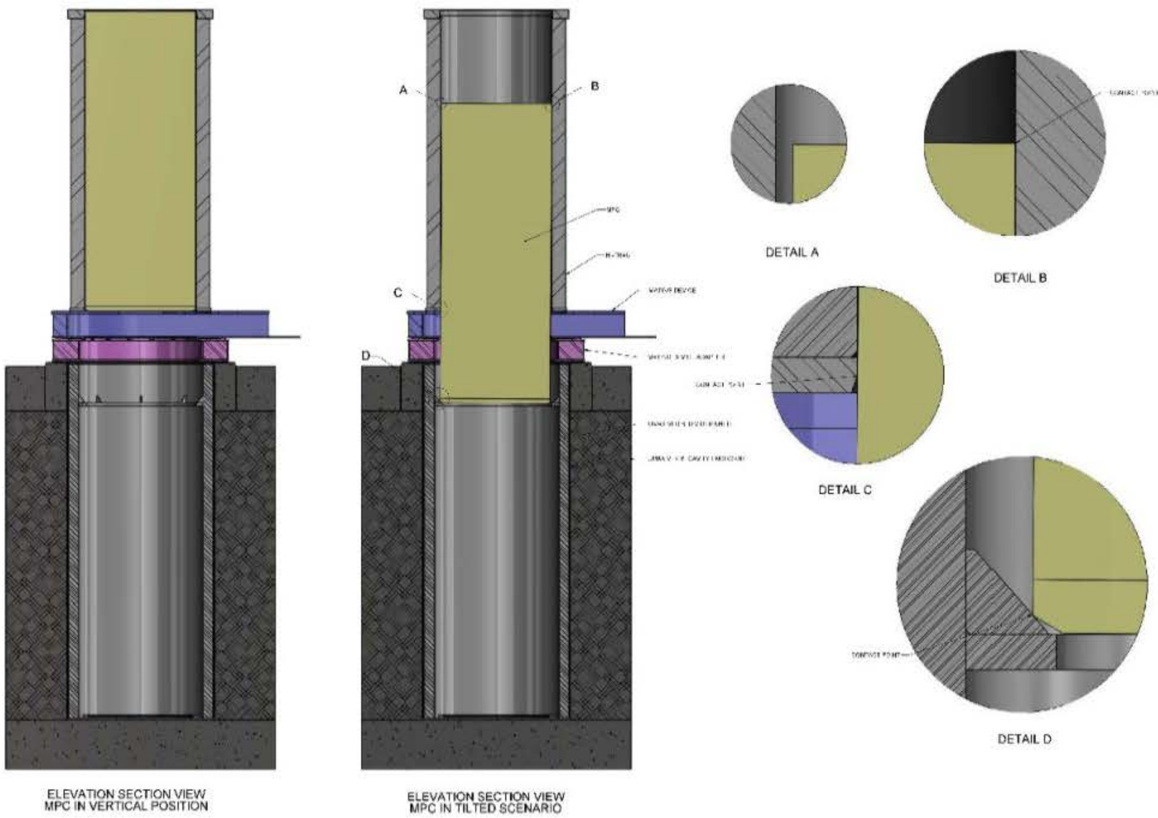


FIGURE 2 MPC DOWNLOADING W/ MPC STUCK ON DIVIDER SHELL SHIELD RING

C. Brief Summary of Issues / Potential Violations:

AV1:

10 CFR 72.212(b)(3) requires, in part, that each cask used by the general licensee conforms to the terms, conditions, and specifications of a Certificate of Compliance (CoC) listed in 10 CFR 72.214.

10 CFR 72.214 included casts approved for storage of spent fuel under the conditions specified in Certificate of Compliance Number 1040.

Certificate of Compliance Number 1040, Amendment 2, dated January 6, 2017, for the Holtec HI-STORM UMAX ISFSI. CoC 1040, Appendix A, Technical Specification 5.2.c.3, requires that during Transportation Operations and MPC Transfer, the lifting equipment shall have redundant drop protection features which prevent uncontrolled lowering of the load.

Contrary to the above, on August 3, 2018, during MPC transfer operations the licensee failed to ensure the lifting equipment had redundant drop protection features which prevent uncontrolled lowering of the load. Specifically, the licensee lifted MPC #29 to be placed in the SONGS UMAX ISFSI, loaded with spent fuel and during the transfer operation disabled the safety devices and failed to have redundant drop protection features which would have

prevented uncontrolled lowering of the load. The licensee disabled the Important to Safety Vertical Cask (VCT) Transported cross beam and downloader slings when the licensee lowered the VCT cross beam to the fully seated position while the MPC was suspended by the metal shield ring or gusset in the stack-up position approximately 18 feet above the fully seated MPC position in the UMAX ISFSI vault. The loaded MPC was placed in a potential load drop condition for approximately 45 minutes to an hour before the licensee was able to restore the load onto the ITS VCT and slings, thereby enabling the VCT's redundant drop protection features.

During the 45 minutes to an hour time period, no redundant safety equipment was available to perform the required safety function of preventing an uncontrolled lowering of the loaded MPC to mitigate the consequences of an MPC drop accident.

AV2:

10 CFR 72.75(d)(1) requires, in part, that each licensee shall notify the NRC within 24 hours after the discovery of any of the following events involving spent fuel in which important to safety equipment is disabled or fails to function as designed when: (i) the equipment is required by certification of compliance to be available and operable to mitigate the consequences of an accident; and (ii) no redundant equipment was available and operable to perform the required safety function.

Contrary to the above, on August 3, 2018, the licensee failed to notify the NRC within 24 hours after the discovery of any of the following events involving spent fuel in which important to safety equipment is disabled or fails to function as designed when: (i) the equipment is required by certification of compliance to be available and operable to mitigate the consequences of an accident; and (ii) no redundant equipment was available and operable to perform the required safety function. Specifically, the licensee failed to make the required 24 hour notification after discovery of the near miss drop event that occurred when the licensee's important to safety Vertical Cask Transporter was disabled and failed to function as designed when required by license condition Technical Specification 5.2.c.3 to provide redundant drop protection features to prevent and mitigate the consequences of a drop accident and no redundant equipment was available and operable to perform the required safety function.

The licensee made the proper notification to the NRC Headquarters Operation Center on September 14, 2018, approximately one month and eleven days after the event took place, and only after considerable prompting by the NRC.

D Root Cause:

The causal factors will be described in detail in the Inspection Report. The root case can be attributed to the licensee management's failure to provide adequate oversight of licensed activities performed by a dry cask storage vendor at its ISFSI. The Special Inspection team identified causal factors that can be attributed to: adequacy of procedures used during canister downloading operations, adequacy of training and supervisory oversight, and deficiencies in implementing the licensee's Corrective Action program.

SCE apparent cause evaluation TBD.
Holtec International root cause evaluation TBD

E. Actual Consequences: None.

F. Potential Consequences: The inspection includes a review of the licensee's assessment of the potential impact on the loaded MPC (contact between the canister and the shield ring or gussets), as well as review of the licensee's analysis of potential impacts on the canister and fuel had the canister dropped. We have reviewed draft analyses from the licensee and the licensee's initial evaluations were deficient. Subject matter experts at NRC identified shortcomings in the licensee's analytical methods regarding the MPC-37 load drop such that SCE was required to perform a reanalysis. The revised calculation provided by the licensee shows that the canister would remain intact in the event of a load drop. We are currently evaluating the acceptability of the licensee's evaluation.

The licensee has not provided to NRC an assessment of the condition of the spent fuel assemblies stored within the MPC after the load drop. Our preliminary assessment indicates that any undamaged fuel assemblies inside the canister prior to the load drop would be damaged afterwards and would no longer meet the storage requirements of the Certificate of Compliance.

A load drop scenario also calls into question aging management concerns regarding long term MPC integrity due to possible stress induced corrosion cracking issues related to additional stresses imparted s to MPC confinement welds, as well and any scratches and gouging experienced by the MPC during the drop event.

We are awaiting receipt of the licensee's final analyses, including an assessment of the spent fuel contents of the MPC, which is expected in the near term.

G. Potential for Impacting the Regulatory Process:

AV1:N/A

AV2

A more timely notification of the event provided to the Headquarters Operations Officer would have allowed for NRC to enter into the decision making process for a reactive inspection 4 days sooner.

A notification to the NRC Operations Center would have received a higher level of visibility of the event by the program office and NRC decision makers who would not have needed to be contacted by the Regional office, which was the case given the "courtesy notification" that Region IV received on Monday afternoon, August 6th.

There was a distinct lack of public awareness to this event. SCE was essentially blindsided by a whistleblower at the Community Engagement Panel meeting on August 9, 2018. When the public and media have to learn of potential safety events at an NRC licensed facility in this fashion, both NRC and our licensee's lose credibility in the public's eyes. Judging by the level of public interest in the near miss load drop event, it may have been beneficial for SCE to have made a public announcement about the event.

H. Apparent Severity Level and Basis (based on factors E-G, *absent willfulness*):

AV1

This is an example of a Severity Level III violation based on the NRC Enforcement Policy, Section 6.3.c.1(a) and (b), "A system designed to prevent or mitigate a serious safety event has one of the following characteristics: (a) It is unable to perform its intended function under certain conditions (e.g., a safety system is not operable the VCT boom has the load), or (b) It is outside design specifications to the extent that a detailed evaluation would be required to determine its operability." In the Case of the August 3, 2018, event at SONGS, both conditions apply.

This event also meets the Enforcement Policy criteria for a Severity Level III violation under Section 6.1.c.4 in which a licensee fails to adequately oversee contractors, which results in the use of safety significant products or services that are defective or of indeterminate quality.

AV2

This is an example of a Severity Level III violation based on the NRC Enforcement Policy, Section 6.9.c.2(d), "Inaccurate and Incomplete Information or Failure to Make a Required Report," SL III violations involve "a withholding of information or a failure to make a required report occurs. If this information had been provided or the report been made, it would likely have caused the NRC to reconsider a regulatory position or undertake a substantial further inquiry [like chartering a Special Investigation]; or for a materials licensee, failure to make an immediate or 24-hour report or notification when required."

I. Consideration of Willful Aspects, if any: N/A

J. Impact of Willful Consideration, if applicable: N/A

K. Application of Enforcement Policy Civil Penalty Assessment

1. **Enforcement/Performance History:** None.
   There have been no escalated enforcement actions taken against the licensee within the last 2 years.

2. **Is Credit Warranted for Identification of the violation(s)? Explain:** N/A

3. **Is Credit Warranted for Corrective Actions? Explain:**

   AV1: TBD

   After the issue was identified, Holtec performed a Root Cause Evaluation and SCE performed an Apparent Cause Evaluation. Those items and the final corrective actions have not been finalized, however.

   AV2: TBD
   SCE did make a late notification to the NRC Headquarters Operations Center after they were prompted by the NRC and informed of a potential violation that was being considered by the Special Inspection Team. Although the notification was made, the

NRC has not reviewed any changes to the licensee's notification procedures or other corrective actions to prevent recurrence.

4. **Based on the Enforcement Process, is a Civil Penalty Warranted?** TBD

L. For each violation subject to a civil penalty, should discretion be exercised to mitigate or escalate the sanction? N/A

M. Is action being considered against individuals? No.

N. Recommended Regional Enforcement Strategy:

Region IV recommends issuing a choice letter and inspection report identifying two (2) apparent violations (AVs) and issue three (3) SL IV violations in a Notice of Violation (NOV), with a written response required for the NOV. The choice letter would offer either a Predecisional Enforcement Conference (PEC) or Alternative Dispute Resolution (ADR).

O. Relevant Precedent/Non-routine Issues/Lessons Learned/Additional Information: N/A

DRAFT NOVS FOR SEVERITY LEVEL IV VIOLATIONS

VIO1.
10 CFR 72.150, requires, in part, that, the licensee shall prescribe activities affecting quality by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall require that these instructions, procedures, and drawings be followed. The instructions, procedures, and drawings must include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Contrary to the above, on August 3, 2018, the licensee failed to prescribe activities affecting quality by documented instructions, procedures, or drawings of a type appropriate to the circumstances and failed to require that these instructions, procedures, and drawings include a quantitative or qualitative acceptance criterion for determining that the MPC-37 canister had been fully downloaded into the UMAX ISFSI vault. Three examples of the licensee's failure are as follows:

(1) Procedure HPP-2464-400, “MPC Transfer at SONGS,” Rev. 15, July 16, 2018, did not include appropriate quantitative or qualitative acceptance criteria for determining that the MPC-37 dry fuel storage canister was in the fully downloaded position.

   a. Step 7.6.23 states "if, at any time, the download slings become slack prior to the MPC being in the full down position, then immediately stop lowering the MPC and perform the following: (A) Notify the cask loading supervisor of the status of the MPC; and (B) Initialte corrective actions to determine the cause of the download interruption and to resolve the situation.

      NRC Comment: There is no qualitative description provided for how to determine when the slings go "slack." There is a note before step 7.2.23 stating the "the load on the VCT HMI screen may be used to determine if the downloader slings are going slack." However, there is no quantitative description given for the VCT operator to read from the VCT HMI screen that indicates at which load, loss of load, or pressure indicates when the downloader slings are in a slack condition.

   b. Procedure step 7.6.24 directs the cask loading supervisor to verify the MPC is fully inserted into HI-STORM UMAX.

      NRC Comment: During actual downloading operations the rigger provides the indication to the cask loading supervisor that the MPC is fully inserted into the HI-STORM UMAX. Still no qualitative or quantitative criteria are listed for determining that the MPC has been fully downloaded.

(2) Procedure HPP-2464-031, "Pool to Pad Certificate of Compliance Radiological Surveys at SONGS," Rev. 2, March 15, 2018, did not include survey points for determining whether the MPC-37 canister is in the fully downloaded position in the UMAX ISFSI vault as required by the Certificate of Compliance.

(3) Procedure HPP-2464-600, "Off-normal conditions," Rev. 6, June 12, 2018, did not contain MPC recovery activities for the type of event that occurred on August 3, 2018.

> The off-normal condition experienced on August 3, 2018, was an event that was deemed as non-credible in the Holtec HI-STORM UMAX Final Safety Analysis Report. The event occurred and SCE placed an MPC-37 canister into an unanalyzed condition for which there was no proceduralized recovery plan.

The team assessed and dispositioned the violation in accordance with the NRC Enforcement Policy. The team determined that the violation is more than minor because of the extent of condition. The team characterized the finding as Severity Level IV. The team cited the violation because this violation is viewed by NRC as a contributing factor to the SL III violation that is being cited. NRC Enforcement Policy section 2.2.2.d, indicates that SL IV violations are those that are less serious, but are of more than minor concern, that resulted in no safety consequences.

VIO2.

10 CFR 72.190 requires, in part, that operation of equipment and controls that have been identified as important to safety in the Safety Analysis Report and in the license must be limited to trained and certified personnel or be under the direct visual supervision of an individual with training and certification in the operation. Supervisory personnel who personally direct the operation of equipment and controls that are important to safety must also be certified in such operations.

Contrary to the above, on August 3, 2018, the licensee failed to assure that operation of equipment and controls that have been identified as important to safety in the Safety Analysis Report and in the license were limited to trained and certified personnel or were under the direct visual supervision of an individual with training and certification in the operation. Specifically, a rigger/spotter who had not received any formal training in downloading operations at SONGS was responsible for making the determination that the Important to Safety MPC-37 canister had been fully downloaded and seated within the UMAX ISFSI vault.

NRC inspectors interviewed the rigger/spotter that was onsite during the downloading operations on August 3rd. Discussions with the individual revealed that he had not received specific training in downloading operations, although he had been involved in various other site activities. The contract employee had never performed the downloading evolution before and was unsure of what his exact role was in the process. In addition, the rigger/spotter indicated to the NRC inspectors that the extent of his nuclear training was being provided a SONGS employee orientation brochure.

The team assessed and dispositioned the violation in accordance with the NRC Enforcement Policy. The team determined that the violation is more than minor because it involved important to safety equipment. The team characterized the finding as a Severity Level IV violation. The team cited the violation because this violation is viewed by NRC as a contributing factor to the SL III violation that is being cited. NRC Enforcement Policy section 2.2.2.d, indicates that SL IV violations are those that are less serious, but are of more than minor concern, that resulted in no safety consequences.

VIO3.

10 CFR 72.172 requires, in part, that, licensees shall establish measures to ensure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances, are promptly identified and corrected. In the case of a significant condition identified as adverse to quality, the measures must ensure that the cause of the condition is determined and corrective action is taken to preclude repetition.

The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken must be documented and reported to appropriate levels of management.

Contrary to the above, during the period beginning on January 22, 2018 to August 3, 1028, the licensee failed to establish measures to ensure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances, were promptly identified and corrected. Specifically, two examples of the licensee's failure were identified as follows:

(1) A precursor event on July 22, 2018, where the load was lost briefly during downloading operations. However, during this event the VCT operator was vigilant and load was restored, albeit it numerous times. This event showed that downloading operations took 90 minutes, instead of the typical 15 minutes. During this time both the VCT operator and the rigger/spotter assigned were in a radiation area absorbing dose during a time when the ISFSI pad becomes a locked high radiation area. This event should have been entered into the corrective action program because of the potential radiation exposure if not for apparent problem encountered with centering the MPC into the ISFSI vault.

(2) The licensee has not performed an adequate appraisal of the condition of multi-purpose canisters (MPCs) that have been successfully downloaded into their UMAX ISFSI vault. Interviews with contractor employees involved in downloading activities indicate that typically downloading involves at least a moderate amount of contact between the MPC and the divider shell assembly as it travels down for final placement. If contact is routinely being made, there should be some assessment that includes all of the MPC that have been downloaded at SONGS so far. This assessment should be used to dispositions the exterior conditions of all of the downloaded MPCs as being acceptable.

The team assessed the violation of 10 CFR 72.172 in accordance with the NRC Enforcement Policy. The team characterized the finding as a Severity Level IV violation. The team determined that the violation is more than minor because it was a contributing factor to the Severity Level III violations being cited and involved important to safety equipment. NRC Enforcement Policy section 2.2.2.d, indicates that SL IV violations are those that are less serious, but are of more than minor concern, that resulted in no safety consequences.

License, licensee's procedures, etc., attached

NRC FORM 651
(3-1999)
10 CFR 72

CERTIFICATE OF COMPLIANCE FOR SPENT FUEL STORAGE CASKS
Supplemental Sheet

U.S. NUCLEAR REGULATORY COMMISSION

Certificate No.	1040
Amendment No.	2
Page 3	of 4

4. HEAVY LOADS REQUIREMENTS

Each lift of an MPC or a HI-TRAC VW transfer cask must be made in accordance to the existing heavy loads requirements and procedures of the licensed facility at which the lift is made. A plant-specific review of the heavy load handling procedures (under 10 CFR 50.59 or 10 CFR 72.48, as applicable) is required to show operational compliance with existing plant specific heavy loads requirements. Lifting operations outside of structures governed by 10 CFR Part 50 must be in accordance with Section 5.2 of Appendix A.

5. APPROVED CONTENTS

Contents of the HI-STORM UMAX Canister Storage System must meet the fuel specifications given in Appendix B to this certificate.

6. DESIGN FEATURES

Features or characteristics for the site or system must be in accordance with Appendix B to this certificate.

7. CHANGES TO THE CERTIFICATE OF COMPLIANCE

The holder of this certificate who desires to make changes to the certificate, which includes Appendix A (Technical Specifications) and Appendix B (Approved Contents and Design Features), shall submit an application for amendment of the certificate.

8. PRE-OPERATIONAL TESTING AND TRAINING EXERCISE

A dry run training exercise of the loading, closure, handling, unloading, and transfer of the HI-STORM UMAX Canister Storage System shall be conducted by the licensee prior to the first use of the system to load spent fuel assemblies. The training exercise shall not be conducted with spent fuel in the MPC. The dry run may be performed in an alternate step sequence from the actual procedures, but all steps must be performed. The dry run shall include, but is not limited to the following:

a. Moving the MPC and the transfer cask into the spent fuel pool or cask loading pool.

b. Preparation of the HI-STORM UMAX Canister Storage System for fuel loading.

c. Selection and verification of specific fuel assemblies to ensure type conformance.

d. Loading specific assemblies and placing assemblies into the MPC (using a dummy fuel assembly), including appropriate independent verification.

e. Remote installation of the MPC lid and removal of the MPC and transfer cask from the spent fuel pool or cask loading pool.

f. MPC welding, NDE inspections, pressure testing, draining, moisture removal (by vacuum drying or forced helium dehydration, as applicable), and helium backfilling. (A mockup may be used for this dry-run exercise.)

g. Transfer of the MPC from the transfer cask to the VVM.

5.0 ADMINISTRATIVE CONTROLS AND PROGRAMS (continued)

5.2 Transport Evaluation Program

a. For lifting of the loaded MPC or TRANSFER CASK using equipment which is integral to a structure governed by 10 CFR Part 50 regulations, 10 CFR 50 requirements apply.

b. This program is not applicable when the TRANSFER CASK is in the FUEL BUILDING or is being handled by equipment providing support from underneath (i.e., on a rail car, heavy haul trailer, air pads, etc...).

c. The TRANSFER CASK when loaded with spent fuel, may be lifted to and carried at any height necessary during TRANSPORT OPERATIONS and MPC TRANSFER, provided the lifting equipment is designed in accordance with items 1, 2, and 3 below.

1. The metal body and any vertical columns of the lifting equipment shall be designed to comply with stress limits of ASME Section III, Subsection NF, Class 3 for linear structures. All vertical compression loaded primary members shall satisfy the buckling criteria of ASME Section III, Subsection NF.

2. The horizontal cross beam and any lifting attachments used to connect the load to the lifting equipment shall be designed, fabricated, operated, tested, inspected, and maintained in accordance with applicable sections and guidance of NUREG-0612, Section 5.1. This includes applicable stress limits from ANSI N14.6.

3. The lifting equipment shall have redundant drop protection features which prevent uncontrolled lowering of the load.

TAL is an acronym for the Tapped Anchor Location.

Thermal Capacity of the HI-STORM system is defined as the amount of heat the storage system, containing an MPC loaded with CSF stored in *uniform storage*, will actually reject with the ambient environment at the normal temperature and the peak fuel cladding temperature (PCT) at 400°C.

Thermo-siphon is the term used to describe the buoyancy-driven natural convection circulation of helium within the MPC fuel basket.

Top MPC Guides and Bottom MPC Guides mean the set of radial plates that are shaped to aid in the insertion and withdrawal of MPCs and serve to restrain the MPC's lateral movement during seismic events.

TOG is an acronym for top-of-the-grade of the ISFSI and identified by the by the riding surface of the cask transporter.

Traveler means the set of sequential instructions used in a controlled manufacturing program to ensure that all required tests and examinations required upon the completion of each significant manufacturing activity are performed and documented for archival reference.

Undamaged Fuel Assembly is defined as a fuel assembly without known or suspected cladding defects greater than pinhole leaks and hairline cracks, and which can be handled by normal means. Fuel assemblies without fuel rods in fuel rod locations shall not be classified as Intact Fuel Assemblies unless dummy fuel rods are used to displace an amount of water greater than or equal to that displaced by the fuel rod(s).

Under-grade is the space below the SFP.

Uniform Fuel Loading is a fuel loading strategy where any authorized fuel assembly may be stored in any fuel storage location, subject to other restrictions in the CoC, such as those applicable to non-fuel hardware, and damaged fuel containers.

Vertical Cask Transporter or VCT is the generic name for a device that has the ability to raise or lower a cask or a canister with the built-in safety of a redundant drop protection system. A VCT may be designed to be limited in its operation space to the ISFSI pad area and/or it may have the capability to translocate the cask over a suitably engineered haul path.

VVM is an acronym for Vertical Ventilated Module

ZPA is an acronym for zero period acceleration.

ZR means any zirconium-based fuel cladding material authorized for use in a commercial nuclear power plant reactor. Any reference to Zircaloy fuel cladding in this FSAR applies to any zirconium-based fuel cladding material.

b. Cask Cooling

To ensure that an effective passive heat removal capability exists for long-term satisfactory performance, several thermal design features are incorporated in the storage system. They are as follows:

The MPC fuel basket is formed by a honeycomb structure of Metamic-HT plates which allows the unimpeded conduction of heat from the center of the basket to the periphery. The MPC cavity is equipped with the capability to circulate helium internally by natural buoyancy effects and transport heat from the interior region of the canister to the peripheral region (Holtec Patent 5,898,747).

The MPC confinement boundary ensures that the inert gas (helium) atmosphere inside the MPC is maintained during normal, off-normal, and accident conditions of storage and transfer. The MPC confinement boundary maintains the helium confinement atmosphere below the design temperatures and pressures stated in Table 2.3.7 and Table 2.3.5, respectively.

The MPC thermal design maintains the fuel rod cladding temperatures below the ISG-11 limits such that fuel cladding does not experience degradation during the long term storage period.

The HI-STORM UMAX is optimally designed, with multiple cooling passages and suitably sized flow annuli, which maximize air flow by ensuring a turbulent flow regime at Design Basis heat loads.

As shown in the licensing drawing package, cooling air to each MPC storage cavity is provided by four independent ducts. Thus, there is a significant level of redundancy in the cooling air delivery system for the HI-STORM UMAX.

As can be observed from the licensing drawings, the air inlet locations are separated from the outlet vent by a significant lateral and vertical distance. This design feature ensures that there is minimal mixing of cold and heated air in the storage system. Calculations summarized in Chapter 4 show that the heat rejection performance of the system is stable under varying wind speed.

2.7.3 Protection by Equipment and Instrumentation Selection

a. Equipment

The HI-STORM UMAX System may include use of ancillary or support equipment for ISFSI implementation. Ancillary equipment and structures utilized at the HI-STORM UMAX ISFSI may be broken down into two broad categories, namely Important-to-Safety (ITS) ancillary equipment and Not Important to Safety (NITS) ancillary equipment. NUREG/CR-6407 provides guidance for the determination of a component's safety classification [2.6.4].

The only ancillary equipment used in conjunction with the MPC loading at an ISFSI consists of the Mating Device (a patented design, see Table 1.3.2) and the load handling device such as the cask transporter.

The MPC transfer is carried out by actuating the Mating Device and moving the MPC vertically to the cylindrical cavity of the recipient VVM cavity. The mating device is actuated by removing the bottom lid of the HI-TRAC transfer cask. The device utilized to lift the HI-TRAC transfer cask to place it on the VVM and to vertically transfer the MPC may be of stationary or mobile

type, but it must have redundant drop protection features. The cask transporter can serve as the load handling device.

b. Instrumentation

As a consequence of the passive nature of the HI-STORM UMAX System, Important-to-Safety instrumentation is not necessary. No instrumentation is required or provided for HI-STORM UMAX storage operations, other than normal security service instruments and dosimeters.

However, in lieu of performing the periodic inspection of the HI-STORM UMAX VVM vent screens, temperature elements may be installed inside the VVM outlet duct and below the bottom of outlet screen to continuously monitor the air temperature. If the temperature elements and associated temperature monitoring instrumentation are used as the sole means of surveillance then they shall be designated as Important-to-Safety.

of the VVM. For an example of the rigging required to handle the HI-STORM UMAX VVM Closure Lid, see Figure 9.2.3.

9.2.2 Preparation for MPC Transfer

The required equipment/devices that participate in the transferring of the MPC into dry storage are, as a minimum:

1. Equipment to remove and install the VVM Closure Lid;
2. The vertical cask transporter (VCT) or equivalent load handling devices with redundant drop protection features;
3. The loaded transfer cask containing the MPC;
4. The Mating Device; and
5. MPC lifting and handling devices.

Prior to staging the Mating Device and the transfer cask on the recipient VVM cavity, the storage cavity shall be inspected for absence of debris, water, animals or insect nests, and the like. A general checklist for performing the pre-staging inspection of the VVM cavities is provided below:

1. The painted surfaces shall be inspected for corrosion and chipped, cracked, or blistered paint.
2. All lid surfaces shall be relatively free of dents, scratches, gouges, or other damage.
3. Lid lifting points shall be inspected for dirt, debris, and general condition.
4. Vent openings shall be free from obstructions.
5. Vent screens shall be available, intact, and free of holes and tears.
6. Temperature monitoring elements, if used, shall be inspected for availability, function, calibration, and provisions for mounting to the VVM outlet air passage.

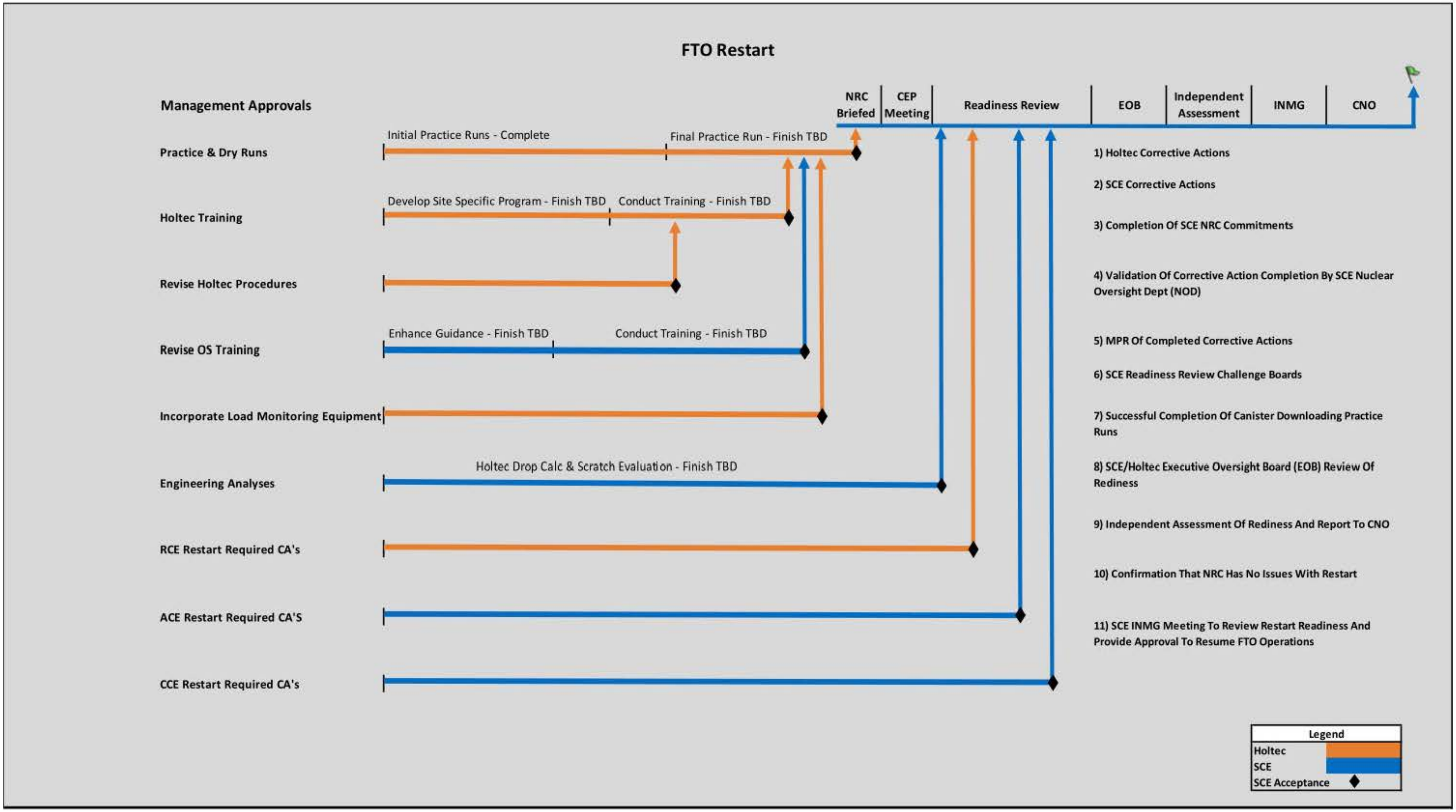
<u>HI-STORM UMAX VVM Main Body</u>

1. Cooling passages shall be free from obstructions.
2. The interior cavity shall be free of debris, litter, tools, and equipment.
3. Painted surfaces shall be inspected for corrosion, and chipped, cracked or blistered paint.

<u>VERTICAL CASK TRANSPORTER (VCT)</u>

The VCT shall be serviced before the beginning of a dry storage campaign and all VCT checks are performed in accordance with its manufacturer's O&M manual. The quantity of fuel and other combustibles in the VCT shall be confirmed to be within the limits specified in the site's 72.212 safety evaluation report. The VCT shall be operated only if the ambient temperature is within the specified limit in the VCT's O&M manual. The VCT operator must have received training in the use of the VCT as specified in its O&M manual.

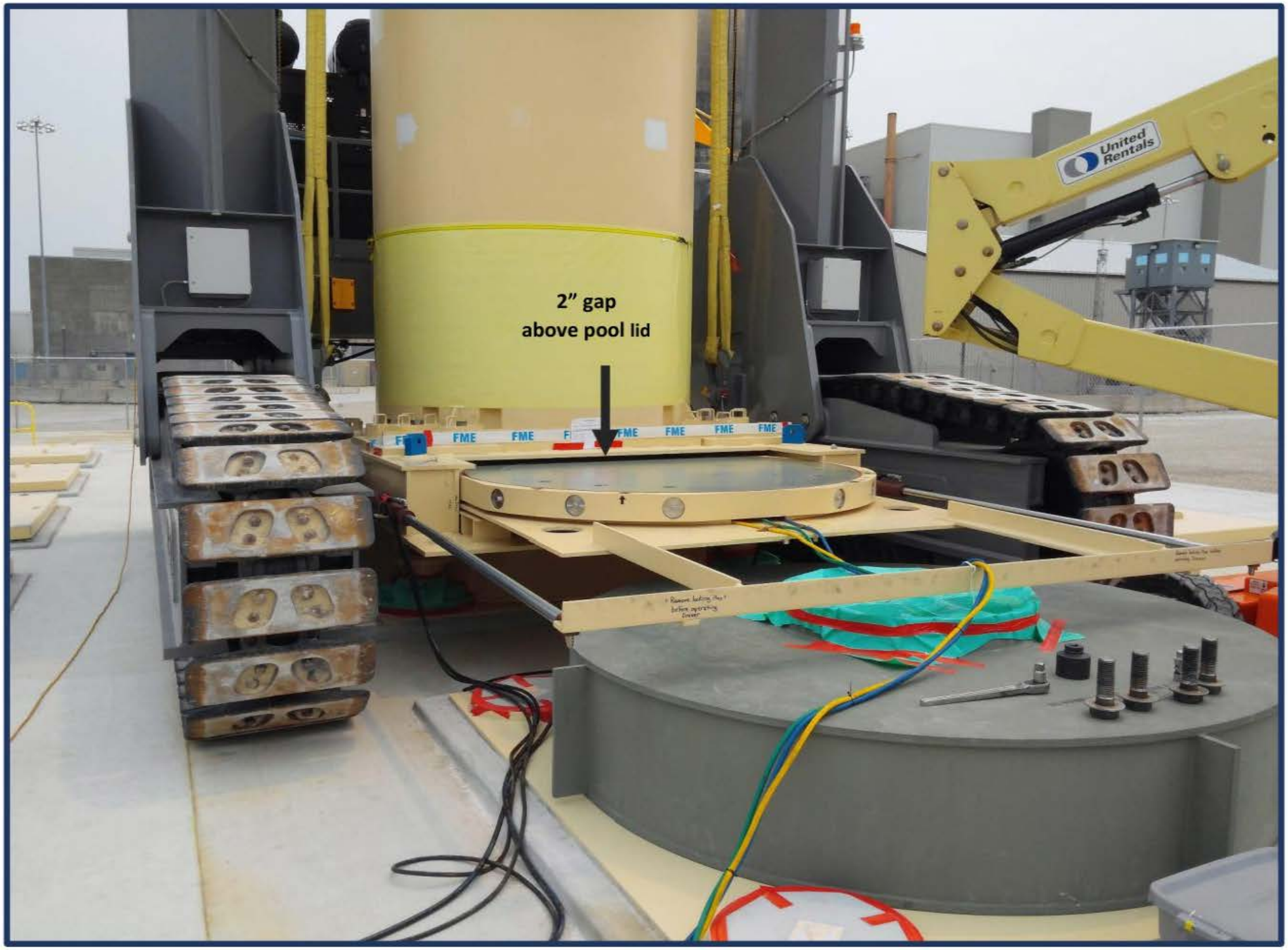
Recovery Plan Level 1



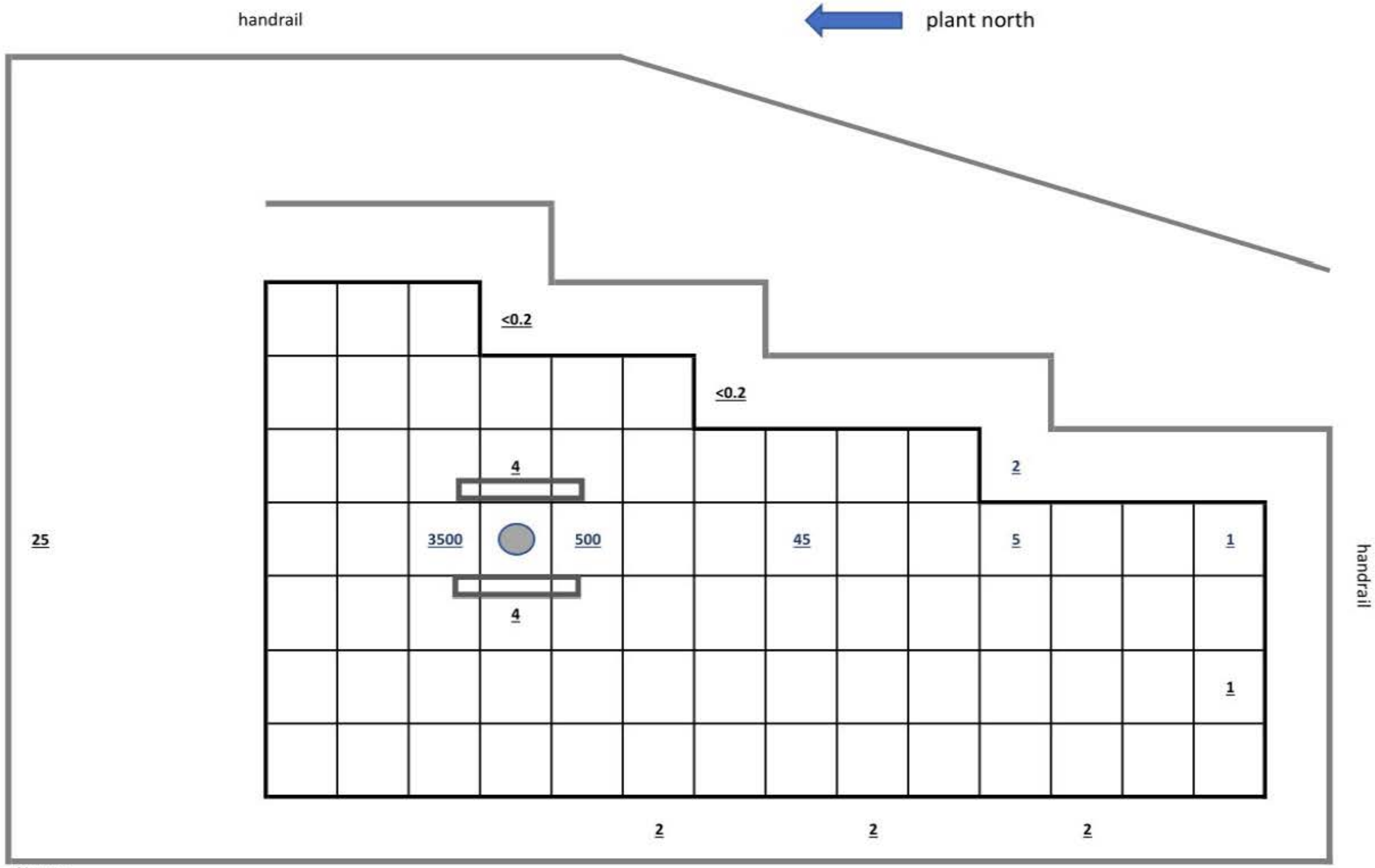
For Planning Purposes

ISFSI PAD DOSE RATE PROFILE DURING DOWNLOAD: TABLE OF CONTENT

RADIATION STREAMING FROM 2 INCH GAP ABOVE POOL LID DURING DOWNLOAD



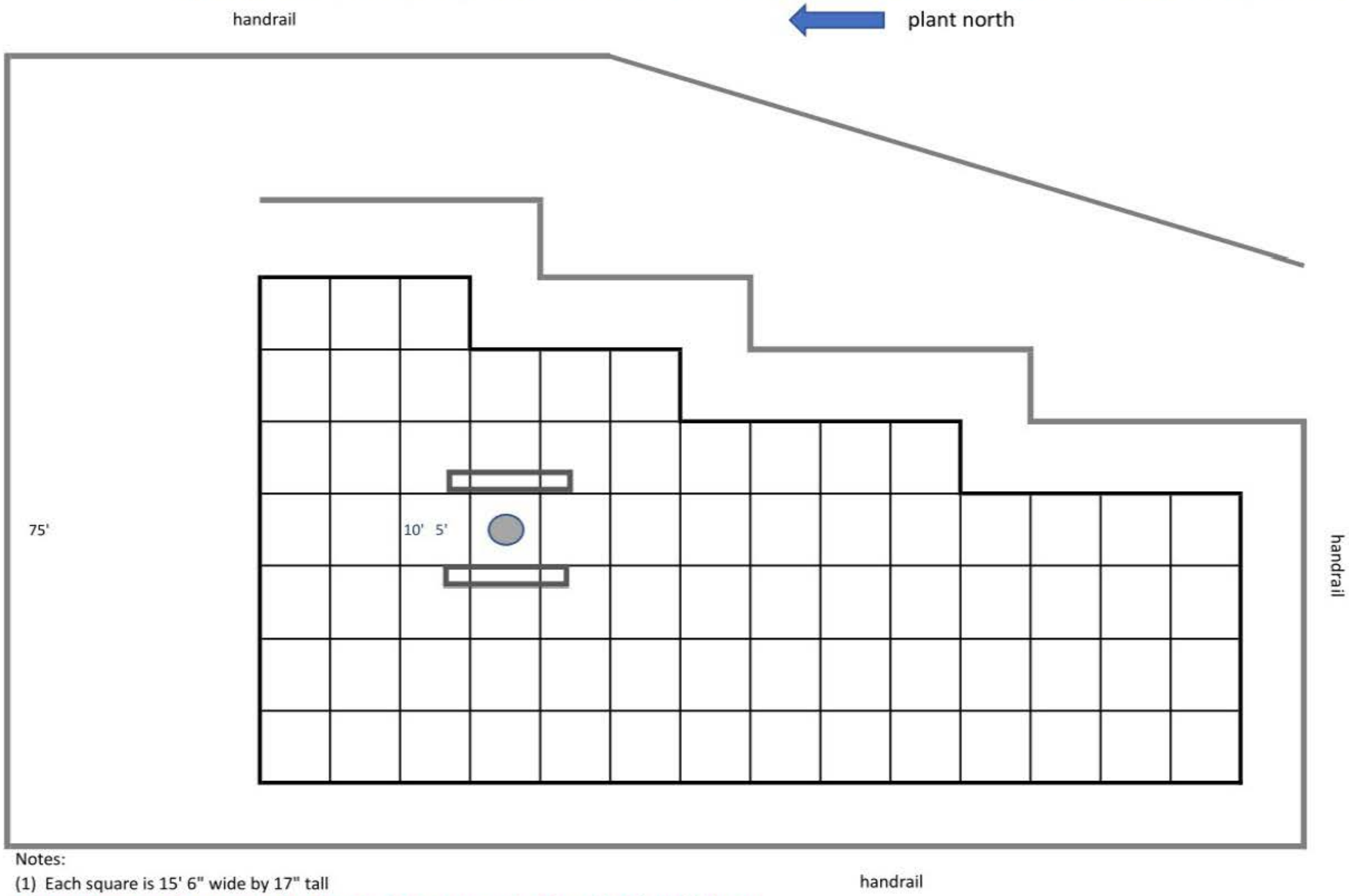
7/22/18 FTO26 VVM23 MEASURED DOSE RATES



Notes:

(1) Each VVM square is 15' 6" wide by 17" tall
(2) Underlined numbers are mrem/hour
(3) VCT tracks are 26' long
(4) MPC is 6.3 feet in diameter
(5) Radiation streaming from MPC is north through a 2" gap above pool lid
(6) **Average HI-TRAC contact gamma dose rate is 42 mrem/hour**

7/22/18 FTO26 VVM23 CALCULATED DOSE RATES AT SELECTED DISTANCES



FTO26 MICROSHIELD GAMMA DOSE RATES (mrem/hour)	
mrem/hour	feet from 2" gap
8000	1
5500	2
4000	3
2300	5
900	10
25	75

Notes:

(1) Each square is 15' 6" wide by 17" tall

(2) Numbers are distances in feet from radiation streaming from the 2" pool lid gap

(3) VCT tracks are 26' long

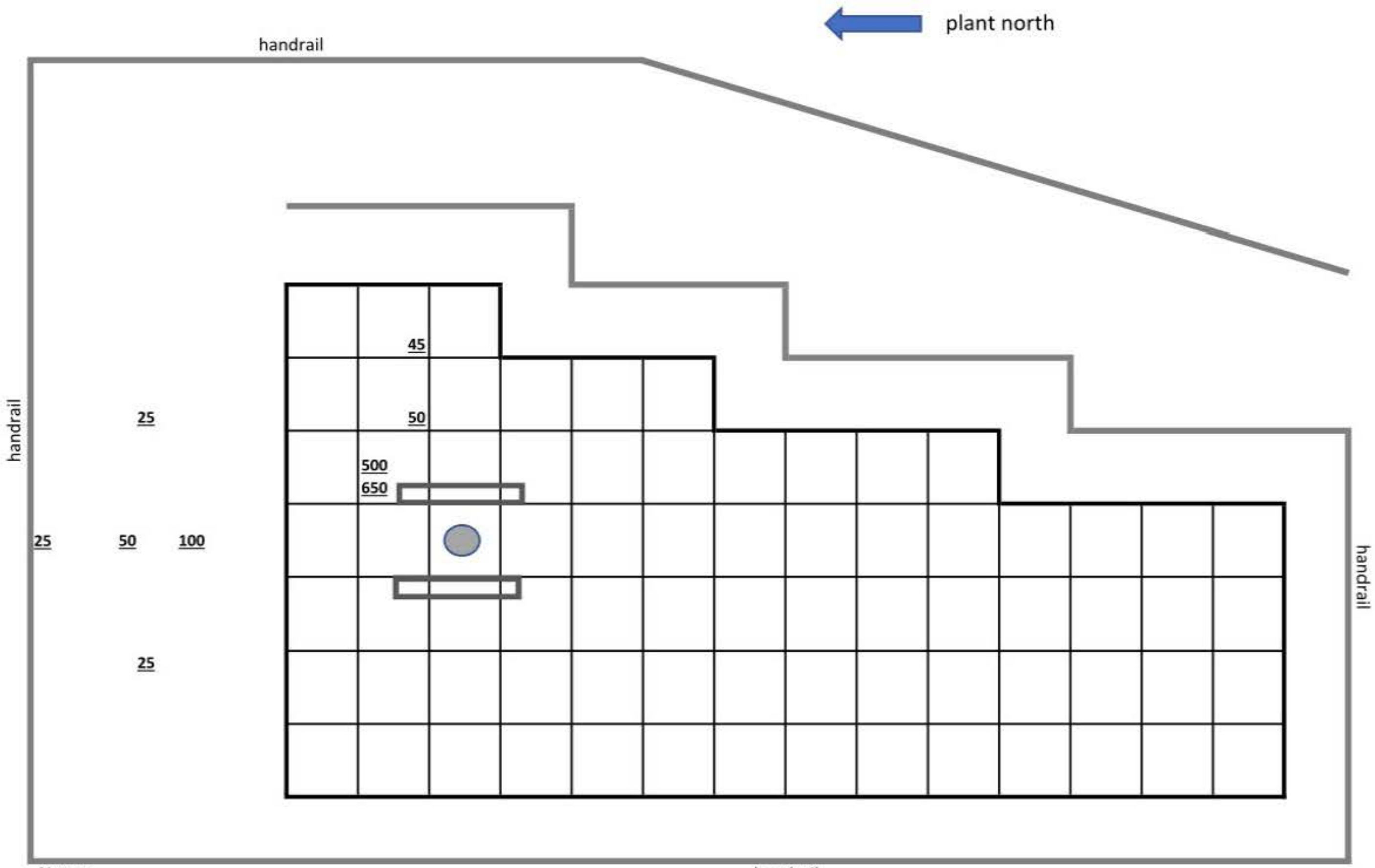
(4) MPC is 6.33 feet in diameter

(5) Radiation streaming north is through a 2" gap above pool lid

(6) Average HI-TRAC contact gamma dose rate is 42 mrem/hour

(7) Dose rate at 3 feet (4R/h) is in general agreement with survey measurement

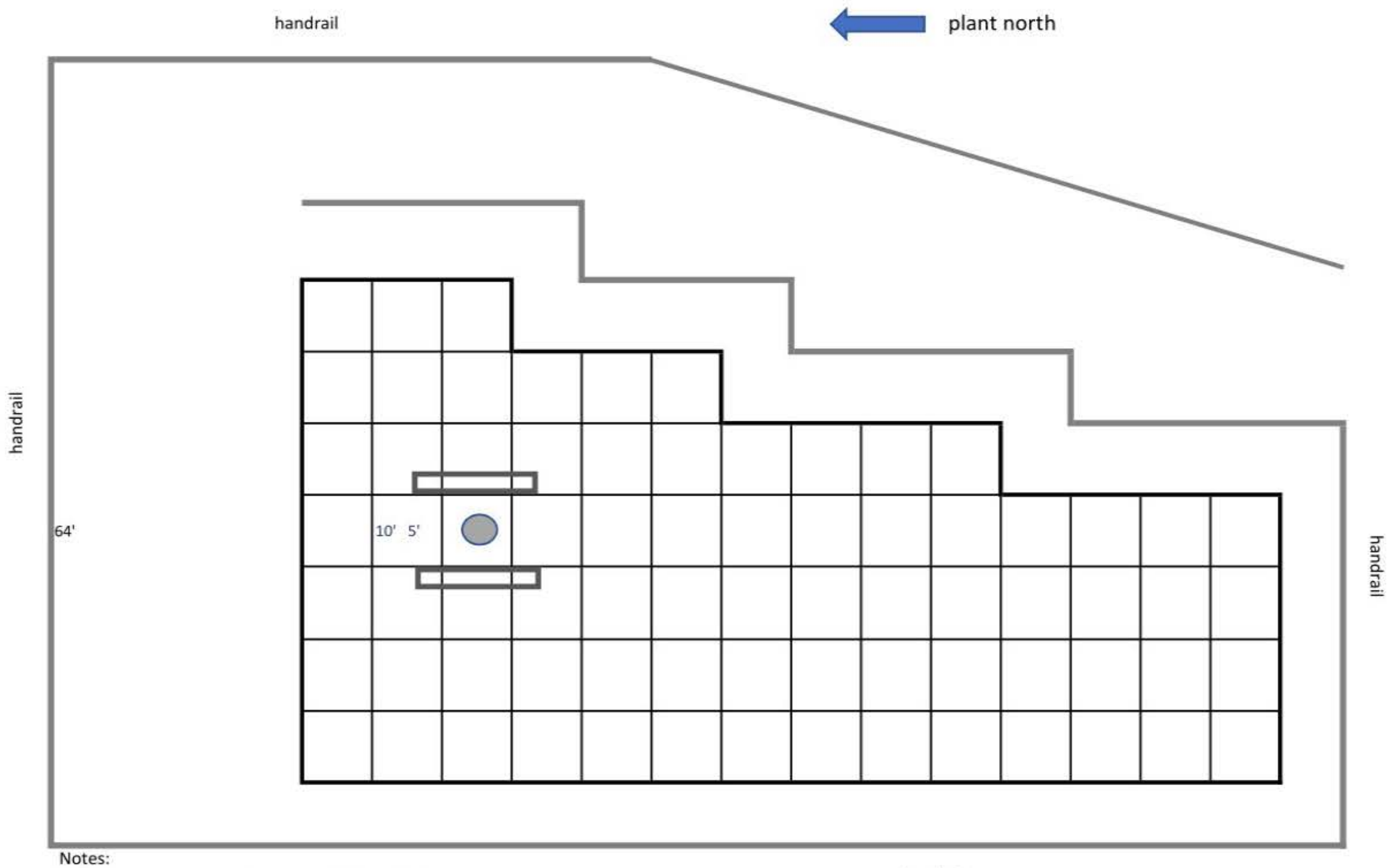
8/3/18 FTO29 VVM22 MEASURED DOSE RATES



Notes:

(1) Each VVM square is 15' 6" wide by 17" tall
(2) Underlined numbers are mrem/hour
(3) VCT tracks are 26' long
(4) MPC is 6.33 feet in diameter
(5) Radiation streaming north is through a 2" gap above pool lid
(6) Average HI-TRAC contact gamma dose rate is 24 mrem/hour

8/3/18 FTO29 VVM22 CALCULATED DOSE RATES AT SELECTED DISTANCES



FTO29 MICROSHIELD GAMMA DOSE RATES (mrem/hour)	
mrem/hour	feet from 2" gap
5700	1
3900	2
2800	3
1700	5
660	10
25	64

Notes:

(1) Each VVM square is 15' 6" wide by 17" tall

(2) Numbers are distances in feet from radiation streaming from the 2" pool lid gap

(3) VCT tracks are 26' long

(4) MPC is 6.33 feet in diameter

(5) Radiation streaming north is through a 2" gap above pool lid

(6) Average HI-TRAC contact gamma dose rate is 24 mrem/hour

DISTANCES TO SUPPORT MICROSHIELD CALCULATIONS

Distance from Center of MPC to 2" Gap above Pool Lid

Reference	Holtec	10546R4	**Mating Device**	p.12	21 P1-G2
GIVEN		COMMENTS			
drawing length (inches)	150.25	150" length on lower part of drawing			
drawing length ruler measure (cm)	9.50	ruler measurement on printout along 150" length			
ruler measure (cm)	4.25	ruler measurement from center of mating device to the 2" gap above pool lid			

distance from MPC center to 2" gap calc		COMMENTS
length on print out converted to inches	67.22	proportional calculation
length in feet	5.60	converse inches to feet

Reference	Holtec	9986R14	**MPC-37**	p.13
GIVEN		COMMENTS		
MPC dimeter (in)	76.00	length on drawing		
MPC radius (in)	38.00	radius = 1/2 diameter		
inner radius (in)	37.38	MPC wall thickness (5/8") subtracted from outer radius		

Verification Calc: distance from center of mpc to 2" gap above pool-lid

Reference	Holtec	10546R4	**Mating Device**	p.3 of 25
GIVEN		COMMENTS		
drawing length (inches)	170.75	170" length on drawing		
drawing length ruler measure (cm)	10.70	ruler measurement along 170" drawing		
ruler measure (cm)	4.20	ruler measurement from center of mating device to the 2" gap above pool lid		

distance from MPC center to 2" gap calc		COMMENTS
short drawing length (in)	67.02	proportional calculation
actual length (feet)	5.59	converse inches to feet

Distance from MPC to 2" Gap above Pool Lid used in MICROSHIELD Calculation		
MPC center to 2" gap (inches)	67	length on drawing
MPC radius (in)	38	radius = 1/2 diameter on drawing
MPC-to-2" gap (in)	29	MICROSHIELD uses source dimension
NOTE: Yellow highlited value ued in MICROSHIELD calculations		

(b)(4)

(b)(4)

(b)(4)

SDS RADIOLOGICAL SURVEY

DATE 7/21/18 TIME 0100 Page 1 of 1

UNIT	2	SURVEY REASON	Post-Decon / Pre-Job	SURVEY NO.	~~NA~~ N/A
AREA	FH	Routine	Shipment/Receipt	MO NO.	N/A
ELEV	63'	Job Coverage	Source/Leak Test	RWP NO.	18-2-520-6
ROOM	407	Pwr Entry ___%	[X] Other Tech Spec	EQUIP. ID.	2MPC015

7-24-18 Bum

Room ~~406~~ 407

HRAWSS, NHPPTE

Ramp

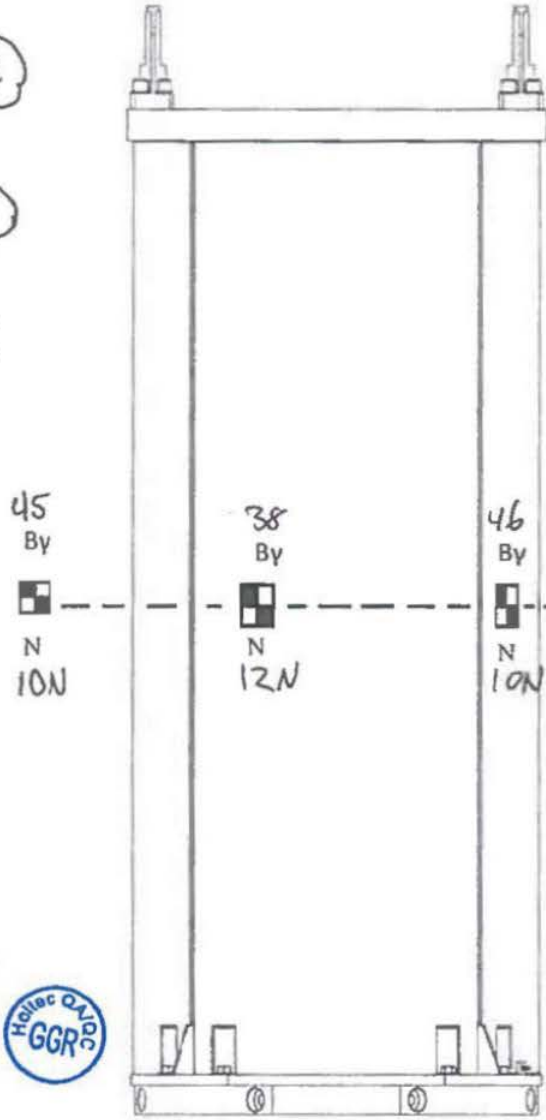
NDR, NHPPTE

Bum 7-24-18

Room ~~407~~ 406

RA, CABT NHPPTE

MPC 64



38
By
N
8N

Per CoC 1040, Appendix A, Section 5.3.8(c) a minimum of four (4) dose rate measurements shall be taken on the side of the TRANSFER CASK approximately at the cask mid-height plane. The measurement locations shall be approximately 90 degrees apart around the circumference of the cask. Dose rates shall be measured between the radial ribs of the water jacket.

Holtec QA/QC GGR

SMEARS

NO.	β−γ	α	NO.	β−γ	α
1			16		
2			17		
3			18		
4			19		
5			20		
6			21		
7			22	N	
8			23	A	
9			24		
10			25		
11					
12					
13					
14					
15					

MASSLINNS

NO	Gross dpm	Hot Part (Y/N)
A		
B		
C		
D		
E		
F		

SURVEY CLASS N/A: Trend Pt. / Boundary / General Area / Component / Individual

SURVEY DESCRIPTION:

TECH-SPEC DOSE RATE SURVEY

REMARKS:

-All are contact dose rates.

Instruments used

Model	R02	ASP NRD	N/A	
Serial No.	2444	0903		

TECHNICIAN

Print A.Barragan / B.McGraw

Sign [signature] / [signature]

SHUTDOWN [ ]

N/A [X]

SDS-1000

APPROVED BY

Print CARL EMERSON

Sign Carl Emerson

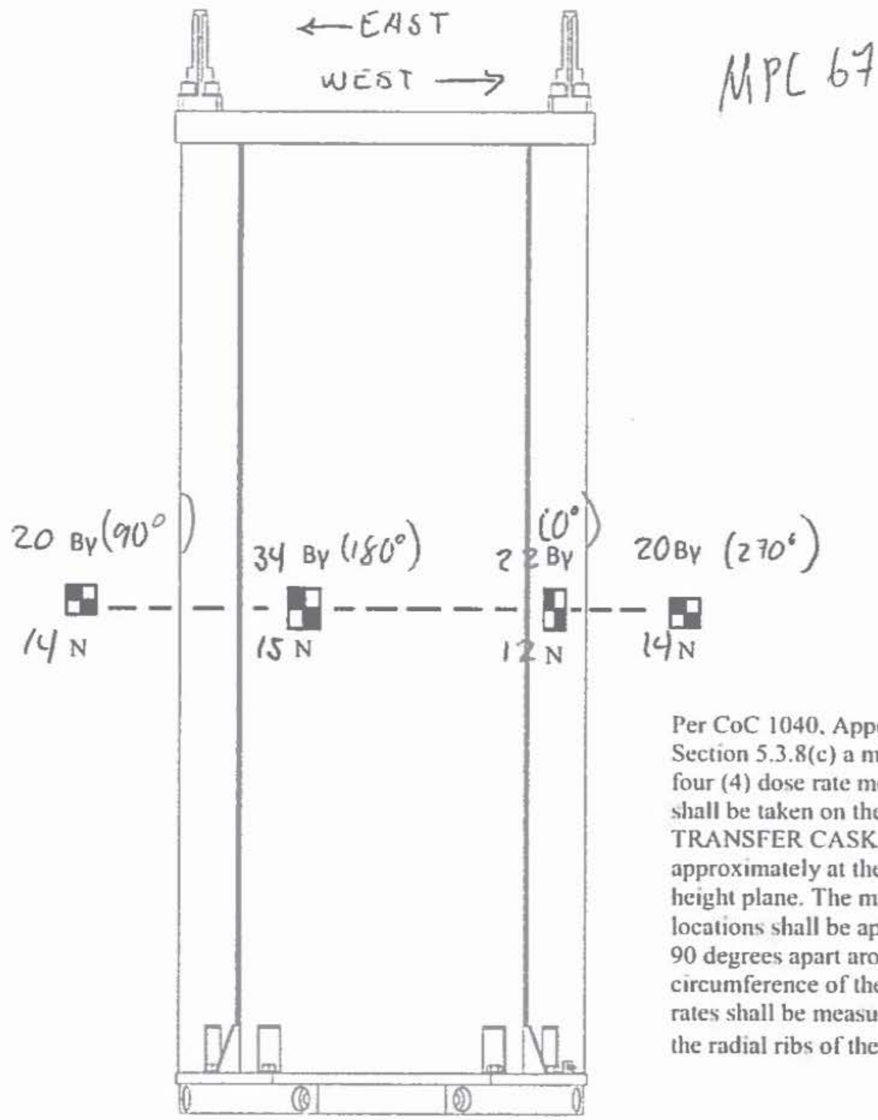
Approval Date: 7/25/18 Time: 0958

PEER CHECK: [signature]

SDS RADIOLOGICAL SURVEY

DATE 8/2/18 | TIME 2230 | Page 1 of 1

UNIT	2	SURVEY REASON	Post-Decon	Pre-Job	SURVEY NO. N/A
AREA	FH	Routine	Shipment/Receipt		MO NO. N/A
ELEV	63'	☑ Job Coverage	Source/Leak Test		RWP NO. 18-2-321-6
ROOM	407	Pwr Entry ___ %	Other		EQUIP. ID. 2MPC016



Per CoC 1040, Appendix A, Section 5.3.8(c) a minimum of four (4) dose rate measurements shall be taken on the side of the TRANSFER CASK approximately at the cask mid-height plane. The measurement locations shall be approximately 90 degrees apart around the circumference of the cask. Dose rates shall be measured between the radial ribs of the water jacket.

SMEARS / MASSLINNS

NO.	β−γ	α	NO.	β−γ	α	NO.	Gross dpm	Hot Part (Y/N)
1			16			A		
2			17			B		
3			18			C		
4			19			D		
5			20			E		
6			21			F		
7			22	N/A				
8			23					
9			24					
10			25					
11								
12								
13								
14								
15								

SURVEY CLASS N/A: Trend Pt, Boundary, General Area, Component, Individual

SURVEY DESCRIPTION:
TECH-SPEC DOSE RATE SURVEY

REMARKS:
407 – HRAWSS, NHPPTE
RAMP – NDR, NHPPTE
406 – RA, CABT, NHPPTE

Instruments used

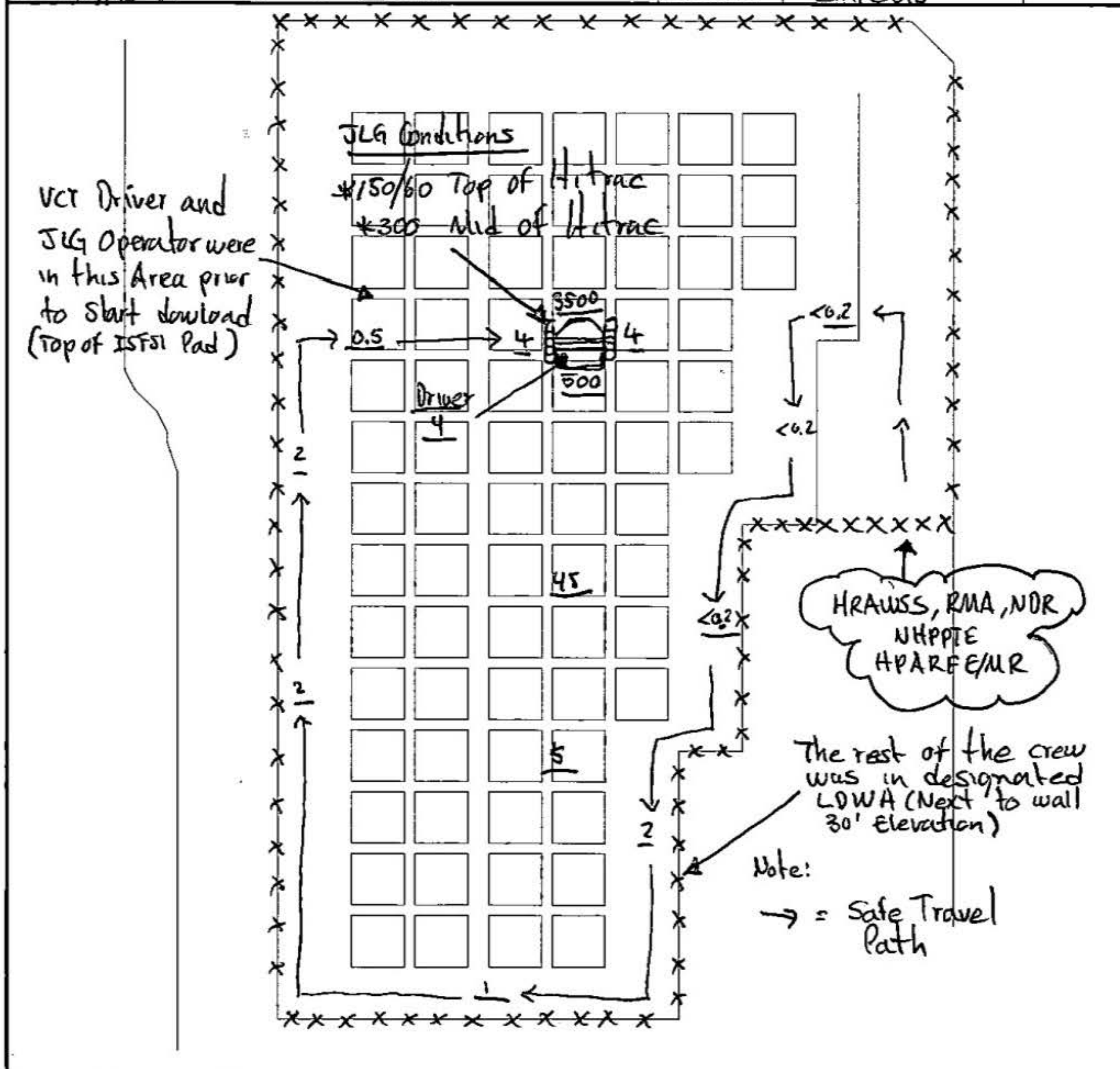
Model	R02	(API-NR1)	N/A	
Serial No.	2444	903		

TECHNICIAN	
Print: A. Baragun / J. Brnds	SHUTDOWN ☐
Sign: [signature] [signature]	N/A [X]
	SDS-1000
APPROVED BY	
Print: Helmer, Pearsall	PEER CHECK:
Sign: [signature]	[signature]
Approval Date: 8-4-18 Time: 0550	PAGE 11

SDS RADIOLOGICAL SURVEY

DATE 7/22/18 | TIME 0425 | Page 1 of 1

UNIT	N	SURVEY REASON	SURVEY NO. SDS-RP1-SRV-2075
AREA	NA	☐ Routine ☐ Post-Decon ☐ Pre-Job	MO NO. N/A
ELEV	30	☒ Job Coverage ☐ Shipment/Receipt	RWP NO. 18-2-520-6
ROOM	N/A	☐ Pwr Entry ___% ☐ Source/Leak Test ☐ Other	EQUIP. ID. 2MPC015



SMEARS

NO.	β−γ	α	NO.	β−γ	α
1			16		
2			17		
3			18		
4			19		
5			20		
6			21		
7			22	N	
8			23	A	
9			24		
10			25		
11					
12					
13					
14					
15					

MASSLINNS

NO.	Gross dpm	Hot Part. (Y/N)
A		
B		
C		
D		
E		
F		

SURVEY CLASS: ☐ Trend Pt. ☐ Component ☐ Boundary ■ General Area ☐ Individual

SURVEY DESCRIPTION: Verify Conditions for Travel Path During Download

REMARKS: Travel Path was surveyed for a 2nd JLG Operator to assist with download of 2MPC015

Instruments used

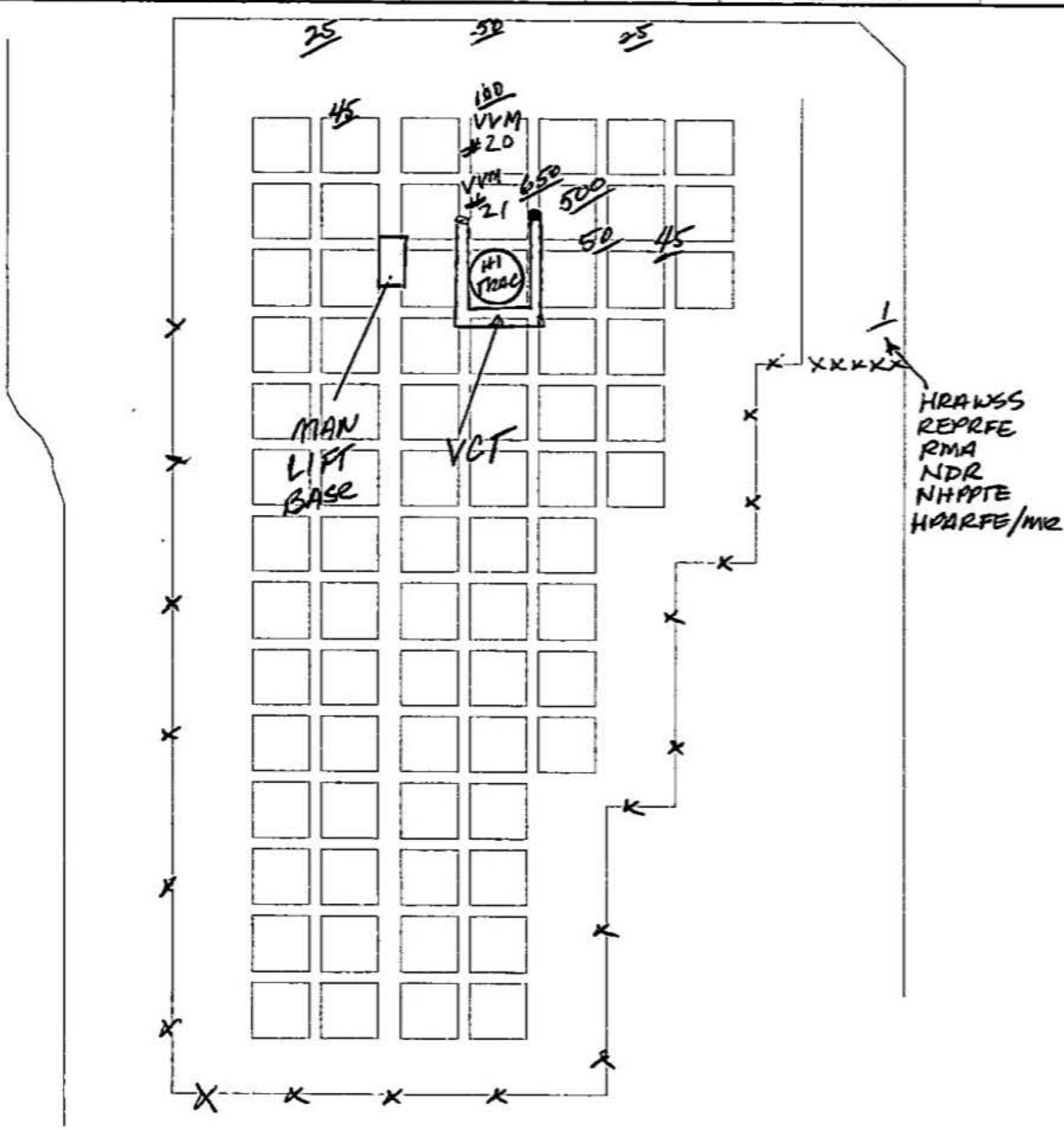
Model	Tele	Tele		N/A
Serial No.	8145	8180		

TECHNICIAN		SHUTDOWN ☐
Print	Abarragan / M. Mason	N/A ■
Sign	[signature] / [signature]	SDS-1000
APPROVED BY		
Print	STEPHEN FINCHUM	PEER CHECK:
Sign	[signature]	[signature]
Approval	Date: 9-13-18 Time: 1215	

SDS RADIOLOGICAL SURVEY

DATE 8/3/18 TIME 1345 Page 1 of 1

UNIT NA	SURVEY REASON	☐ Post-Decon ☐ Pre-Job	SURVEY NO.	SDS-RPI-SRV-1996
AREA N/A	☐ Routine	☐ Shipment/Receipt	MO NO.	N/A
ELEV 30	☒ Job Coverage	☐ Source/Leak Test	RWP NO.	18-2-521-7
ROOM N/A	☐ Pwr Entry ___%	☐ Other	EQUIP. ID.	2MPC016



SMEARS						MASSLINNS		
NO.	β−γ	α	NO.	β−γ	α	NO.	Gross dpm	Hot Part. (Y/N)
1	N/A		16	N/A		A	N/A	
2			17			B		
3			18			C		
4			19			D		
5			20			E		
6			21			F		
7			22					
8			23					
9			24					
10			25					
11								
12								
13								
14								
15								

SURVEY CLASS ☐ Boundary ☐ Trend Pt. ☒ General Area ☐ Component ☐ Individual

SURVEY DESCRIPTION: DOSE RATES WHEN MPC#67 did NOT DOWN LOAD. Properly

REMARKS:

DURING DOWN LOAD ISFSI PAD IS CONTROLED AS A LHRA, HPCRFE. Survey written on 8/21/18 to record conditions with stuck MPC of 8/3/18.

Instruments used

Model	tele	R02	N/A	N/A	N/A
Serial No.	8106	2444	N/A	N/A	N/A

TECHNICIAN		SHUTDOWN ☐
Print	DEBOLD	N/A ☒
Sign	[signature]	SDS-1000
APPROVED BY		
Print	CARL EMERSON	PEER CHECK: AZ
Sign	Carl Emerson	RLS
Approval	Date 8/22/18 Time: 0903	

MicroShield v5.03a (5.03-00305)
Southern California Edison Company

Page : 1
DOS File : 26REAL.MS5
Run Date : September 24, 2018
Run Time: 1:16:22 PM
Duration : 00:00:07

File Ref: FTO 26
Date: 9/24/2018
By: JPJoyce
Checked: Em Goldin

Case Title: MPC FTO 26
Description: FTO 26 MPC calc at 75 feet from gap 2 inch gap
Geometry: 7 - Cylinder Volume - Side Shields

Source Dimensions

Height	5.08 cm	2.0 in
Radius	94.933 cm	3 ft 1.4 in

Dose Points

	X	Y	Z
# 1	200.66 cm	2.54 cm	0 cm
	6 ft 7.0 in	1.0 in	0.0 in
# 2	231.14 cm	2.54 cm	0 cm
	7 ft 7.0 in	1.0 in	0.0 in
# 3	261.62 cm	2.54 cm	0 cm
	8 ft 7.0 in	1.0 in	0.0 in
# 4	322.58 cm	2.54 cm	0 cm
	10 ft 7.0 in	1.0 in	0.0 in
# 5	474.98 cm	2.54 cm	0 cm
	15 ft 7.0 in	1.0 in	0.0 in
# 6	2456.18 cm	2.54 cm	0 cm
	80 ft 7.0 in	1.0 in	0.0 in

Shields

Shield Name	Dimension	Material	Density
Source	8776.923 in³	Uranium	18.7
Transition		Air	0.00122
Air Gap		Air	0.00122
Wall Clad	.625 in	Iron	7.86

Source Input
Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	µCi/cm³	Bq/cm³
Ba-137m	4.8000e+004	1.7760e+015	3.3373e+005	1.2348e+010
Co-60	1.5680e+003	5.8016e+013	1.0902e+004	4.0337e+008
Cs-134	6.0500e+003	2.2385e+014	4.2064e+004	1.5564e+009
Cs-137	5.1000e+004	1.8870e+015	3.5459e+005	1.3120e+010
Kr-85	3.3000e+003	1.2210e+014	2.2944e+004	8.4893e+008
Pm-147	1.0300e+004	3.8110e+014	7.1613e+004	2.6497e+009
Pu-238	1.8500e+003	6.8450e+013	1.2863e+004	4.7592e+008
Pu-241	5.0000e+004	1.8500e+015	3.4764e+005	1.2863e+010
Sr-90	3.6250e+004	1.3413e+015	2.5204e+005	9.3254e+009
Y-90	3.6250e+004	1.3413e+015	2.5204e+005	9.3254e+009

Buildup

Page : 2
DOS File : 26REAL.MS5
Run Date : September 24, 2018
Run Time: 1:16:22 PM
Duration : 00:00:07

The material reference is : Source

Integration Parameters

Radial	10
Circumferential	10
Y Direction (axial)	20

Results - Dose Point # 1 - (79,1,0) in

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	3.677e+13	0.000e+00	2.316e-20	0.000e+00	1.929e-22
0.0318	4.799e+11	0.000e+00	3.022e-22	0.000e+00	2.518e-24
0.0322	6.784e+13	0.000e+00	4.326e-20	0.000e+00	3.482e-22
0.0322	8.854e+11	0.000e+00	5.647e-22	0.000e+00	4.545e-24
0.0364	2.469e+13	2.794e-266	1.796e-20	1.587e-268	1.021e-22
0.0364	3.222e+11	3.647e-268	2.344e-22	2.072e-270	1.332e-24
0.0553	3.238e+10	1.491e-88	3.765e-23	3.326e-91	8.400e-26
0.1213	1.086e+10	5.581e-43	5.272e-06	8.739e-46	8.255e-09
0.2769	7.924e+10	2.020e-04	2.834e-04	3.790e-07	5.317e-07
0.4753	3.268e+12	1.766e+02	2.738e+02	3.465e-01	5.372e-01
0.514	5.299e+11	5.931e+01	9.315e+01	1.164e-01	1.828e-01
0.5632	1.876e+13	4.374e+03	6.960e+03	8.564e+00	1.363e+01
0.5693	3.454e+13	8.716e+03	1.389e+04	1.706e+01	2.718e+01
0.6047	2.185e+14	8.372e+04	1.346e+05	1.633e+02	2.626e+02
0.6616	1.598e+15	1.065e+06	1.739e+06	2.065e+03	3.371e+03
0.6938	9.464e+09	8.212e+00	1.351e+01	1.586e-02	2.609e-02
0.7958	1.912e+14	3.252e+05	5.472e+05	6.190e+02	1.041e+03
0.8019	1.954e+13	3.440e+04	5.794e+04	6.541e+01	1.102e+02
1.0386	2.238e+12	1.071e+04	1.831e+04	1.961e+01	3.353e+01
1.1679	4.029e+12	2.790e+04	4.745e+04	4.991e+01	8.488e+01
1.1732	5.802e+13	4.071e+05	6.922e+05	7.275e+02	1.237e+03
1.3325	5.802e+13	5.781e+05	9.731e+05	1.003e+03	1.688e+03
1.3652	6.805e+12	7.211e+04	1.211e+05	1.244e+02	2.089e+02
TOTALS:	2.345e+15	2.618e+06	4.352e+06	4.864e+03	8.079e+03

Results - Dose Point # 2 - (91,1,0) in

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	3.677e+13	0.000e+00	1.689e-20	0.000e+00	1.406e-22
0.0318	4.799e+11	0.000e+00	2.204e-22	0.000e+00	1.836e-24
0.0322	6.784e+13	0.000e+00	3.155e-20	0.000e+00	2.539e-22
0.0322	8.854e+11	0.000e+00	4.117e-22	0.000e+00	3.314e-24

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0364	2.469e+13	7.104e-266	1.310e-20	4.036e-268	7.441e-23
0.0364	3.222e+11	9.272e-268	1.709e-22	5.268e-270	9.713e-25
0.0553	3.238e+10	1.451e-88	2.745e-23	3.238e-91	6.125e-26
0.1213	1.086e+10	4.266e-43	3.844e-06	6.680e-46	6.019e-09
0.2769	7.924e+10	1.293e-04	1.815e-04	2.426e-07	3.405e-07
0.4753	3.268e+12	1.211e+02	1.880e+02	2.376e-01	3.689e-01
0.514	5.299e+11	4.080e+01	6.418e+01	8.008e-02	1.259e-01
0.5632	1.876e+13	3.014e+03	4.800e+03	5.902e+00	9.398e+00
0.5693	3.454e+13	6.007e+03	9.578e+03	1.176e+01	1.875e+01
0.6047	2.185e+14	5.770e+04	9.275e+04	1.126e+02	1.810e+02
0.6616	1.598e+15	7.334e+05	1.196e+06	1.422e+03	2.319e+03
0.6938	9.464e+09	5.647e+00	9.284e+00	1.090e-02	1.792e-02
0.7958	1.912e+14	2.228e+05	3.742e+05	4.241e+02	7.122e+02
0.8019	1.954e+13	2.356e+04	3.961e+04	4.481e+01	7.532e+01
1.0386	2.238e+12	7.274e+03	1.239e+04	1.332e+01	2.269e+01
1.1679	4.029e+12	1.888e+04	3.197e+04	3.378e+01	5.718e+01
1.1732	5.802e+13	2.755e+05	4.663e+05	4.924e+02	8.332e+02
1.3325	5.802e+13	3.899e+05	6.528e+05	6.765e+02	1.133e+03
1.3652	6.805e+12	4.861e+04	8.121e+04	8.382e+01	1.401e+02
TOTALS:	2.345e+15	1.787e+06	2.962e+06	3.321e+03	5.501e+03

Results - Dose Point # 3 - (103,1,0) in

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	3.677e+13	0.000e+00	1.290e-20	0.000e+00	1.075e-22
0.0318	4.799e+11	0.000e+00	1.684e-22	0.000e+00	1.403e-24
0.0322	6.784e+13	0.000e+00	2.411e-20	0.000e+00	1.940e-22
0.0322	8.854e+11	0.000e+00	3.147e-22	0.000e+00	2.532e-24
0.0364	2.469e+13	1.078e-265	1.001e-20	6.124e-268	5.687e-23
0.0364	3.222e+11	1.407e-267	1.306e-22	7.993e-270	7.422e-25
0.0553	3.238e+10	1.272e-88	2.098e-23	2.838e-91	4.681e-26
0.1213	1.086e+10	3.257e-43	2.937e-06	5.100e-46	4.600e-09
0.2769	7.924e+10	9.069e-05	1.273e-04	1.701e-07	2.388e-07
0.4753	3.268e+12	8.875e+01	1.378e+02	1.741e-01	2.704e-01
0.514	5.299e+11	2.990e+01	4.704e+01	5.869e-02	9.232e-02
0.5632	1.876e+13	2.206e+03	3.512e+03	4.320e+00	6.876e+00
0.5693	3.454e+13	4.396e+03	7.006e+03	8.603e+00	1.371e+01
0.6047	2.185e+14	4.217e+04	6.772e+04	8.227e+01	1.321e+02
0.6616	1.598e+15	5.347e+05	8.709e+05	1.037e+03	1.688e+03
0.6938	9.464e+09	4.112e+00	6.751e+00	7.939e-03	1.303e-02

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.7958	1.912e+14	1.616e+05	2.709e+05	3.076e+02	5.156e+02
0.8019	1.954e+13	1.709e+04	2.867e+04	3.249e+01	5.451e+01
1.0386	2.238e+12	5.239e+03	8.899e+03	9.593e+00	1.630e+01
1.1679	4.029e+12	1.357e+04	2.290e+04	2.427e+01	4.096e+01
1.1732	5.802e+13	1.980e+05	3.340e+05	3.538e+02	5.968e+02
1.3325	5.802e+13	2.796e+05	4.667e+05	4.851e+02	8.098e+02
1.3652	6.805e+12	3.485e+04	5.805e+04	6.009e+01	1.001e+02
TOTALS:	2.345e+15	1.294e+06	2.139e+06	2.405e+03	3.976e+03

Results - Dose Point # 4 - (127,1,0) in

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	3.677e+13	0.000e+00	8.280e-21	0.000e+00	6.897e-23
0.0318	4.799e+11	0.000e+00	1.081e-22	0.000e+00	9.001e-25
0.0322	6.784e+13	0.000e+00	1.547e-20	0.000e+00	1.245e-22
0.0322	8.854e+11	0.000e+00	2.019e-22	0.000e+00	1.625e-24
0.0364	2.469e+13	1.395e-265	6.422e-21	7.925e-268	3.649e-23
0.0364	3.222e+11	1.821e-267	8.382e-23	1.034e-269	4.763e-25
0.0553	3.238e+10	9.103e-89	1.346e-23	2.031e-91	3.003e-26
0.1213	1.086e+10	2.010e-43	1.885e-06	3.147e-46	2.951e-09
0.2769	7.924e+10	5.248e-05	7.371e-05	9.844e-08	1.383e-07
0.4753	3.268e+12	5.354e+01	8.313e+01	1.051e-01	1.631e-01
0.514	5.299e+11	1.800e+01	2.829e+01	3.532e-02	5.553e-02
0.5632	1.876e+13	1.323e+03	2.103e+03	2.590e+00	4.117e+00
0.5693	3.454e+13	2.634e+03	4.192e+03	5.155e+00	8.205e+00
0.6047	2.185e+14	2.520e+04	4.041e+04	4.917e+01	7.884e+01
0.6616	1.598e+15	3.183e+05	5.174e+05	6.171e+02	1.003e+03
0.6938	9.464e+09	2.443e+00	4.002e+00	4.716e-03	7.726e-03
0.7958	1.912e+14	9.549e+04	1.597e+05	1.817e+02	3.039e+02
0.8019	1.954e+13	1.009e+04	1.689e+04	1.919e+01	3.212e+01
1.0386	2.238e+12	3.073e+03	5.208e+03	5.627e+00	9.536e+00
1.1679	4.029e+12	7.948e+03	1.339e+04	1.422e+01	2.395e+01
1.1732	5.802e+13	1.159e+05	1.953e+05	2.072e+02	3.489e+02
1.3325	5.802e+13	1.637e+05	2.731e+05	2.839e+02	4.737e+02
1.3652	6.805e+12	2.040e+04	3.397e+04	3.517e+01	5.858e+01
TOTALS:	2.345e+15	7.641e+05	1.262e+06	1.421e+03	2.345e+03

Results - Dose Point # 5 - (187,1,0) in

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	3.677e+13	0.000e+00	3.726e-21	0.000e+00	3.104e-23

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Duration : 00:00:07

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.6047	2.185e+14	2.552e+02	4.125e+02	4.979e-01	8.047e-01
0.6616	1.598e+15	3.240e+03	5.322e+03	6.282e+00	1.032e+01
0.6938	9.464e+09	2.497e-02	4.139e-02	4.820e-05	7.991e-05
0.7958	1.912e+14	9.910e+02	1.686e+03	1.886e+00	3.209e+00
0.8019	1.954e+13	1.049e+02	1.786e+02	1.994e-01	3.396e-01
1.0386	2.238e+12	3.321e+01	5.791e+01	6.082e-02	1.060e-01
1.1679	4.029e+12	8.758e+01	1.525e+02	1.567e-01	2.727e-01
1.1732	5.802e+13	1.279e+03	2.226e+03	2.285e+00	3.978e+00
1.3325	5.802e+13	1.842e+03	3.189e+03	3.196e+00	5.532e+00
1.3652	6.805e+12	2.304e+02	3.984e+02	3.973e-01	6.870e-01
TOTALS:	2.345e+15	8.104e+03	1.369e+04	1.504e+01	2.537e+01

MicroShield v5.03a (5.03-00305)
Southern California Edison Company

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File Ref: FTO 29
Date: 9/24/2018
By: JP Joyce
Checked: EM Goldin

Case Title: MPC FTO 29
Description: FTO 29 MPC calc at 64 feet from gap 2 inch gap
Geometry: 7 - Cylinder Volume - Side Shields

Source Dimensions

Height	5.08 cm	2.0 in
Radius	94.933 cm	3 ft 1.4 in

Dose Points

	X	Y	Z
# 1	200.66 cm	2.54 cm	0 cm
	6 ft 7.0 in	1.0 in	0.0 in
# 2	231.14 cm	2.54 cm	0 cm
	7 ft 7.0 in	1.0 in	0.0 in
# 3	261.62 cm	2.54 cm	0 cm
	8 ft 7.0 in	1.0 in	0.0 in
# 4	322.58 cm	2.54 cm	0 cm
	10 ft 7.0 in	1.0 in	0.0 in
# 5	474.98 cm	2.54 cm	0 cm
	15 ft 7.0 in	1.0 in	0.0 in
# 6	2120.9 cm	2.54 cm	0 cm
	69 ft 7.0 in	1.0 in	0.0 in

Shields

Shield Name	Dimension	Material	Density
Source	8776.923 in³	Uranium	18.7
Transition		Air	0.00122
Air Gap		Air	0.00122
Wall Clad	.625 in	Iron	7.86

Source Input
Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm³	Bq/cm³
Ba-137m	3.4300e+004	1.2691e+015	2.3848e+005	8.8237e+009
Co-60	1.0780e+003	3.9886e+013	7.4951e+003	2.7732e+008
Cs-134	4.4100e+003	1.6317e+014	3.0662e+004	1.1345e+009
Cs-137	3.6260e+004	1.3416e+015	2.5211e+005	9.3279e+009
Kr-85	2.4000e+003	8.8800e+013	1.6687e+004	6.1740e+008
Pm-147	7.3500e+003	2.7195e+014	5.1103e+004	1.8908e+009
Pu-238	1.3750e+003	5.0875e+013	9.5600e+003	3.5372e+008
Pu-241	3.6260e+004	1.3416e+015	2.5211e+005	9.3279e+009
Sr-90	2.5480e+004	9.4276e+014	1.7716e+005	6.5548e+009
Y-90	2.5480e+004	9.4276e+014	1.7716e+005	6.5548e+009

Buildup

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The material reference is : Source

Integration Parameters

Radial	10
Circumferential	10
Y Direction (axial)	20

Results - Dose Point # 1 - (79,1,0) in

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	2.627e+13	0.000e+00	1.655e-20	0.000e+00	1.378e-22
0.0318	3.498e+11	0.000e+00	2.203e-22	0.000e+00	1.835e-24
0.0322	4.848e+13	0.000e+00	3.092e-20	0.000e+00	2.488e-22
0.0322	6.454e+11	0.000e+00	4.116e-22	0.000e+00	3.313e-24
0.0364	1.764e+13	1.996e-266	1.284e-20	1.134e-268	7.293e-23
0.0364	2.349e+11	2.658e-268	1.709e-22	1.510e-270	9.710e-25
0.0553	2.407e+10	1.108e-88	2.798e-23	2.472e-91	6.243e-26
0.1213	7.751e+09	3.983e-43	3.762e-06	6.236e-46	5.890e-09
0.2769	5.776e+10	1.473e-04	2.066e-04	2.763e-07	3.876e-07
0.4753	2.382e+12	1.287e+02	1.996e+02	2.526e-01	3.916e-01
0.514	3.854e+11	4.313e+01	6.775e+01	8.465e-02	1.330e-01
0.5632	1.367e+13	3.188e+03	5.074e+03	6.243e+00	9.934e+00
0.5693	2.518e+13	6.353e+03	1.013e+04	1.243e+01	1.982e+01
0.6047	1.593e+14	6.103e+04	9.811e+04	1.191e+02	1.914e+02
0.6616	1.142e+15	7.613e+05	1.242e+06	1.476e+03	2.409e+03
0.6938	6.506e+09	5.646e+00	9.291e+00	1.090e-02	1.794e-02
0.7958	1.393e+14	2.371e+05	3.989e+05	4.512e+02	7.591e+02
0.8019	1.424e+13	2.508e+04	4.223e+04	4.768e+01	8.031e+01
1.0386	1.632e+12	7.805e+03	1.335e+04	1.429e+01	2.444e+01
1.1679	2.937e+12	2.034e+04	3.459e+04	3.638e+01	6.187e+01
1.1732	3.989e+13	2.799e+05	4.759e+05	5.002e+02	8.505e+02
1.3325	3.989e+13	3.975e+05	6.690e+05	6.896e+02	1.161e+03
1.3652	4.960e+12	5.256e+04	8.830e+04	9.064e+01	1.523e+02
TOTALS:	1.679e+15	1.852e+06	3.078e+06	3.444e+03	5.720e+03

Results - Dose Point # 2 - (91,1,0) in

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	2.627e+13	0.000e+00	1.207e-20	0.000e+00	1.005e-22
0.0318	3.498e+11	0.000e+00	1.606e-22	0.000e+00	1.338e-24
0.0322	4.848e+13	0.000e+00	2.254e-20	0.000e+00	1.814e-22
0.0322	6.454e+11	0.000e+00	3.001e-22	0.000e+00	2.415e-24

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Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0364	1.764e+13	5.076e-266	9.359e-21	2.884e-268	5.317e-23
0.0364	2.349e+11	6.758e-268	1.246e-22	3.840e-270	7.080e-25
0.0553	2.407e+10	1.079e-88	2.040e-23	2.407e-91	4.552e-26
0.1213	7.751e+09	3.044e-43	2.743e-06	4.767e-46	4.295e-09
0.2769	5.776e+10	9.429e-05	1.323e-04	1.769e-07	2.482e-07
0.4753	2.382e+12	8.827e+01	1.370e+02	1.732e-01	2.689e-01
0.514	3.854e+11	2.968e+01	4.667e+01	5.824e-02	9.160e-02
0.5632	1.367e+13	2.197e+03	3.499e+03	4.302e+00	6.850e+00
0.5693	2.518e+13	4.379e+03	6.982e+03	8.569e+00	1.366e+01
0.6047	1.593e+14	4.206e+04	6.761e+04	8.205e+01	1.319e+02
0.6616	1.142e+15	5.241e+05	8.546e+05	1.016e+03	1.657e+03
0.6938	6.506e+09	3.882e+00	6.383e+00	7.496e-03	1.232e-02
0.7958	1.393e+14	1.624e+05	2.728e+05	3.091e+02	5.191e+02
0.8019	1.424e+13	1.718e+04	2.887e+04	3.266e+01	5.490e+01
1.0386	1.632e+12	5.302e+03	9.032e+03	9.708e+00	1.654e+01
1.1679	2.937e+12	1.377e+04	2.330e+04	2.462e+01	4.168e+01
1.1732	3.989e+13	1.894e+05	3.206e+05	3.385e+02	5.728e+02
1.3325	3.989e+13	2.681e+05	4.488e+05	4.651e+02	7.787e+02
1.3652	4.960e+12	3.543e+04	5.920e+04	6.110e+01	1.021e+02
TOTALS:	1.679e+15	1.264e+06	2.095e+06	2.352e+03	3.895e+03

Results - Dose Point # 3 - (103,1,0) in

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	2.627e+13	0.000e+00	9.221e-21	0.000e+00	7.681e-23
0.0318	3.498e+11	0.000e+00	1.228e-22	0.000e+00	1.023e-24
0.0322	4.848e+13	0.000e+00	1.723e-20	0.000e+00	1.386e-22
0.0322	6.454e+11	0.000e+00	2.294e-22	0.000e+00	1.846e-24
0.0364	1.764e+13	7.702e-266	7.152e-21	4.376e-268	4.064e-23
0.0364	2.349e+11	1.025e-267	9.523e-23	5.826e-270	5.410e-25
0.0553	2.407e+10	9.454e-89	1.559e-23	2.109e-91	3.479e-26
0.1213	7.751e+09	2.324e-43	2.096e-06	3.639e-46	3.282e-09
0.2769	5.776e+10	6.611e-05	9.280e-05	1.240e-07	1.741e-07
0.4753	2.382e+12	6.469e+01	1.005e+02	1.269e-01	1.971e-01
0.514	3.854e+11	2.175e+01	3.421e+01	4.268e-02	6.714e-02
0.5632	1.367e+13	1.608e+03	2.560e+03	3.149e+00	5.012e+00
0.5693	2.518e+13	3.204e+03	5.107e+03	6.271e+00	9.994e+00
0.6047	1.593e+14	3.074e+04	4.937e+04	5.997e+01	9.631e+01
0.6616	1.142e+15	3.821e+05	6.224e+05	7.408e+02	1.207e+03
0.6938	6.506e+09	2.827e+00	4.641e+00	5.458e-03	8.961e-03

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.7958	1.393e+14	1.178e+05	1.975e+05	2.242e+02	3.758e+02
0.8019	1.424e+13	1.246e+04	2.090e+04	2.368e+01	3.974e+01
1.0386	1.632e+12	3.819e+03	6.487e+03	6.993e+00	1.188e+01
1.1679	2.937e+12	9.891e+03	1.669e+04	1.769e+01	2.986e+01
1.1732	3.989e+13	1.361e+05	2.296e+05	2.432e+02	4.103e+02
1.3325	3.989e+13	1.922e+05	3.209e+05	3.335e+02	5.567e+02
1.3652	4.960e+12	2.540e+04	4.231e+04	4.380e+01	7.297e+01
TOTALS:	1.679e+15	9.155e+05	1.514e+06	1.703e+03	2.815e+03

Results - Dose Point # 4 - (127,1,0) in

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	2.627e+13	0.000e+00	5.917e-21	0.000e+00	4.928e-23
0.0318	3.498e+11	0.000e+00	7.877e-23	0.000e+00	6.561e-25
0.0322	4.848e+13	0.000e+00	1.105e-20	0.000e+00	8.896e-23
0.0322	6.454e+11	0.000e+00	1.472e-22	0.000e+00	1.184e-24
0.0364	1.764e+13	9.967e-266	4.589e-21	5.663e-268	2.607e-23
0.0364	2.349e+11	1.327e-267	6.110e-23	7.540e-270	3.472e-25
0.0553	2.407e+10	6.766e-89	1.000e-23	1.510e-91	2.232e-26
0.1213	7.751e+09	1.434e-43	1.345e-06	2.246e-46	2.106e-09
0.2769	5.776e+10	3.825e-05	5.373e-05	7.176e-08	1.008e-07
0.4753	2.382e+12	3.903e+01	6.059e+01	7.658e-02	1.189e-01
0.514	3.854e+11	1.309e+01	2.058e+01	2.569e-02	4.038e-02
0.5632	1.367e+13	9.642e+02	1.533e+03	1.888e+00	3.001e+00
0.5693	2.518e+13	1.920e+03	3.056e+03	3.758e+00	5.981e+00
0.6047	1.593e+14	1.837e+04	2.945e+04	3.584e+01	5.747e+01
0.6616	1.142e+15	2.275e+05	3.697e+05	4.410e+02	7.168e+02
0.6938	6.506e+09	1.679e+00	2.751e+00	3.242e-03	5.312e-03
0.7958	1.393e+14	6.961e+04	1.164e+05	1.325e+02	2.215e+02
0.8019	1.424e+13	7.357e+03	1.231e+04	1.399e+01	2.341e+01
1.0386	1.632e+12	2.240e+03	3.796e+03	4.102e+00	6.951e+00
1.1679	2.937e+12	5.793e+03	9.759e+03	1.036e+01	1.746e+01
1.1732	3.989e+13	7.971e+04	1.342e+05	1.424e+02	2.399e+02
1.3325	3.989e+13	1.125e+05	1.877e+05	1.952e+02	3.257e+02
1.3652	4.960e+12	1.487e+04	2.476e+04	2.564e+01	4.270e+01
TOTALS:	1.679e+15	5.409e+05	8.928e+05	1.007e+03	1.661e+03

Results - Dose Point # 5 - (187,1,0) in

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	2.627e+13	0.000e+00	2.663e-21	0.000e+00	2.218e-23

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	3.498e+11	0.000e+00	3.545e-23	0.000e+00	2.953e-25
0.0322	4.848e+13	0.000e+00	4.974e-21	0.000e+00	4.003e-23
0.0322	6.454e+11	0.000e+00	6.623e-23	0.000e+00	5.330e-25
0.0364	1.764e+13	8.467e-266	2.065e-21	4.811e-268	1.173e-23
0.0364	2.349e+11	1.127e-267	2.750e-23	6.405e-270	1.562e-25
0.0553	2.407e+10	3.184e-89	4.502e-24	7.103e-92	1.005e-26
0.1213	7.751e+09	5.841e-44	6.053e-07	9.146e-47	9.478e-10
0.2769	5.776e+10	1.532e-05	2.153e-05	2.873e-08	4.038e-08
0.4753	2.382e+12	1.589e+01	2.465e+01	3.117e-02	4.836e-02
0.514	3.854e+11	5.301e+00	8.324e+00	1.040e-02	1.634e-02
0.5632	1.367e+13	3.883e+02	6.162e+02	7.603e-01	1.206e+00
0.5693	2.518e+13	7.728e+02	1.228e+03	1.512e+00	2.403e+00
0.6047	1.593e+14	7.369e+03	1.179e+04	1.438e+01	2.301e+01
0.6616	1.142e+15	9.087e+04	1.475e+05	1.762e+02	2.859e+02
0.6938	6.506e+09	6.697e-01	1.096e+00	1.293e-03	2.115e-03
0.7958	1.393e+14	2.767e+04	4.623e+04	5.266e+01	8.799e+01
0.8019	1.424e+13	2.924e+03	4.891e+03	5.561e+00	9.300e+00
1.0386	1.632e+12	8.914e+02	1.514e+03	1.632e+00	2.772e+00
1.1679	2.937e+12	2.311e+03	3.911e+03	4.135e+00	6.995e+00
1.1732	3.989e+13	3.181e+04	5.380e+04	5.684e+01	9.615e+01
1.3325	3.989e+13	4.507e+04	7.571e+04	7.820e+01	1.313e+02
1.3652	4.960e+12	5.960e+03	9.998e+03	1.028e+01	1.724e+01
TOTALS:	1.679e+15	2.161e+05	3.572e+05	4.022e+02	6.643e+02

Results - Dose Point # 6 - (835,1,0) in

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.0318	2.627e+13	0.000e+00	1.310e-22	0.000e+00	1.091e-24
0.0318	3.498e+11	0.000e+00	1.744e-24	0.000e+00	1.453e-26
0.0322	4.848e+13	0.000e+00	2.447e-22	0.000e+00	1.969e-24
0.0322	6.454e+11	0.000e+00	3.258e-24	0.000e+00	2.622e-26
0.0364	1.764e+13	5.610e-267	1.016e-22	3.187e-269	5.773e-25
0.0364	2.349e+11	7.469e-269	1.353e-24	4.244e-271	7.686e-27
0.0553	2.407e+10	1.132e-90	2.215e-25	2.526e-93	4.942e-28
0.1213	7.751e+09	1.874e-45	2.978e-08	2.934e-48	4.663e-11
0.2769	5.776e+10	5.377e-07	7.570e-07	1.009e-09	1.420e-09
0.4753	2.382e+12	5.586e-01	8.701e-01	1.096e-03	1.707e-03
0.514	3.854e+11	1.864e-01	2.942e-01	3.658e-04	5.774e-04
0.5632	1.367e+13	1.369e+01	2.186e+01	2.681e-02	4.281e-02
0.5693	2.518e+13	2.726e+01	4.360e+01	5.336e-02	8.532e-02

DOS File : 29REAL.MS5
Run Date : September 24, 2018
Run Time: 1:33:12 PM
Duration : 00:00:07

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.6047	1.593e+14	2.609e+02	4.208e+02	5.090e-01	8.210e-01
0.6616	1.142e+15	3.240e+03	5.311e+03	6.282e+00	1.030e+01
0.6938	6.506e+09	2.400e-02	3.969e-02	4.633e-05	7.663e-05
0.7958	1.393e+14	1.007e+03	1.708e+03	1.917e+00	3.252e+00
0.8019	1.424e+13	1.065e+02	1.810e+02	2.026e-01	3.441e-01
1.0386	1.632e+12	3.358e+01	5.835e+01	6.150e-02	1.068e-01
1.1679	2.937e+12	8.839e+01	1.533e+02	1.581e-01	2.743e-01
1.1732	3.989e+13	1.217e+03	2.111e+03	2.175e+00	3.772e+00
1.3325	3.989e+13	1.750e+03	3.018e+03	3.036e+00	5.236e+00
1.3652	4.960e+12	2.320e+02	3.997e+02	4.000e-01	6.892e-01
TOTALS:	1.679e+15	7.977e+03	1.343e+04	1.482e+01	2.492e+01

From: (b)(7)(C)
Sent: Saturday, September 01, 2018 11:48 AM
To: MARK MORGAN
Subject: FW: Oversight Personnel on Sight the Day of Downloading Issue

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From: (b)(7)(C)
Sent: Tuesday, August 28, 2018 4:15 PM
To: (b)(7)(C)
Cc: (b)(7)(C)
Subject: Oversight Personnel on Sight the Day of Downloading Issue

Mark,
This email is in response to the action, "Licensee Oversight Personnel – Provide names of affected personnel". On the day of the downloading issue, the following SCE Oversight Personnel were on site:
(b)(7)(C) was on site in the morning but left site before the incident. PAX 86433
(b)(7)(C) was at the ISFSI Pad when the issue occurred.
(b)(7)(C) was in the Unit 3 Fuel Handling Building when the issue occurred, but went down to the ISFSI Pad after learning there was an issue. When he arrived, the VCT had been raised so that the load was back on the slings. PAX 89254
(b)(7)(C) was in his office in the ISFSI Project Area. PAX 89159

Respectfully,
(b)(7)(C)

SONGS ISFSI Expansion Project
T. (b)(7)(C) | M. (b)(7)(C)
5000 Pacific Coast Highway, San Clemente, CA 92674

EDISON | Energy for What's Ahead

Decommissioning
San Onofre
Nuclear Generating Station

ISFSI Oversight Training
Oversight Behaviors and Processes
Training Attendance Sheet
Date: 08/30/18 Time: 1500 Place: D1

Name (Print)	PAX	Signature
CHAD SAMPLES	86720	[illegible]
Craig Harberts	89266	[illegible]
Joseph (Jody) Self	89159	[illegible]
Frank Parish	87797	[illegible]
Michael Kemeipl	86433	[illegible]
MARK FLEGGE	89537	Mark Flagg
Greg Duffy	717 305 6465	[illegible]
MIKE BOCCA	89149	[illegible]
PAUL SMITH	87033	[illegible]
Shawn P. Collins	87876	Shawn P. Collins
Robert Ramsey	86213	[illegible]
GERALD MANNING	89171	Gerald Manning
LARRY CALDWELL	86238	Larry T. Caldwell
David M. LeBoeuf	86290	[illegible]
JOHN PATTERSON	89175	[illegible]
Mark Van Dillen	87179	[illegible]
JAMES BEATTIE	86245	[illegible]
Kerry Rud		[illegible]

Decommissioning San Onofre Nuclear Generating Station

ISFSI Oversight Training
Oversight Behaviors and Processes
Training Attendance Sheet
Date: 08/30/18 Time: 1500 Place: D1

Name (Print)	PAX	Signature
JOAN MANSO	86682	

Decommissioning San Onofre Nuclear Generating Station

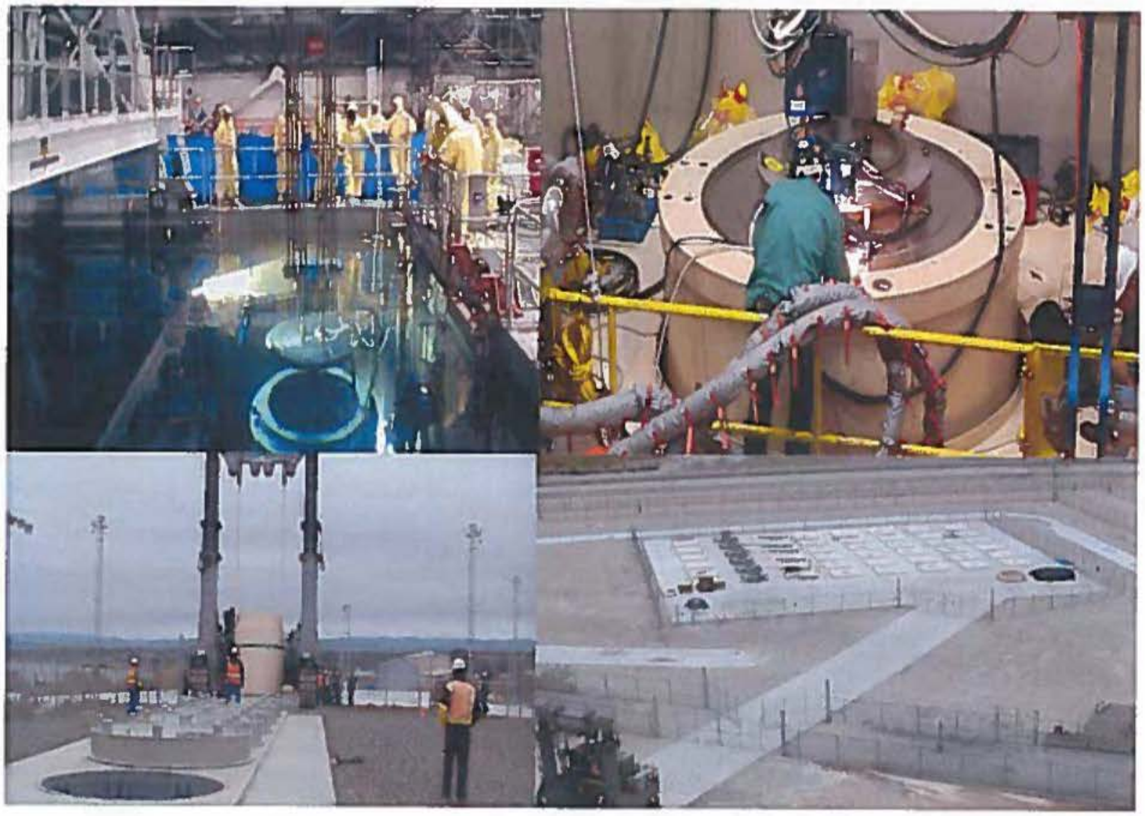
ISFSI Oversight Training
Steve Soler Training on Downloading and Rigging
Training Attendance Sheet
Date: 08/30/18 Time: ~~1200~~ 1700 Place: D1N

Name (Print)	PAX	Signature
CHAD SAMPLES	86720	[signature]
MARK FLEEGE	89537	[signature]
GERALD MANNING	89171	Gerald Manning
Robert Ramsett	86217	[signature]
MICHAEL ORBWYLON	86148	[signature]
Tim Morrison	89011	[signature]
William Spiker	86191	William Spiker
Michael Keneipp	86433	[signature]
Joseph Self	89159	[signature]
LARRY CALDWELL	86238	Larry T. Caldwell
Shawn P. Collins	87876	Shawn P. Collins
Mark Van Dillen	87177	Mark Van Dillen
Craig Harberts	86966	Craig Harberts
JOHN PATTERSON	89175	[signature]
FRANK PAVIN	87797	[signature]
JAMES PEATTIE	86245	[signature]
JOHN MANSO	86684	[signature]

SONGS UNITS 2 and 3 SPENT FUEL POOL to PAD PROJECT

ALARA PLAN

Rev 3



Prepared by: Gary Fausett, BHI Energy   3/4/2018

Reviewed by: Jim Moore, BHI Energy   3/6/2018

Approved by: Jared Smith, Holtec International   03-06-2018

TABLE OF CONTENTS

SECTION ONE EXECUTIVE SUMMARY

At present, SONGS Units 2 and 3 spent fuel pools contain a total of 2668 spent fuel assemblies, along with two rod storage baskets and two("trash cans"). The "Pool-to-Pad" Project will safely transfer all of this material to the newly constructed UMAX ISFSI Pad.

"Dry-Run" demonstrations began in late June, 2017, and transfer of spent fuel started in January, 2018.

The project staff will consist of personnel from Holtec International, Master Lee, BHI Energy, Choice, Westinghouse, and Southern California Edison. This same team performed SONGS spent fuel inspections in 2015-2016, and brings significant teaming experience and expertise to the project.

The primary purpose of this Project ALARA Plan is to provide for:

- Ensuring all project exposures will be maintained as low as reasonably achievable.
- Accurate and timely reporting of project radiological safety status.
- Prevention of Personnel Contamination Events.

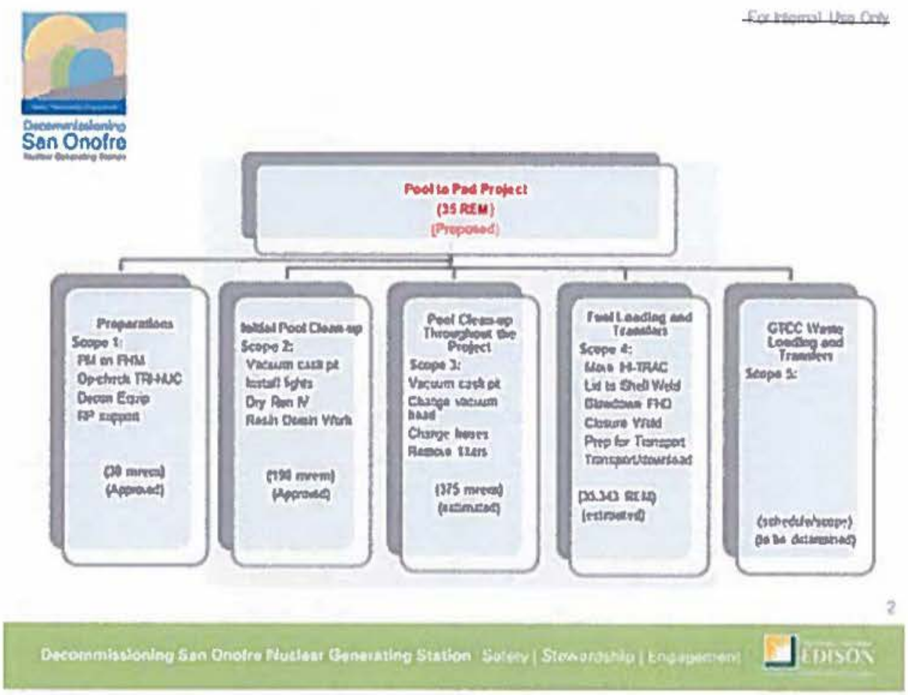
A preliminary exposure estimate of **46.616 person-REM** was developed in July, 2017 using canister heat loads in kW as a method to develop the preliminary estimate.

On October 11, 2017, a presentation was made to the station ALARA Committee which included a proposed Pool to Pad Project ALARA goal of **35 person-REM**. The committee determined that the proposed goal was acceptable and the goal was approved.

Seven ALARA Initiatives were originally identified in July 2017. Seven additional ALARA Initiatives were developed and discussed in the October 11 presentation. These fourteen ALARA initiatives will be implemented and will ensure project exposures will be kept as low as reasonably achievable.

All project ALARA related updates will be communicated to the site on a daily basis.

The approved project ALARA goal includes five big picture scopes of work that together makes up the Pool to Pad Project. This block diagram illustrates the Pool to Pad work structure.

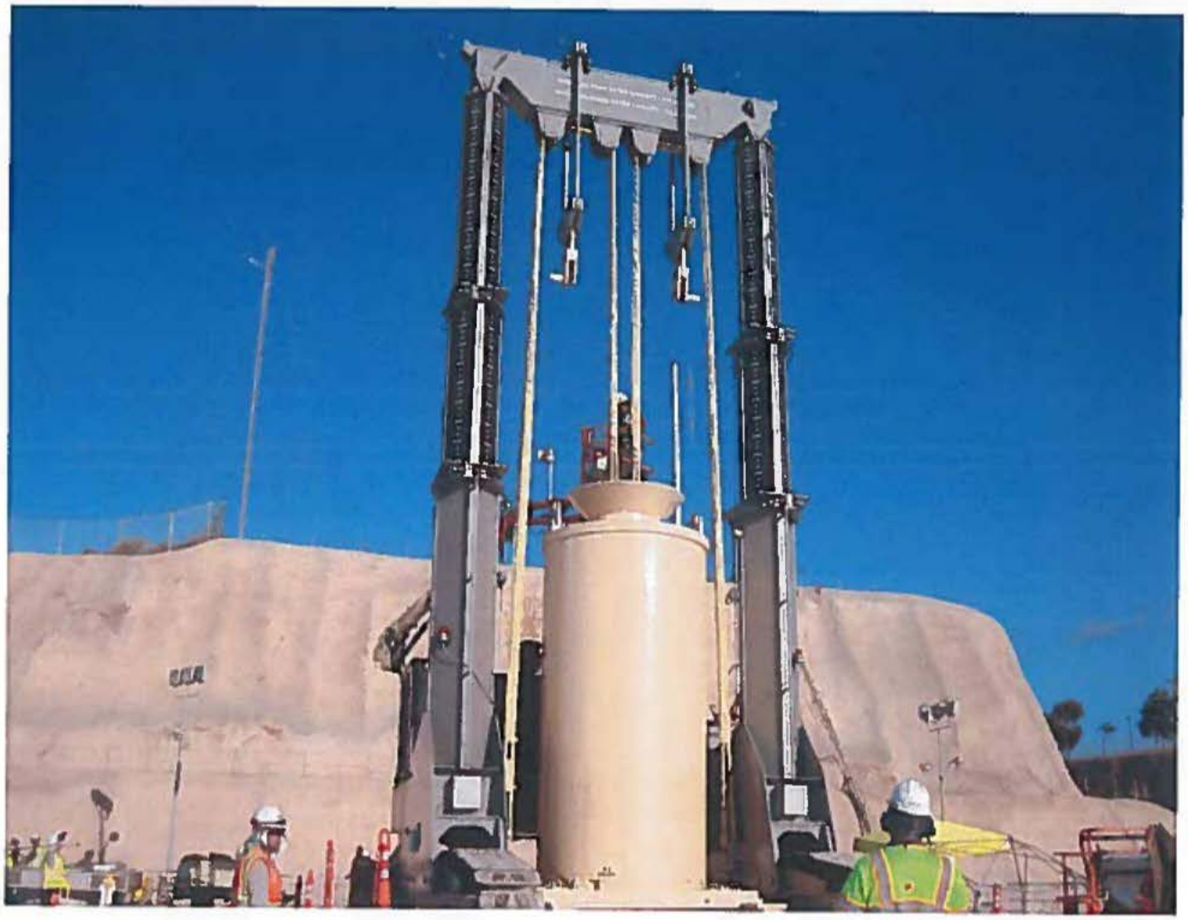


SECTION ONE EXECUTIVE SUMMARY

Holtec International has developed innovative storage systems and equipment that will be utilized during the San Onofre Pool to Pad Project. Holtec's dry fuel transfer cask known as HI-TRAC VW will be used to safely contain a Multi-Purpose Canister (MPC) holding 37 spent fuel assemblies during removal and transfer to the ISFSI.

SECTION ONE — EXECUTIVE SUMMARY

Holtec's Vertical Canister Transporter (VCT) will be used to transfer and download each MPC-37 containing 37 spent fuel assemblies into the UMAX storage system.



Each MPC-37 containing 37 spent fuel assemblies will be downloaded into the Holtec designed safe storage system known as UMAX.

The Overpack lid will then be secured over the Cavity Enclosure Container (CEC)

ACRONYMS and ABBREVIATIONS

ALARA	As Low As Reasonably Achievable
ARM	Area Radiation Monitor
AWP	ALARA Work Plan
AWS	Automated Welding Machine
C of C	Certificate of Compliance
CEC	Cavity Enclosure Container
CLS	Cask Loading Supervisor
CLT	Cask loading Technician
CWDA	Cask Wash Down Area
FHD	Forced Helium Dehydration
FHM	Fuel Handling Machine
FHS	Fuel Handling Supervisor
FSAR	Final Safety Analysis report
He	Helium
HI-PORT	Goldhofer Heavy Transporter
HI-TRAC VW	Shielded Cask
MPC-37	Multipurpose Canister
NRC	Nuclear Regulatory Commission
NSW	Nuclear Service Water
PA	Protected Area
RMS	Remote Monitoring System
RVOA	Remote Valve Operating Assembly
SFP	Spent Fuel Pool
TS	Technical Specification
UMAX	Underground Maximum Capacity
VCT	Vertical Crawler Transporter
VVM	Vertical Ventilated Module
WCP	Work Control Plan

SECTION TWO PROJECT SCOPE

All 2668 fuel assemblies in the Units 2 and 3 spent fuel pools will be loaded into the Holtec MPC-37 canister, shielded by the HI-TRAC VW transfer cask. HI-TRAC VW and the MPC-37 loaded with 37 spent fuel assemblies will be removed from the spent fuel pool, decontaminated and moved to the cask wash down area. All water in the MPC will be drained and dried using forced helium dehydration. The MPC lid will be welded and HI-TRAC will be surveyed and prepared for removal from the fuel handling building. HI-TRAC will be lowered downward and secured onto a waiting Goldhofer heavy transporter and will slowly make its way to the ISFSI turning area where HI-TRAC will be moved from the Goldhofer transporter to the waiting Vertical Cask Transporter (VCT). The VCT will slowly transport and download the MPC into a UMAX Cavity Enclosure Container (CEC). After downloading the MPC into the CEC, the VCT will transport the empty HI-TRAC back to the Goldhofer which will return HITRAC back to the fuel handling building to start the process all over again until all remaining fuel assemblies have been transferred to UMAX. Prior to the loading campaign, Pre-Operational Testing and Demonstrations (Dry Runs) will be performed.

The project will be staffed with the following personnel:

- Project Management
- Fuels Engineering
- Project Oversight
- Radiation Protection
- Spent Fuel Handling Machine Operators
- Spent Fuel Handling Machine repair Technicians
- Rigging Specialists
- Welding Specialists
- Crane Operators
- Labor support
- Carpenter Support for Scaffolding

Due to the large number of spent fuel assemblies expected to be moved, the San Onofre Pool to Pad Project will be the largest one time dry fuel transfer project performed at any commercial nuclear facility.

SECTION THREE RADIOLOGICAL ASSESSMENT

3.1 BENCHMARK INFORMATION

Benchmark data was collected from recent Dry Fuel Campaigns at the following commercial nuclear stations: Diablo Canyon, Fermi, Watts Bar, and Callaway. Callaway data and information has proven to be the most valuable because their pool to pad process is nearly the same as we will use at SONGS. Table 1 lists the most recent dose and heat load data from Callaway, Diablo Canyon, and Watts Bar. Heat loads at Fermi were not available.

Table 1

Calloway (6 loads)	**mrem**	**kW**	**mrem per kW**
MPC load 1	607	19.1	31.8
MPC load 2	353	19.3	18.3
MPC load 3	345	20	17.3
MPC load 4	333	20	16.7
MPC load 5	276	20	13.8
MPC load 6	329	20	16.5
totals	**2243**	**118.4**	**18.9**
Diablo Canyon (12 loads)			
MPC load 1	266	17.9	14.9
MPC load 2	217	18.6	11.7
MPC load 3	169	17.9	9.4
MPC load 4	382	25.9	14.7
MPC load 5	332	25.9	12.8
MPC load 6	331	25.9	12.8
MPC load 7	150	18.2	8.2
MPC load 8	194	17.7	11.0
MPC load 9	143	16.5	8.7
MPC load 10	434	27.3	15.9
MPC load 11	291	24.5	11.9
MPC load 12	335	26.1	12.8
totals	**3244**	**262.4**	**12.4**
Watts Bar (6 loads)			
MPC load 1	472	29.7	15.9
MPC load 2	236	29.9	7.9
MPC load 3	175	29.8	5.9
MPC load 4	157	29.8	5.3
MPC load 5	111	29.9	3.7
MPC load 6	105	29.9	3.5
totals	**1256**	179	**7.0**

SECTION THREE RADIOLOGICAL ASSESSMENT

3.1 BENCHMARK INFORMATION

Table 1 lists the dose, heat load in kW and mrem per kW. Of the three benchmarked plant listed Watts Bar had the lowest mrem per kW average. This average is a reasonably accurate metric for determining efficient ALARA practices. However, due to differences in plant design and limits on sizes of work area space, this metric may not always be accurate. The four benchmarked plants submitted Post-Job Reviews and Lessons Learned. This information will be valuable as Pool to Pad Project RP planning continues. Copies of the Post-Job Reviews and Lessons Learned are included as attachments.

3.2 HISTORICAL DATA

Prior to the Pool to Pad project, fifty canister loads of dry spent fuel and one load of GTCC waste were transferred to the Trans Nuclear horizontal ISFSI at San Onofre throughout a span of approximately 9 years. Data from the 20 most recent fuel transfers at San Onofre is shown in table 2.

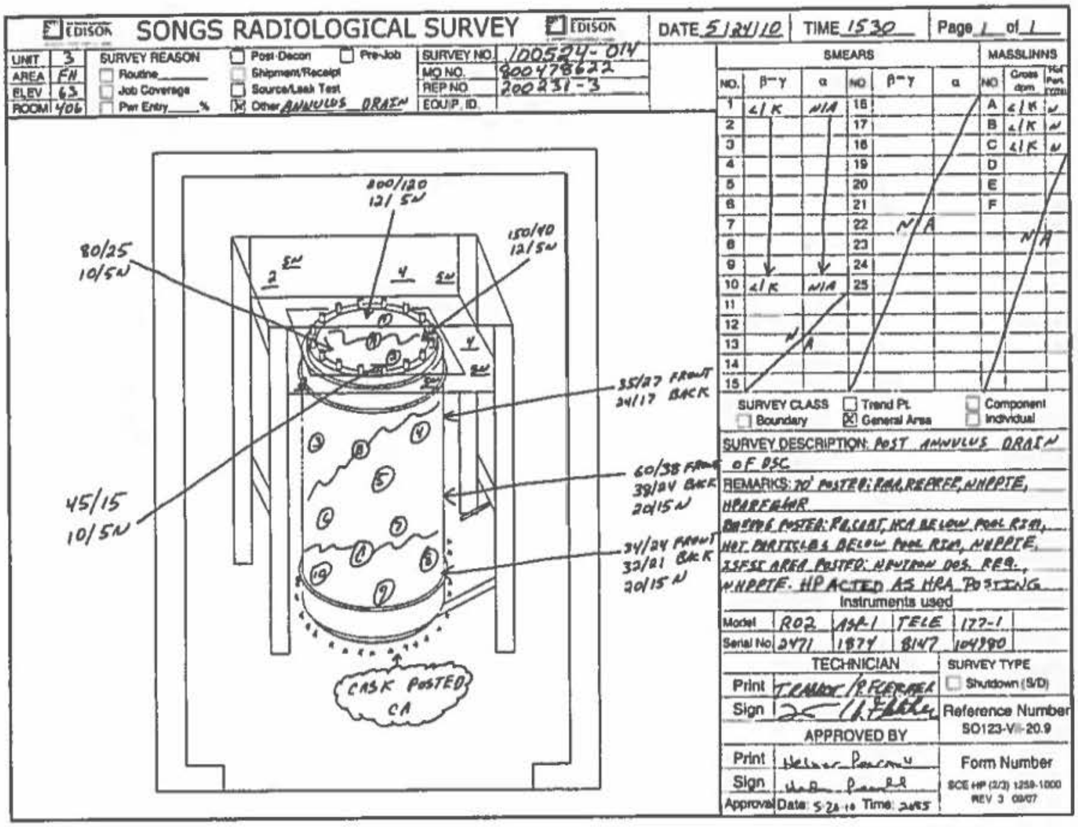
Table 2

DSC	Year	Unit	KW	Mrem
51	2012	3	13.2	175
50	2012	3	13.3	156
49	2012	3	12.3	264
48	2012	3	7.9	131
47	2011	2	8.9	95
46	2011	2	8.8	114
45	2011	2	8.8	107
44	2011	2	8.8	127
43	2011	2	7.8	159
42	2010	3	15.4	288
41	2010	3	15.3	326
40	2010	3	15	326
39	2010	3	13.5	278
38	2010	3	14.5	342
37	2010	3	13.3	360
36	2009	3	14.7	220
35	2009	3	13.6	180
34	2009	3	13	248
33	2009	3	12.9	177
32	2009	2	12.4	328

Data from table 1 reveals that previous dry fuel transfers has relatively low to moderate decay heat kW levels and corresponding low to moderate exposure accumulations per canister load.

3.2 HISTORICAL DATA

The following radiological surveys taken during the previous dry fuel transfer campaigns indicate low to moderate dose rates:



EDISON SONGS RADIOLOGICAL SURVEY EDISON

DATE 5/24/10 TIME 1530 Page 1 of 1

UNIT 3 AREA FH ELEV 63 ROOM 406

SURVEY REASON: ☐ Routine ☐ Job Coverage ☐ Pwr Entry ___% ☐ Post-Decon ☐ Pre-Job ☐ Shipment/Receipt ☐ Source/Leak Test ☒ Other ANNULUS DRAIN

SURVEY NO. 100524-014 MO NO. 800478622 REP NO. 200231-3 EQUIP. ID.

SMEARS NO.	β−γ	α	NO	β−γ	α	MASSLINNS NO	Gross dpm	Hot Part.
1	<1K	N/A	16			A	<1K	N
2			17			B	<1K	N
3			18			C	<1K	N
4			19			D		
5			20			E		
6			21			F		
7			22	N/A				
8			23					
9			24					
10	<1K	N/A	25					
11								
12								
13	N/A							
14								
15								

SURVEY CLASS: ☐ Boundary ☐ Trend Pt. ☒ General Area ☐ Component ☐ Individual

SURVEY DESCRIPTION: POST ANNULUS DRAIN OF DSC

REMARKS: 70' POSTED: RCA, REPREF, NHPPTE, HPAREF...

INSIDE POSTED: RCA, CA, HCA BELOW POOL RIM, HOT PARTICLES BELOW POOL RIM, NHPPTE, ISFSI AREA POSTED: NEUTRON DOS. REQ., NHPPTE. HP ACTED AS HRA POSTING

Instruments used

Model	R02	ASP-1	TELE	177-1
Serial No	2471	1874	8147	104980

TECHNICIAN Print T. CARLOS / R. FERRER Sign

SURVEY TYPE ☐ Shutdown (S/D)

Reference Number SO123-VII-20.9

APPROVED BY Print Sign

Approval Date: 5-28-10 Time: 2025

Form Number SCE HP (2/3) 1259-1000 REV 3 09/07

Originator File Copy

3.2 HISTORICAL DATA

EDISON SONGS RADIOLOGICAL SURVEY EDISON

DATE 25/MAY/2010 TIME 2330 Page 1 of 1

UNIT 3
AREA FH
ELEV 30
ROOM

SURVEY REASON
☐ Routine
☐ Job Coverage
☐ Pwr Entry ___%
☒ Post-Decon
☐ Shipment/Receipt
☐ Source/Leak Test
☐ Other
☐ Pre-Job

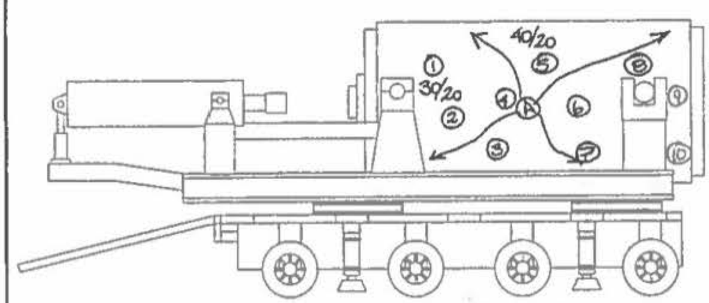
SURVEY NO. 100525-011
MO NO. 800478622
REP NO. 20231-3
EQUIP. ID. SO22DBHUDSC038

SMEARS

NO.	β−γ	α	NO.	β−γ	α
1	<1K	ND	16	<1K	ND
2			17		
3			18		
4			19		
5			20		
6			21		
7			22		
8			23		
9			24		
10			25		
11					
12					
13					
14					
15					

MASSLINNS

NO	Gross dpm	Net Part YNC
A	1.5K	N
B	<1K	N
C		
D		
E		
F		



POST DECON: AS PER HP-I-17 ALL DSC SURFACES VERIFIED <1K DPM/100 cm², ≤ 1.5KDPM/LAS FOR PERMISSION TO TRANSPORT FROM U3 FHB CRANE BAY TO ISFSI AS PER HP SUPV. H. PEARSALL AND HPGF R. HEREDIA

~~HP Was RA Posting~~ 6.6.2010

SURVEY CLASS ☐ Boundary ☐ Trend Pt. ☒ General Area ☐ Component ☐ Individual

SURVEY DESCRIPTION: DSC 038 SURVEY FOR TRANSPORT FROM U3 FUEL BAY TO ISFSI

REMARKS: SMEARS (11)-(20) & MASSLINN (B) ON OPPOSITE SIDE
U3 FUEL BAY POSTED & RA, BRA, HRA, VHRA, UNACCEPTABLE

Instruments used

Model	TELEPOLE	2-1	ASP1 AC3-7
Serial No	80531	258980	1028

TECHNICIAN
Print [illegible]
Sign [illegible]

APPROVED BY
Print B Girard
Sign B Girard
Approval Date: 5/26/10 Time: 0730

SURVEY TYPE ☐ Shutdown (S/D)

Reference Number SO123-VII-20.9

Form Number SCE HP (2/3) 1259-1000 REV 3 09/07

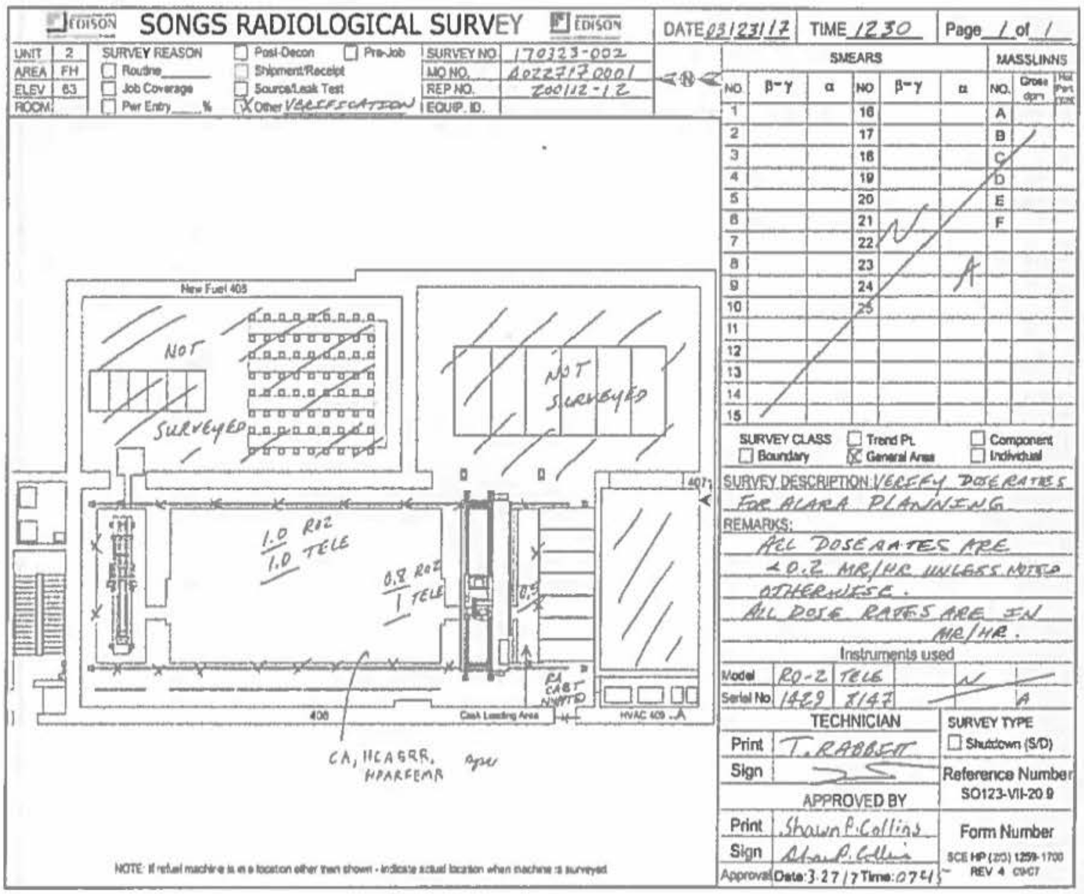
Originator File Copy

3.3 CURRENT RADIOLOGICAL CONDITIONS

Nearly all of the radiation sources in the U2/3 cask wash down areas have been removed with the exception of one Tri-nuc portable filtration unit that remains in U2 cask wash down. This filter unit has a dose rate of 0.8 mR/hr and will be moved to the U2 spent fuel pool prior to fuel loading. All other accessible general areas with U2/3 rooms 406 and cask wash down have dose rates < 0.2 mR/hr.

It should be noted that the dose rate over the pool and the gamma activity in the unit 2 spent fuel pool is significantly higher when compared to unit 3. For those reasons the unit 2 estimated effective dose rate is higher than the unit 3 estimated effective dose rate. This dose rate difference will be observed especially on the unit2 fuel handling machine. A U2 survey performed on 3/23/2017 indicates a chest high dose rate over the U2 spent fuel pool at 0.8 - 1 mR/hr. A U3 survey indicates a chest high dose rate at 0.3 mR/hr. See U2 survey number 170323-002 on page 15, and U3 survey number 170622-003 on page 16.

3.3 CURRENT RADIOLOGICAL CONDITIONS



EDISON SONGS RADIOLOGICAL SURVEY EDISON

DATE 03/23/17 TIME 1230 Page 1 of 1

UNIT	2	SURVEY NO	170323-002
AREA	FH	MO NO.	60227170001
ELEV	63	REP NO.	Z00112-12
ROOM		EQUIP. ID.	

SURVEY REASON: ☐ Routine ☐ Job Coverage ☐ Per Entry ___ % ☐ Post-Decon ☐ Pre-Job ☐ Shipment/Receipt ☐ Source/Leak Test ☒ Other VERIFICATION

SMEARS: NO | β-γ | α | NO | β-γ | α — MASSLINNS: NO. | Gross dpm | Hot Part

NO	β-γ	α	NO	β-γ	α	NO.	Gross dpm	Hot Part
1			16			A		
2			17			B		
3			18			C		
4			19			D		
5			20			E		
6			21			F		
7			22	N/A				
8			23					
9			24					
10			25					
11								
12								
13								
14								
15								

New Fuel 405

NOT SURVEYED

NOT SURVEYED

1.0 ROZ
1.0 TELE

0.8 ROZ
1 TELE

0.5

RA CAST NOTED

407

408

Cask Loading Area

HVAC 409

CA, HCA&RR, HPA&FEMR

NOTE: If refuel machine is in a location other than shown - indicate actual location when machine is surveyed

SURVEY CLASS ☐ Trend Pt. ☐ Component ☐ Boundary ☒ General Area ☐ Individual

SURVEY DESCRIPTION: VERIFY DOSERATES FOR ALARA PLANNING

REMARKS: ALL DOSERATES ARE <0.2 MR/HR UNLESS NOTED OTHERWISE. ALL DOSE RATES ARE IN MR/HR.

Instruments used

Model	RO-2	TELE	N/A
Serial No	1429	8147	

TECHNICIAN — Print: T. RABBETT — Sign:

SURVEY TYPE ☐ Shutdown (S/D)

Reference Number SO123-VII-20.9

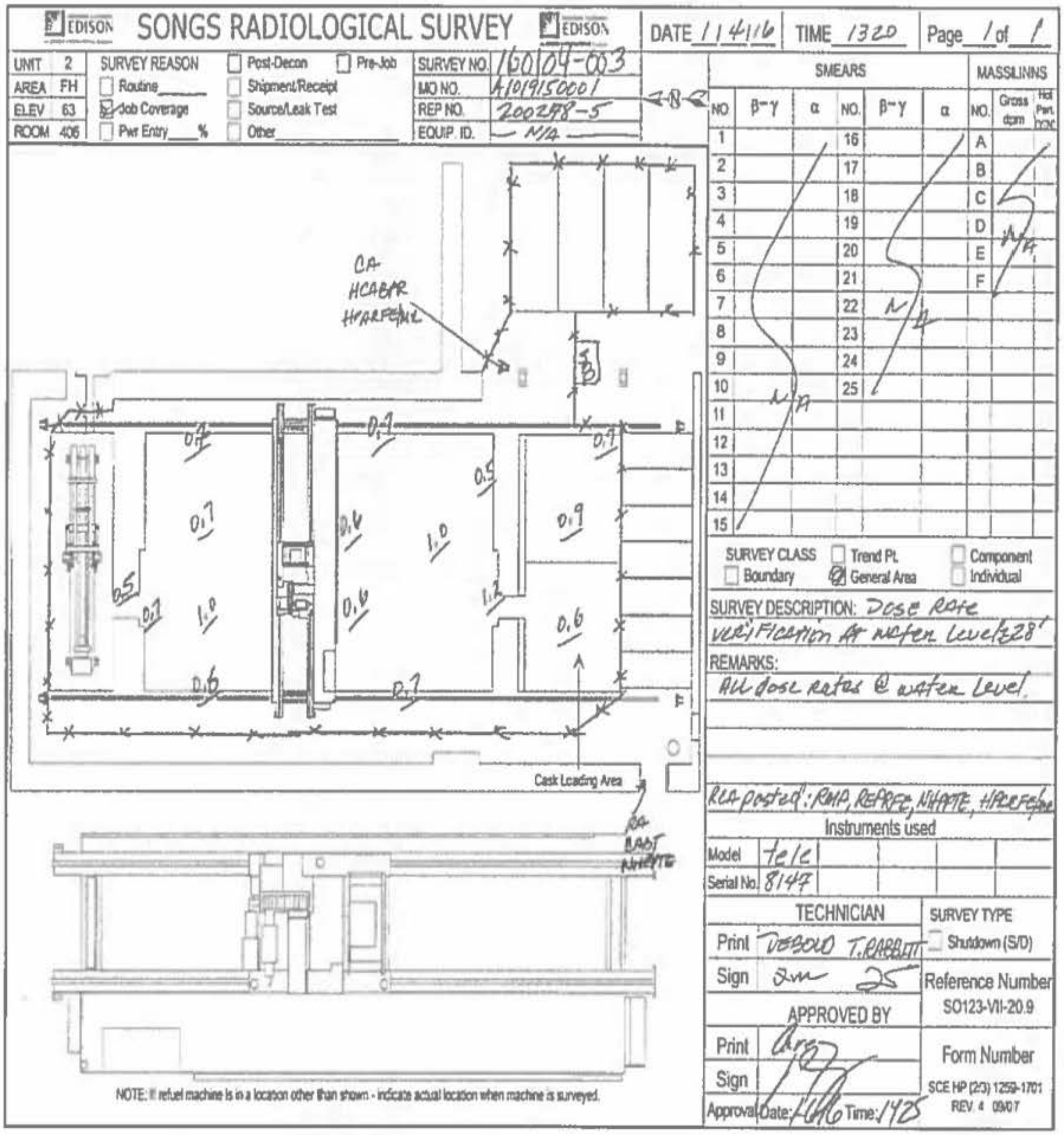
APPROVED BY — Print: Shawn P. Collins — Sign: Shawn P. Collins

Approval Date: 3-27-17 Time: 0745

Form Number SCE HP (20) 1259-1700 REV 4 09/07

3.3 CURRENT RADIOLOGICAL CONDITIONS

Compare chest high dose rates documented on survey number 170323-002 with pool level dose rates documented on survey number 160104-003. This comparison illustrates that the U2 spent fuel pool activity and dose rates continue to increase over time.


EDISON SONGS RADIOLOGICAL SURVEY EDISON

DATE 1/4/16 TIME 1320 Page 1 of 1

UNIT	2	SURVEY REASON		SURVEY NO.	160104-003
AREA	FH	☐ Routine	☐ Shipment/Receipt	MO NO.	410191500001
ELEV	63	☑ Job Coverage	☐ Source/Leak Test	REP NO.	200248-5
ROOM	406	☐ Pwr Entry ___%	☐ Other	EQUIP. ID.	N/A

☐ Post-Decon ☐ Pre-Job

SMEARS: N/A (items 1–25); MASSLINNS: N/A (A–F)

CA HCABAR HRARFEHR

Dose rate readings on drawing: 0.4, 0.7, 0.9, 0.5, 0.7, 0.6, 1.0, 0.9, 0.5, 0.7, 1.0, 0.6, 1.2, 0.6, 0.6, 0.7

Cask Loading Area

RA RADT NHATE

NOTE: If refuel machine is in a location other than shown - indicate actual location when machine is surveyed.

SURVEY CLASS ☐ Trend Pt. ☐ Component ☐ Boundary ☑ General Area ☐ Individual

SURVEY DESCRIPTION: Dose Rate verification at water level ≈28'

REMARKS: All dose rates @ water level

RCA posted: RMP, REPRFE, NHATE, HRARFEHR

Instruments used

Model: Tele

Serial No.: 8147

TECHNICIAN — Print: DeBold T. Rabbitt; Sign: [signatures]

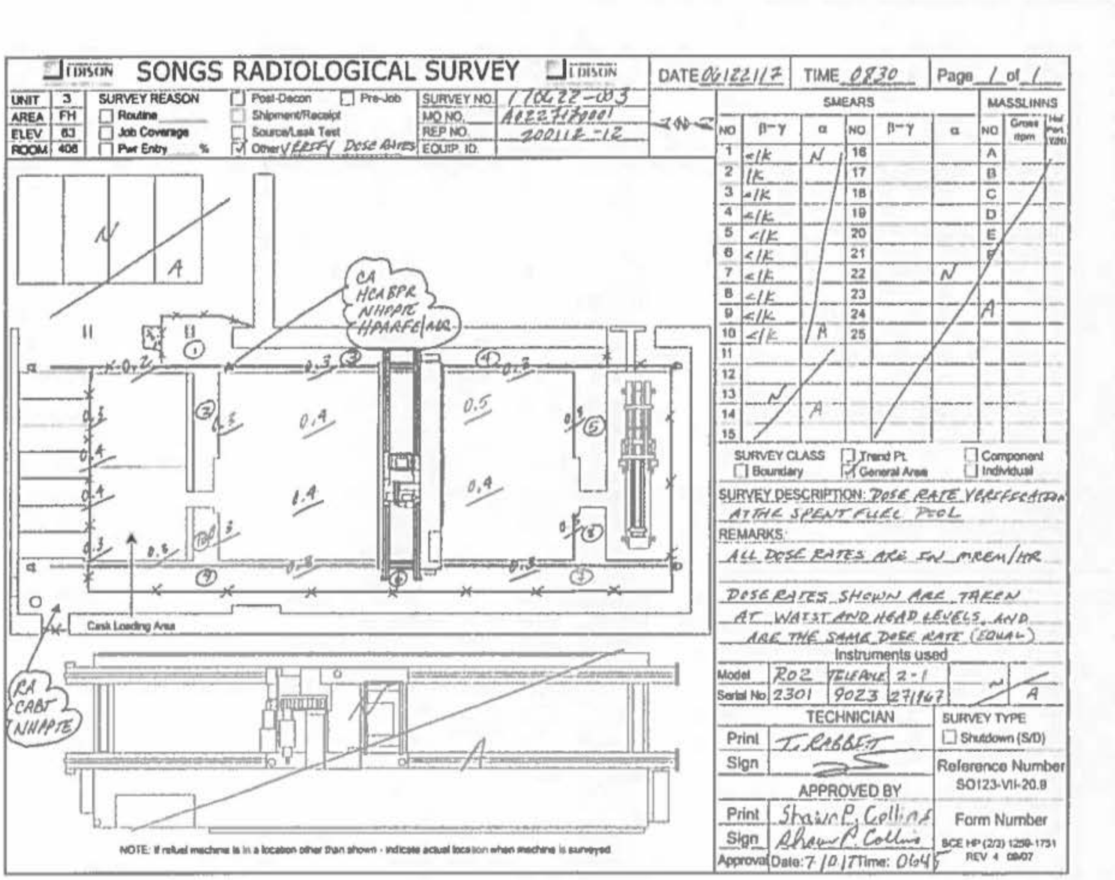
SURVEY TYPE ☐ Shutdown (S/D)

Reference Number SO123-VII-20.9

APPROVED BY — Print: [signature]; Sign: [signature]

Approval Date: 1/4/16 Time: 1425

Form Number SCE HP (2/3) 1259-1701 REV 4 09/07


SONGS RADIOLOGICAL SURVEY
DATE 06/22/17
TIME 0830
Page 1 of 1
UNIT 3
AREA FH
ELEV 63
ROOM 406
SURVEY REASON
Routine
Job Coverage
Pwr Entry %
Post-Decon
Pre-Job
Shipment/Receipt
Source/Leak Test
Other VERIFY DOSE RATES
SURVEY NO.
MO NO.
REP NO.
EQUIP. ID.
SMEARS
MASSLINNS
Cask Loading Area
SURVEY CLASS
Boundary
Trend Pt.
General Area
Component
Individual
SURVEY DESCRIPTION: DOSE RATE VERIFICATION AT THE SPENT FUEL POOL
REMARKS:
ALL DOSE RATES ARE IN mREM/HR
DOSE RATES SHOWN ARE TAKEN AT WAIST AND HEAD LEVELS, AND ARE THE SAME DOSE RATE (EQUAL)
Instruments used
Model
Serial No
TECHNICIAN
Print
Sign
SURVEY TYPE
Shutdown (S/D)
Reference Number
SO123-VII-20.9
APPROVED BY
Print
Sign
Form Number
NOTE: If refuel machine is in a location other than shown - indicate actual location when machine is surveyed

3.3 CURRENT RADIOLOGICAL CONDITIONS

An increase in the total gamma activity in the U2 spent fuel pool is also documented using the station chemistry database known as "ACIDS". Results from a pool dip sample taken on 01/12/2016 campared to results from a pool dip sample taken on 04/19/2017 shown here in table 3 reveal the following:

Table 3

Sample date	Sample source	Sample point	$\mu ci/ml$
01/12/2016	U2 spent fuel pool	U2 SFP dip	1.59 E-03
04/19/2017	U2 spent fuel pool	U2 SFP dip	2.62 E-03

This increase in total gamma activity and pool dose rates have been slowly increasing over time since the spent fuel pool purification system was taken out of service.

Portable demineralizers were run in both pools to remove dissolved radionuclides and reduce dose rates over the pool.

3.4 PRELIMINARY EXPOSURE ESTIMATE

Based on the best available data, it is expected that exposures will be collected performing the following tasks:

- Wet operations portion of the project dry runs
- Operation of the Fuel Handling Machines
- Removal and decontamination of HI-TRAC from the spent fuel pools
- Placement of HI-TRAC in the cask wash down areas
- Installation/removal of equipment on top of the loaded MPC
- Blow down/draining of water from the loaded MPC
- Performing lid to shell and closure welding
- Preparing Hi-TRAC for transport to UMAX
- Loading and securing of HI-TRAC onto the Goldhofer transporter
- Transportation of HI-TRAC to the ISFSI turning area
- Transference of HI-TRAC from the Goldhofer to the VCT
- Securing HI-TRAC to the VCT and transport to UMAX
- Download the MPC into the UMAX CEC and install the VVM
- Oversight personnel performing QA and QC functions.
- RP personnel performing surveys and decontamination.
- Removal and disposition of Tri-Nuc filters and filtration equipment

The preliminary project exposure estimate has been calculated based on radiological data from previous dry fuel transfers at San Onofre, data from Diablo Canyon, Callaway, and Watts Bar, as well as project work scope and dose rate calculations provided by Holtec. The preliminary project exposure estimate has been calculated using two independent methods:

- Method 1: Mrem per kW for each MPC transfer
- Method 2: Person-Hours per task

3.4 PRELIMINARY EXPOSURE ESTIMATE

Method 1:

Table 4 calculates a SONGS historical data point of 17.7 mrem per kW. This data point was derived by averaging the mrem per kW summation from the 20 most recent DSC transfers at San Onofre. This establishes and averaged mrem per kW of 17.7.

Table 4

DSC	Year	Unit	Order	KW	mrem	mrem/kw
51	2012	3	800836172	13.2	175	13.26
50	2012	3	800836171	13.3	156	11.73
49	2012	3	800836169	12.3	264	21.46
48	2012	3	800836168	7.9	131	16.58
47	2011	2	800675826	8.9	95	10.67
46	2011	2	800675618	8.8	114	12.95
45	2011	2	800671815	8.8	107	12.16
44	2011	2	800671826	8.8	127	14.43
43	2011	2	800667280	7.8	159	20.38
42	2010	3	800479253	15.4	288	18.70
41	2010	3	800479245	15.3	326	21.31
40	2010	3	800479153	15	326	21.73
39	2010	3	800479150	13.5	278	20.59
38	2010	3	800478622	14.5	342	23.59
37	2010	3	800419730	13.3	360	27.07
36	2009	3	800217593	14.7	220	14.97
35	2009	3	800217921	13.6	180	13.24
34	2009	3	800202846	13	248	19.08
33	2009	3	800202845	12.9	177	13.72
32	2009	2	800162992	12.4	328	26.45
				total	4401	354.08

354/20 = **17.7 mrem per kW**

3.4 PRELIMINARY EXPOSURE ESTIMATE

Table 5 calculates a Callaway data point of **18.94 mrem per kW, and 19.73 kW per load**. These data points were derived by averaging the mrem per kW summation from the recent 6 MPC transfers at Callaway.

Table 5

MPC	mrem	kW
37	607	19.1
38	353	19.3
39	345	20
40	333	20
41	276	20
42	329	20
total	**2243**	**118.4**

2243 mrem/118.4 kW equals 18.94 mrem per kW
118.4 kW/ 6 loads equals 19.73 kW per load

3.4 PRELIMINARY EXPOSURE ESTIMATE

Table 6 calculates an expected SONGS data point of **25.82 averaged kW**, per load.

Table 6

	KW		KW		KW		KW
U2 MPC 1	27.5	U3 MPC 1	25.7	U2 MPC 19	25.2	U3 MPC 19	26.6
U2 MPC 2	26.6	U3 MPC 2	24.7	U2 MPC 20	25.7	U3 MPC 20	24.6
U2 MPC 3	28.2	U3 MPC 3	25.5	U2 MPC 21	25.3	U3 MPC 21	27.6
U2 MPC 4	27.8	U3 MPC 4	27.2	U2 MPC 22	28.6	U3 MPC 22	26.4
U2 MPC 5	27.0	U3 MPC 5	27.8	U2 MPC 23	25.6	U3 MPC 23	25.2
U2 MPC 6	26.6	U3 MPC 6	26.8	U2 MPC 24	27.6	U3 MPC 24	25.8
U2 MPC 7	27.9	U3 MPC 7	27.4	U2 MPC 25	28.5	U3 MPC 25	25.9
U2 MPC 8	27.3	U3 MPC 8	25.7	U2 MPC 26	26.7	U3 MPC 26	25.5
U2 MPC 9	28.3	U3 MPC 9	27.3	U2 MPC 27	26.4	U3 MPC 27	26.5
U2 MPC 10	29.8	U3 MPC 10	27.1	U2 MPC 28	25.4	U3 MPC 28	27.1
U2 MPC 11	26.5	U3 MPC 11	27.1	U2 MPC 29	25.1	U3 MPC 29	26.3
U2 MPC 12	25.7	U3 MPC 12	27	U2 MPC 30	28.8	U3 MPC 30	26.5
U2 MPC 13	27.8	U3 MPC 13	26.5	U2 MPC 31	26.4	U3 MPC 31	27.6
U2 MPC 14	25.8	U3 MPC 14	25.2	U2 MPC 32	28.7	U3 MPC 32	26.2
U2 MPC 15	27.1	U3 MPC 15	24.5	U2 MPC 33	27.3	U3 MPC 33	25.6
U2 MPC 16	25	U3 MPC 16	27.4	U2 MPC 34	25.2	U3 MPC 34	26.3
U2 MPC 17	28.2	U3 MPC 17	27.4	U2 MPC 35	25.7	U3 MPC 35	24.3
U2 MPC 18	28.2	U3 MPC 18	24.3	U2 MPC 36	6.8	U3 MPC 36	10.5
				subtotal	950.3	U3 MPC 37	5.6
						subtotal	934.7

950 kW plus 935 kW equals 1885 total kW. 1885 kW/73 loads equals A SONGS Data Point of 25.82 kW per load.

The data points from Callaway and the data point from SONGS can be used to establish a SONGS expected data point of **24.73 mrem per kW**

Callaway SONGS

$$\frac{19.73\ kW\ per\ load}{18.94\ mrem\ per\ kW} = \frac{25.82\ kW\ per\ load}{x}$$

X = 24.73 mrem per kW at SONGS

3.4 PRELIMINARY EXPOSURE ESTIMATE

Table 7 uses the calculated SONGS data point of **24.73 mrem per kW** to establish a preliminary dose estimate of **46.616** person-REM.

Table 7

	KW	avg mrem/KW	est mrem		KW	avg mrem/KW	est mrem
U2 MPC 1	27.5	24.73	680.075	U3 MPC 1	25.7	24.73	635.561
U2 MPC 2	26.6	24.73	657.818	U3 MPC 2	24.7	24.73	610.831
U2 MPC 3	28.2	24.73	697.386	U3 MPC 3	25.5	24.73	630.615
U2 MPC 4	27.8	24.73	687.494	U3 MPC 4	27.2	24.73	672.656
U2 MPC 5	27.0	24.73	667.71	U3 MPC 5	27.8	24.73	687.494
U2 MPC 6	26.6	24.73	657.818	U3 MPC 6	26.8	24.73	662.764
U2 MPC 7	27.9	24.73	689.967	U3 MPC 7	27.4	24.73	677.602
U2 MPC 8	27.3	24.73	675.129	U3 MPC 8	25.7	24.73	635.561
U2 MPC 9	28.3	24.73	699.859	U3 MPC 9	27.3	24.73	675.129
U2 MPC 10	29.8	24.73	736.954	U3 MPC 10	27.1	24.73	670.183
U2 MPC 11	26.5	24.73	655.345	U3 MPC 11	27.1	24.73	670.183
U2 MPC 12	25.7	24.73	635.561	U3 MPC 12	27	24.73	667.71
U2 MPC 13	27.8	24.73	687.494	U3 MPC 13	26.5	24.73	655.345
U2 MPC 14	25.8	24.73	638.034	U3 MPC 14	25.2	24.73	623.196
U2 MPC 15	27.1	24.73	670.183	U3 MPC 15	24.5	24.73	605.885
U2 MPC 16	25	24.73	618.25	U3 MPC 16	27.4	24.73	677.602
U2 MPC 17	28.2	24.73	697.386	U3 MPC 17	27.4	24.73	677.602
U2 MPC 18	28.2	24.73	697.386	U3 MPC 18	24.3	24.73	600.939
U2 MPC 19	25.2	24.73	623.196	U3 MPC 19	26.6	24.73	657.818
U2 MPC 20	25.7	24.73	635.561	U3 MPC 20	24.6	24.73	608.358
U2 MPC 21	25.3	24.73	625.669	U3 MPC 21	27.6	24.73	682.548
U2 MPC 22	28.6	24.73	707.278	U3 MPC 22	26.4	24.73	652.872
U2 MPC 23	25.6	24.73	633.088	U3 MPC 23	25.2	24.73	623.196
U2 MPC 24	27.6	24.73	682.548	U3 MPC 24	25.8	24.73	638.034
U2 MPC 25	28.5	24.73	704.805	U3 MPC 25	25.9	24.73	640.507
U2 MPC 26	26.7	24.73	660.291	U3 MPC 26	25.5	24.73	630.615
U2 MPC 27	26.4	24.73	652.872	U3 MPC 27	26.5	24.73	655.345

3.4 PRELIMINARY EXPOSURE ESTIMATE

Table 7 (cont.)

U2 MPC 28	25.4	24.73	628.142	U3 MPC 28	27.1	24.73	670.183
U2 MPC 29	25.1	24.73	620.723	U3 MPC 29	26.3	24.73	650.399
U2 MPC 30	28.8	24.73	712.224	U3 MPC 30	26.5	24.73	655.345
U2 MPC 31	26.4	24.73	652.872	U3 MPC 31	27.6	24.73	682.548
U2 MPC 32	28.7	24.73	709.751	U3 MPC 32	26.2	24.73	647.926
U2 MPC 33	27.3	24.73	675.129	U3 MPC 33	25.6	24.73	633.088
U2 MPC 34	25.2	24.73	623.196	U3 MPC 34	26.3	24.73	650.399
U2 MPC 35	25.7	24.73	635.561	U3 MPC 35	24.3	24.73	600.939
U2 MPC 36	6.8	24.73	168.164	U3 MPC 36	10.5	24.73	259.665
	950.3			U3 MPC 37	5.6	24.73	138.488
		Unit 2	**23501**		934.7	**Unit 3**	**23115**

Total	**46.616 P-REM**

This estimate of 46.616 person-REM is for the U2/3 Pool to Pad fuel loading campaign.

This estimate does not include increased dose during removal of HI-TRAC from the spent fuel pool due to the HI-TRAC water jacket being empty of water.

This estimate is based on spent fuel pool water total gamma activity $\leq$ 5 E-5 μci/ml.

This estimate does not include exposure associated with preliminary project preparations and Dry Runs.

This estimate does not include exposure associated with disposition and processing of spent resin and Tri-Nuc filters used for spent fuel pool purification.

3.4 PRELIMINARY EXPOSURE ESTIMATE

Method 2:

Table 8 calculates the total exposure for transfer of the first 27 kW MPC from pool to pad using estimated man-hours per task multiplied by the expected averaged work area dose rate.

Table 8

Description	RCA-Hours	Eff mR/hr	mrem
Set-up, Load Cask and MPC into pool, move fuel/load MPC	486	0.02	11
Lift/decon HI-TRAC, move to CWDA, decon and remove annulus seal	748	0.31	216
Perform lid to shell welding	72	0.63	19
Perform Blowdown and Forced Helium Dehydration	466	0.25	70
Perform closure weld	59	2.71	265
PRWP HI-TRAC for transport	101	0.97	98
Load HI-TRAC onto Goldhofer, transport to turning area, transfer to VCT, transport/download at UMAX	599	0.33	198
totals	**2531**	**0.35**	**877**

This preliminary MPC estimate of 877 mrem multiplied by 71 fully loaded MPC's equals 62.267 person-REM. This value added to the estimated exposure to transfer the two remaining partial loads of 168 and 138 mrem equals a total of 62.573 person-REM. However as work progresses, efficiencies and incremental exposure savings will occur. We should expect the first load to be at or near 877 mrem but the dose for each load thereafter will be lower. As we approach the end of the project we should expect to see doses < 500 mrem per load and complete the project with an accumulated total of

< 46.6 person-REM of exposure.

This estimate does not include exposure associated with preliminary project preparations and Dry Runs.

This estimate does not include exposure associated with disposition and processing of spent resin and Tri-Nuc filters used for spent fuel pool purification.

The above mentioned preliminary exposure estimate of 46.6 person-REM was developed in July, 2017. On October 11, 2017 the Station ALARA Committee approved a Pool to Pad Project ALARA Goal of **35** person-REM.

3.5 PLANNED ALARA INITIATIVES

Seven ALARA Initiatives were originally identified during development of revision 0 of this document. Seven more ALARA Initiatives were developed and discussed in the ALARA goal presentation on October 11, 2017.

- Temporary shielding was installed during the Fuel Inspection Project on spent fuel pool cooling valves S2-1219-ML-030, and S3-1219-ML-030. This shielding remains in place and lowers the west side walkway dose rate from 5 mR/hr to 1 mR/hr in each unit.

- Shielding will be installed on top of the MPC. This will provide reduced dose rates during the drying process. Also, portable racks with lead blankets will be used to shield workers from HI-TRAC during off-normal work evolutions when the dose spent placing and removing the shielding saves collective dose. Because of the height of the HI-TRAC consideration will be given to placing the shielding close to the work location.

- Spent fuel pool activity levels, especially the Cesium-137 content will be reduced using portable ion exchange. Additionally, Tri-nuc filtration units will be submerged and used in each pool.

- A wireless Remote Monitoring System will be utilized to supplement control of personnel exposures during the project. This will include a camera system and a tele-dosimetry system that will send real time camera views along with work area dose rate and worker accumulated dose to a monitoring station.

- Electronic dose rate display monitors will be used inside each unit. These monitors display real time actual dose rates. Low dose areas will be identified and posted during all phases of the project.

- RWP exposure targets will be calculated and communicated to HOLTEC. Project exposures will be tracked and compared to the target.

- Work processes will be observed and ALARA In-Progress reviews will be performed. Improvement opportunities will be communicated to project management for evaluation and implementation.

3.5 PLANNED ALARA INITIATIVES

- Holtec ALARA/RP will communicate a collective dose goal for each shift based on anticipated progress on the current task. During performance of the task, dose reduction techniques will be observed. Both positive and improvement feedback will be provided during the job task to maintain dose ALARA. At the completion of the overall canister, performance will be evaluated against the goal and previous performance to incorporate both positive techniques and lessons learned for future upcoming canister tasks. A strong bias for ALARA improvements and prevention of personal contamination events will be a continued focus throughout the Pool to Pad Project.

- Holtec ALARA/RP will discuss the work process and number of workers needed for each task with the Cask Loading Supervisors. The goal is to reduce un-needed workers during specific evolutions and reduce dose.

- Holtec ALARA/RP will take photographs and videos of specific high dose work evolutions and review with appropriate personnel. The goal is to provide specific work improvements that will save dose.

- Cleaner water will reduce dose to fuel handlers and decon techs.

- Welding craft will be coached on using high temp lead shielding (i.e. Silflex sheet) wherever possible to reduce exposure during set up, tear-down, and modification to welding equipment.

- ALARA/RP should ensure RVOA craft have the right tools prior to entry into HRA.

- ALARA/RP should ensure only needed craft workers will be in the fuel bays as HI-TRAC is lowered onto HI-PORT.

- ALARA/RP should keep workers at a safe distance until needed during HITRAC stack up.

3.6 PERSONNEL CONTAMINATION PREVENTION PLAN

Personnel Contamination Events at San Onofre during the recent Fuel Inspection Project have been evaluated. The Pool to Pad Project will be committed to adhering to a project goal of **zero** Personnel Contamination Events. Table 9 lists the results from an evaluation of three PCE's that occurred during the recent Fuel Inspection Project.

Table 9

Employer	Body Location	Ncpm	Description
Westinghouse	Lower Back	800	Work performed in clean area, reason for contamination could not be determined
Saulsbury	Right Shoe	800	Work performed in clean area, reason for contamination could not be determined
Master Lee	Left Knee	300	worker dressed and worked in CA, reason for contamination could not be determined

The cause of all three PCE's listed above could not be determined. Therefore, it would be reasonable to conclude that prevention of personnel contamination events will require diligence and a constant awareness of conditions by the work groups, with a strong focus on the following:

- Good Radworker practices.
- Good Housekeeping practices.
- Use of Human Performance tools to eliminate errors.
- Verbatim compliance with all RWP requirements.

During the Pool to Pad Project, the most at risk work activity for a PCE to occur is removal and decontamination of HI-TRAC, the Lift yoke, and lift yoke extension. Every effort will be made to prevent personnel contaminations by implementation of the following initiatives:

- Continuous RP coverage will be performed during removal and decontamination work. RP Technicians will maintain continuous control and line of sight with workers and equipment. RP will ensure that all project personnel adhere to verbatim compliance with all RWP controls. This will include ensuring that workers will wear appropriate protective clothing, using an additional barrier when kneeling, and frequently change outer gloves after handling wet contaminated tooling and equipment.
- RP Supervision will be present and provide oversight and instructions during all work activities.

3.6 PERSONNEL CONTAMINATION PREVENTION PLAN

- Frequent and thorough survey techniques will be utilized that will include dose rates, masslin sweeps looking for loose surface contamination, and discrete radioactive particles. This initiative is in alignment with Corrective Actions CA-02, and CA-03 from SCE ACE 201935321.

- The beta-gamma contamination levels in all clean areas within the FHB work areas will be maintained at no detectable above background per masslin sweep. The alpha contamination levels in all clean areas within the FHB work areas will be maintained at no detectable per masslin sweep. Discrete radioactive particle levels in all areas will be maintained at no detectable. This initiative is also in alignment with Corrective Actions CA-02, and CA-03 from SCE ACE 201935321. Sticky pads will be placed and maintained in strategic areas during all project work. The permanent electromagnetic pads outside each FHB door will be surveyed frequently as directed by RP Supervision. These pads will be cleaned and maintained as per manufacturer's recommendations. The manufacturer recommends cleaning by spraying on Dycem N10 cleaning solution, then remove the excess liquid with a squeegee. Hard to remove dirt and debris can be removed with an alcohol wipe.

- The beta-gamma contamination levels in all posted contaminated areas within the FHB work areas will be maintained at less than 1000 cpm above background per masslin sweep. The alpha contamination levels in all posted contamination areas within the FHB work areas will be maintained at no detectable per masslin sweep. The hot particle levels in all areas will be maintained at no detectable. Corrective actions implemented following a PCE that occurred during fuel inspection in 2016 will continue to be implemented during PHASE IV. They are as follows: The use of plastic suits during removal of HI-TRAC from the spent fuel pool, and during decontamination of HI-TRAC will be determined by the RP Supervisor. Stay times will be reduced for heavy work/lifting evolutions to prevent compromising protective clothing effectiveness.

- If the above mentioned levels in any of the contaminated or non-contaminated areas are exceeded, RP will immediately commence decontamination activities.

3.7 EXPOSURE TRACKING WITH PEDS

Project personnel that enter the RCA will be required to wear personal electronic dosimeters (PEDs) and Thermoluminescent Dosimeters (TLDs). PED exposures will be recorded and tracked on the HIS-20 system. PEDs record every one tenth of a mrem.

3.8 CONCLUSIONS AND EXPECTATIONS

The Pool to Pad project will load and transfer 2668 fuel assemblies and 2 waste cans to the UMAX ISFSI. Although a dry fuel transfer project of this magnitude has never been performed at San Onofre, expectations for a safe, event free project are high. Radiological risks have been mitigated by staffing the project with seasoned experienced personnel. It is expected that this project will be performed with no significant radiological events. All radiation exposures will be As Low As Reasonably Achievable, and no level II or level III personal contaminations are expected.

3.9 BENCHMARKING DATA FROM SELECTED PLANTS

ATTACHMENT 1 from CALLAWAY

Dry Cask Storage Observations and Improvement Opportunities

Attach to CAR 201506977

This document was analyzed to have 3 components ALARA actions either pre work or brief, job coverage notes which were put in TRRQ 201508325, and issues where RP is not the appropriate party to evaluate which were forwarded to Engineering projects. These other items will be reviewed by ALARA and some may appear on the pre-approval checklist. Highlights are yellow for ALARA actions, green for job coverage issues, and no highlight for actions with action outside of RP.

Shielding

1. Consider additional shielding on hand rails for Cask Wash Down Pit (May require supplemental light for the lower portion of pit). Requires revision of TSE Thermal evaluation may prohibit...
2. Purchase replacement Annulus shield that is about half the length of the current shielding. Due to folding in the middle to facilitate carrying etc. Annulus snakes have developed a spot at the fold where shield thickness has become compromised. Shield was purchased and needs TSE. It is in the same box as top of MPC shield package.
3. Make annulus shield fail safe. I.e. monkey fist on end of rope or similar encumbering device. N/A for new shield if used.
4. Continue Silflex hash tag (#) configuration used by welders for welding on vent and drain port covers to provide maximum shielding efficiency.
5. Installation of MPC lid package is best done by starting at the RVOAs and working outside in.
6. Repeat the shield wall behind the ladder, increase width by 1-2 blankets. (New TSE)
7. Continue use of loose blankets for personal shielding.

Training

1. RP Specific training needs to incorporate more RP required actions at the various portions of the process along with expected radiological conditions.

2. Craft qualifications did not provide enough flexibility due to some personnel not being provided the opportunity to become qualified on some equipment. Provide at least 2 people for every position (operators, VCT in particular).
3. Craft and Holtec Technicians could benefit from additional training (dynamic learning activity) in contamination control methods. Include discussion of contamination on leather gloves.
4. Have a lesson on neutron dose including reading neutron EDs. Associate this with receiving CR-39 chip OSLD.
5. Understanding that dry runs are not required, perform table tops or equivalent prior to campaign.

Procedures

1. Make more reference to procedure and procedure steps in the daily brief.
2. Formalize wipe downs of pool lid and bolt threads during stack-up.

Decontamination

1. Micro fiber rags were more effective than mops or provided rags.
2. Decon foam residue created problems when used in areas to be welded.
3. Need more decon personnel.
4. Rusty bolts and threaded ports on HI TRAC leach contamination and a more efficiently designed seal. The RTV sealed the threaded port, but did not allow area to be completely deconned.
5. Contamination controls need to be used when handling HI TRAC bolt in ISFSI.
6. Extensive decon is not desirable on the HI TRAC Lifting Yoke or the Yoke Extension when they will be returned to the Cask Loading Pit within a short period of time.
7. Consider having decon assistance during RVOA rebuild. Determine location for RVOA work if necessary other than the walkway on FB2026.
8. Recognize that everything will need to be deconned twice. Gross decon once and then an independent check and spot decon.
9. Do a HK Decon of neverseize, rust weepage, and tape residue while the HI-TRAC is empty. Build about 1 hour into the schedule. Do this at least every other canister.
10. On the day the HI-TRAC is removed from the water, allow time for the bottom to dry before trying to decon.

Postings

1. Specify a RAM search post work survey after HI TRAC is out of the yard.
2. Frisk HI PORT seating surface.
3. Leave Clean Area Posting materials staged during HI TRAC transfer to the ISFISI to expedite returning the HI-TRAC and new MPC to the FB.
4. SFP CA postings (rope and signs) around CWP (on FB2047 on the temporary handrail) could be replaced by signage in the CWP (high on the wall).
5. Purchase a curtain specific to the temporary handrail so that the FME barrier is easier to install/remove.

6. Make the area extension south of the CLP right from the start.
7. Be prepared to post a RAM area during transport for pop-up storms, etc.
8. For HI-TRAC lift to truck bay post 2047 RA at the doors. Posting plan change.
9. Move the North HRA posting to inside the electrical room or ventilation room for 2026. Mezzanine is too close for passerby's with general access dose rate values. Posting plan change.
10. Consider storing the posting material with ISFSI equipment. Not done

Other

1. Three weeks to get LAN access to RP Autolog, VSDS, etc. is too long; the process needs to be streamlined.
2. Need second valve manifold for Upper CWP Platform so hoses do not have to be disconnected and reconnected.
3. Need narrower table with second shelf for use on Upper CWP Platform. Could also consider hinged table(s) mounted to wall.
4. Need more Senior RP Technicians along with a schedule set up for better rotation.
5. Lower CWP needs more lighting.
6. FB2047 lighting without the Cask Crane is marginal.
7. Small can used for HI TRAC Lifting Yoke control air-line excess was beneficial for contamination control. It also eliminated the safety / tripping hazard of people walking on the excess airline.
8. Drinking needs to be located in a different area than were RP is evaluating contamination levels.
9. HP-210 probes are needed on FB2026 and FB22047 friskers when loaded HI TRAC is removed from CLP.
10. Consider having two LHRA keys for the ISIFSI during campaigns.
11. Need drain trees for both drains in CWP. These need to be special size as the Washdown Pit drains are smaller diameter.
12. Consider a permanent catch pan under HI TRAC Lifting Yoke and Yoke extension.
13. Need to clear excess materials out of FB Truck Bay prior to start of campaign.
14. Need better FME covers for CEC inlet ducts and HI TRAC Mating Device. Make a screen cover for the inlet holes.
15. 12-½ ton shackles were shared between FB and ISFSI; consider purchase of a second set.
16. Replace discarded bridge (temporary walkway between the SFP and the CWP) for the CLP gate.
17. Evaluate hinged handrails vice scaffold handrails around CWP.
18. RP Count Stations became cluttered with non-RP items making it unnecessarily difficult to count smears.

19. Need better count station on FB2026: larger table with second shelf, shielded cave/shield wall between count station and HI TRAC, storage for miscellaneous items.
20. Consider davit arm for welding lines to CWP.
21. Have all RWPs allow Partial PCs with RP approval.
22. Consider permanent platform in CWP for FHD Pre-Filter and Pump. Address accessibility for filter change out.

23.Consider replacing 'Cool Tent' with small CONEX building.

24 If above is not feasible, move the Cool Tent ~ 6 feet further south (reduce dose rates in the cool-tent and reduce congestion in the area).

25 Removing the South CLP handrail and replacing it with a scaffold handrail that is further South worked well.

26. Perform fire loading calculation to have the two six pocket carts of PCs in the RSB kept in the FB during the campaign.
27. Evaluate having a second fall protection line for open CECs.
28. Need permanent covers for HI TRAC (inside/outside FB).
29. Consider using hose reels for camera cables and hoses.
30. Consider putting the SFP Demins in service during the campaign to reduce dose rates in the SFP and keep the water clean.
31. Consider moving the Weld tent to the top of New Fuel Storage. Consider storing the Weld Head on New Fuel Storage also.
32. Spin the HI-TRAC from the work platform to align on the HI-PORT rather than from the truckbay.
33. Organize RP and Decon through AMEREN and not Holtec (vendor).
34. Give ISFSI Techs access to Sentinel for Authorizing individuals after briefs.
35. Frisker in cool tent saved many steps.
36. Consider a supply cabinet in cool tent, this would improve HK and store some PCs.
37. Establish plant radios at designated locations, FB 2047, ISFSI pad, break rooms because of poor cell phone signal in FB and at pad.
38. Ensure a computer is available on 2047 loaded with critical RP software.
39. Consider making Hi Bay operational.
40. Drip area in truck bay needs to be 2 feet wider to allow rigging in and out with yoke on the wall.
41. Post a schedule/fragnet in a public place to allow workers to remember what step is next.

42. Print RWPs front and back for handouts.
43. Establish clearer duty assignments for the craft, hash this all out before starting project.
44. AMEREN projects lease a golf cart/buggy because of all the material movement involved.
45. Get a Holtec supply sealand.
46. Put a freezer in the BAG for the duration of the campaign.
47. Need another laborer per shift.
48. Organize to have formal turnovers and logbooks for cross shift communication among crafts and RP.
49. If caution tape is used as observer control, make sure it is far enough back during transport.
50. Recognize that the clean area access to the truckbay needs to be complete before the HI-TRAC leaves the Cask Washdown Pit. The frisker in the booth is lost immediately.
51. When removing the mating device after download, remove east two bolts before getting the VCT in place. This allows removal by standing on the ground and not having to get up on the drawer. Dose rate is much lower outside shield ring.
52. Consider setting up access control station and PCMs in Hi-Bay of Work Management Building.

ATTACHMENT 2 from DIABLO CANYON

U-0	Notification: **50864083** Type: **DN** Work Type: **PROG ALRA** Description: **TR ISFSI Campgn-6 ALARA Lessons Learned** Order:

Funct. Loc: **DC-0** **U0**

Reported By: **BER1**	Bruce Ryan	Rpt By Work Ctr: **ORA**
Contact Info: **BER1**	Bruce Ryan	Created On: **25 Jul 16 09:59**
Planner Group: **NPR**	No planning requrd	
Main Wrk Ctr: **ORA**	Radiation Protection - ALARA Planning	

PROBLEM DESCRIPTION

07/25/2016 09:53:44 PST Bruce Ryan (BER1)
This purpose of this notification is for tracking both ISFSI ALARA lessons learned and good practices. These may be drawn from worker and supervisor experiences during the work, from ALARA Work-In-Progress evaluations and Post Job ALARA Reviews, or any other reputable source. Some of these lessons learned may warrant inclusion in the main ISFSI Lessons Learned tracking notification. End date of this notification coincides with the start of ISFSI Campaign-7.
Sonny Ryan pager 9467, desk 4983

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07/26/2016 12:49:14 PST James Zimmerlin (JAZ3) Phone 805-545-3796

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The issue/event documented on this notification was reviewed by the Notification Review Team (NRT) and determined to be the indicated significance level per OM4.ID14. If additional information is discovered that would affect the significance level determination, contact a member of the NRT or e-mail DCPP NRT Members.

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Event Date **25 Jul 16**	Station Sig.: **5 Other**
Notif Required By **27 Apr 18**	DN 5 Priority:
	Reference Notification:

Print Date: 17 Apr 17 09:15 *PG&E Corporation* DIABLO CANYON Page 1 of 5

U-0	Notification: **50864083** Type: **DN** Work Type: **PROG ALRA** Description: **TR ISFSI Campgn-6 ALARA Lessons Learned** Order:

STATUS DETAILS

System Status: **OSNO NOPT OSTS**

User Status: **20 APPV** Approved

SFMR Shift Foreman Reviewed

Task # 1 DN Only Notification

Status:	**TSCO**	Task Completed	
Code Group:	**DG-CR**	Condition Report	
Task Code:	**OR**	Organizational	
Responsible:	**User Responsible**		
Work Ctr:	**NPC**	Supervisor - Corrective Action	
Created On:	**26 Jul 16**	By:	**JAZ3** James Zimmerlin
Planned Start:	**26 Jul 16**	Planned Finish:	**26 Jul 16**
Completed On:	**26 Jul 16 12:49**	By:	**JAZ3** James Zimmerlin **805-545-3796**

Task # 2 FSAR Survey on HI-TRAK

Status:	**TSOS**	Task Outstanding	
Code Group:	**DG-LL**	Lessons Learned	
Task Code:	**U-1D**	U1 Daily Lessons Learned	
Responsible:	**User Responsible**		
Work Ctr:			
Created On:	**17 Oct 16**	By:	**MJH2** Matthew Huszarik
Planned Start:		Planned Finish:	
Completed On:		By:	

10/17/2016 13:00:09 PST Matthew Huszarik (MJH2) Phone 805-545-6490
Presently we get considerable dose performing a comprehensive FSAR survey on the HI-TRAK before we transport it up the hill.

We presently take measurements at twenty six points for the HI-TRAK FSAR survey.

U-0

Notification: **50864083** Type: DN Work Type: PROG ALRA

Description: TR ISFSI Campgn-6 ALARA Lessons Learned

Order:

STATUS DETAILS

System Status: OSNO NOPT OSTS

User Status: 20 APPV Approved

SFMR Shift Foreman Reviewed

Task # 1 DN Only Notification

Status: TSCO	Task Completed	
Code Group: DG-CR	Condition Report	
Task Code: OR	Organizational	
Responsible: User Responsible		
Work Ctr: NPC	Supervisor - Corrective Action	
Created On: 26 Jul 16	By: JAZ3 James Zimmerlin	
Planned Start: 26 Jul 16	Planned Finish: 26 Jul 16	
Completed On: 26 Jul 16 12:49	By: JAZ3 James Zimmerlin	805-545-3796

Task # 2 FSAR Survey on HI-TRAK

Status: TSOS	Task Outstanding
Code Group: DG-LL	Lessons Learned
Task Code: U-1D	U1 Daily Lessons Learned
Responsible: User Responsible	
Work Ctr:	
Created On: 17 Oct 16	By: MJH2 Matthew Huszarik
Planned Start:	Planned Finish:
Completed On:	By:

10/17/2016 13:00:09 PST Matthew Huszarik (MJH2) Phone 805-545-6490
Presently we get considerable dose performing a comprehensive FSAR survey on the HI-TRAK before we transport it up the hill.

We presently take measurements at twenty six points for the HI-TRAK FSAR survey.

U-0	Notification: **50864083** Type: DN Work Type: PROG ALRA Description: TR ISFSI Campgn-6 ALARA Lessons Learned Order:

10/17/2016 13:47:38 PST Matthew Huszarik (MJH2) Phone 805-545-6490
Presently we get considerable dose having a FMEA person on the platform next to the Hi-TRAK. If that individual could be moved out of the CWDA to a no dose area considerable dose could be saved.

Task # 5 Water Shields

Status: TSOS	Task Outstanding
Code Group: DG-LL	Lessons Learned
Task Code: U-1D	U1 Daily Lessons Learned
Responsible: User Responsible	
Work Ctr:	
Created On: 17 Oct 16	By: MJH2 Matthew Huszarik
Planned Start:	Planned Finish:
Completed On:	By:

10/17/2016 13:51:16 PST Matthew Huszarik (MJH2) Phone 805-545-6490
Evaluate the purchase and use of water shields for around the ISFSI restraint. Water shields that are 6-10' tall that strap together and are configurable to the work area have been seen at other facilities that would be very effective for neutron and gamma shielding for the CWDA during the ISFSI campaign.

Task # 6 Taking SFP Demin In & Out of Service

Status: TSOS	Task Outstanding
Code Group: DG-LL	Lessons Learned
Task Code: U-1D	U1 Daily Lessons Learned
Responsible: User Responsible	
Work Ctr:	
Created On: 24 Oct 16	By: MJH2 Matthew Huszarik
Planned Start:	Planned Finish:
Completed On:	By:

10/24/2016 14:33:29 PST Matthew Huszarik (MJH2) Phone 805-545-6490
The Orders for each Cask in the sixth ISFSI Outage each had Operations to place both U1s and U2s SFP Demins in service and none of them had

Operation to take them out of service.

Two weeks before loading the first cask in each unit, full SFP purification in only that unit should be placed in service. It should be kept in service for the duration on the campaign in only that unit and removed from service approximately two week after the last cask is remove from the SFP.

Two week before moving to the next unit full SFP purification in only that unit should be placed in service. Again it should be kept in service for the duration of the campaign in only that unit and removed from service approximately two week after the last cask is removed from the SFP.

Task # 7 Evaluate PED/TLD Placement

Status: TSRL	Task Released
Code Group: DG-EVAL	DC General Evaluations
Task Code: EVAL	Evaluate the following (See Long Text)
Responsible: User Responsible	
Work Ctr: ORA	Radiation Protection - ALARA Planning
Created On: 15 Mar 17	By: LMS1 Linda Sewell
Planned Start: 15 Mar 17	Planned Finish: 18 Jan 18
Completed On:	By:

03/15/2017 15:16:28 PST Linda Sewell (LMS1) Phone 805-545-4315
The TLDs for all welders in the 2016 ISFSI campaign showed significant more neutron dose than was estimated on the neutron PEDs. There are three primary contributors to this:
1) The neutron correction factor used for ISFSI TLDs is overestimating the dose due to thermal/lower energy neutron fields. This overresponse is less pronounced in the Thermo PED.
2) The second contributor is the reason for this lessons learned task. Please ensure that the TLD and PED are as close as possible and that the PED is not shielded by body positioning during the welding evolutions.
3) The final contributor may be neutron exposure occurring when a neutron PED has not been issued. Please consider requiring welders to wear neutron sensitive PEDs for all RCA entries during ISFSI campaigns.
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ATTACHMENT 3 from FERMI

ISFSI Lessons Learned for the 2016 Campaign

Exposure Reduction Techniques Used

- ☐ 1. Pre-job survey to be reviewed prior to start of work.
- ☐ 2. Low Dose Waiting Areas to be identified by RP prior to commencing work and during activities as identified.
- ☐ 3. Need for decon of areas and/or components will be based on contamination levels and the nature of work to be performed.
- ☐ 4. RP to verify dose rates and contamination level on components prior to performing surface destroying evolutions.
- ☐ 5. Contamination levels should be kept at <50,000 dpm/100 cm2 for disassembly of valve or components by mechanical means.
- ☐ 6. Work plans will be reviewed for each evolution to be performed.
- ☐ 7. Maintaining an accurate Neutron entry log for workers entering and exiting.
- ☐ 8. Radio communications for personnel on the floor to aid in Radiation protection job coverage.
- ☐ 9. Cameras located in and around the work area for continuous or intermittent monitoring.
- ☐ 10. Shielding used around top of cask during welding activities.
- ☐ 11. Mockup/Dry Runs were performed and evaluated for dose reduction strategies. These Dry Runs help personnel gain proficiencies and allowed for RP controls to be communicated/demonstrated.
- ☐ 12. Observations were performed during Dry Runs and the initial canister that included suggestions for dose reduction. Suggestions included:
  - ☐ a. Minimizing non-essential personnel around HI-TRAC/MPC upon removal from SFP.
  - ☐ b. Maintaining distance and use of remote monitors during initial pump down (50 gallons) of MPC.
  - ☐ c. Minimizing number of personnel around MPC/HI-TRAC during rigging and lowering to RB1 onto Low Profile Transporter, (LPT).
- ☐ 13. Use of designed temporary lead shielding in annulus. Around Hi-Trac top flange, and on Tri-Nuke filter skid was effective in minimizing exposure during MPC closure activities that included Automated Welding and associated PT Inspections, MPC Hydrostatic Testing, Vaccum Drying Hook Ups, Helium Backfill and weld closures of ports.
- ☐ 14. Use of experienced Vendors was instrumental in efficiency seen for first canister. Per NRC exit interview, this was the quickest initial canister load, closure and transport to ISFSI Pad observed. Typical time spent on an initial Canister is roughly two (2) weeks.
- ☐ 15. Review of Vendor and Industry OE was incorporated into planning and RP Pre-Job Briefings. This assisted in mitigating dose related issues experienced at other facilities.
- ☐ 16. ALARA Task Plan developed with the assistance of bench marking other utilities outlining the following:
  - ☐ a. Cask Processing RP Prerequisites
  - ☐ b. Refuel floor cask load/ pRWP
  - ☐ c. Transfer from HI-TRAC to HI-STORM
  - ☐ d. Lowering of HI-TRAC to Rx Bldg for Transfer
  - ☐ e. Exposure Reduction Measures
  - ☐ f. Contamination Control Measures
  - ☐ g. Airborne Radiation Mitigation Techniques / Airborne contamination hold points
  - ☐ h. Identifing High Risk /Task Activities
  - ☐ i. Stop Work" Criteria/Conditions

Problems that may have impacted
❑ 1. Engineering holds on issues with the superstructure of the reactor building holding the weight of the HOLTEC containers while on the cask pad and Overhead crane weight limitations.
❑ 2. Many of the personnel involved where first time workers and getting familiar with all of the equipment and procedures did not goes as smoothly as expected.
❑ 3. The dryer separator pit was used instead of the Reactor head stand for placing the MPC and performing the welding activities. Therefore additional time removing equipment and deconning the pit was needed to insure the area was clean enough for workers not to be in protective clothing for these activities. The pit was also posted Non Permit Required Confined Space and needed be sniffed daily.
❑ 4. A Tri Nuke filtration system was set up inside the dryer separator pit to capture the fuel pool water from the cask before being discharged to the drain inside the dryer separator pit..
❑ 5. Several HOLTEC lifting and latching devices needed modifications during the dry run campaigns that were sometimes identified by the IRON workers. This was also expected and found to be a major contributor to the success of the overall campaign.
❑ 6. A six hour delay was experienced for retrieval of an FME paint chip identified following initial fuel loading. The paint chip was retrieved via a Randolph pump and discharged to the weir gates. Rx Services approved of retrieval method. This resulted in approximately 12 mRem of additional dose for performing pump setup and FME retrieval.
❑ 7. Following initial load of fuel and prior to setting MPC Lid and removing HI-TRAC/MPC from the SFP it was determined that issues with the vendor automated welding procedure needed resolution. This resulted in a one day delay to resolve procedural issues. Because removal of the MPC from the SFP required installation of the MPC Lid thereby starting the "Time to Boil" clock, it was decided that the HI-TRAC/MPC would remain in the SFP until the issues with the welding procedure were resolved. This required leaving the HI-TRAC in the SFP longer than expected allowing for a higher potential for leaching of contamination to external surfaces and more decon effort required than normally planned resulting in more dose for this evolution. While no additional decon was required, repeat occurrence could lead to more decon effort.
❑ 8. Initial draining of the MPC annulus led to approximately one gallon of water spilled to DSP floor. DSP posted CA at lower platform level. Valve was cracked prior to hooking up drain hoses. While water is typically non-contaminated, a potential for contamination of water exists that could have led to cross contaminating areas controlled as non-contaminated.
❑ 9. An RWP discrepancy was identified following loading of first MPC related to the RWP requirement that a Tri-Nuke be in operation during MPC Fuel Loading and piping for removal from SFP. It was decided during the Special SAC ISFSI Review and Approval meeting, that the impact of Tri nuke use on water clarity, skimmer surge tank level and risk/dose to remove the filters did not equate to the benefit of using the system. This issue was not captured in the previously approved RWP. Subsequently, the RWP has been revised to allow Tri-Nuke usage as needed. Rx. Services will initiate CARD.
❑ 10. Equipment issues with the Refuel Bridge were experienced during MPC 269 loading. CARD 14-25766 was initiated to document two (2) Hoist Hang Up Errors Both occurred with a bundle on the grapple. The faults were received immediately when going in the downward direction (just below normal up) over the MPC. All faults were cleared with minimal impacts to fuel movement schedule, however, continued issues may lead to delays for troubleshooting/recovery actions that could ultimately impact dose estimates.
❑ 11. During annulus refilling with DI water, overfill spilled onto MPC lid, down from top of platform to hermit. Radwaste wiped up all water and all areas affected were surveyed. All areas indicated NDA. Need focus on maintaining water levels during filling/draining to avoid potential for cross contaminating surfaces released as non - contaminated.
❑ 12. A PCE was realized during HI-TRAC transfer to DSP. The person contaminated was a load "spotter. CARD 14-25810 documented and investigated the event and is subsequently closed.

- ☐ 13. A dose rate alarm was received by the URS crane operator driving the Vertical Cask Transporter. The unanticipated ED dose rate alarm was discovered upon exit from the RRA. The worker did not hear or feel his teledosimeter alarm or vibrate from the cab. The work was completed in a safe manner and the alarm was noted upon exit. CARD 14-25932 documented the event and will capture results of the investigation.
- ☐ 14. During transfer of loaded HI-STORM/ to ISFSI Pad, the VCT broke down roughly 4' from storage location. No additional dose was received for repair, however, dose rates are significantly higher when transporting the loaded HI-TRAC an additional dose would be required if issue were to occur during that evolution.
- ☐ 15. Observations (OBSR 2014-8541 and 8543) identified overall dose saving opportunities as follows;
  - ☐ a. When lowering the MPC from RB-5 workers had to manually (hands on) manipulate the HI-TRAC into position4 times before they were successful in aligning with LPT. Dose rates in these areas were roughly 30 mRem/hr. Recommend using a remote (long-handled) tool to align the MPC and minimize number of personnel supporting movement.
  - ☐ b. Observers on RB1 were standing near electronic sign that indicated 1 mRem/hr in work area. Recommend installing LDWA (green signs) in lower dose areas for visual inspections and oversight.
  - ☐ c. Belly band installation required 6 personnel to install on HI-TRAC as bands were difficult to install. Rx. Services is considering performing evolution using a come-along/equivalent to minimize time and personnel spent in dose field.
  - ☐ d. Take Two's appeared to be performed inside the dose/roped off areas. Recommend performing handoffs and take twos outside dose rate areas).
  - ☐ e. Personnel observed standing in posted dose rate areas waiting to support work activities. Recommend staggering time in dose rate areas and perform handoff outside of these dose fields.

Lessons Learned

❑ 1. The development of ISFSI RP check list to prepare the High Track and the MPC to the Spent Fuel Pool.
❑ 2. The Revising of the Radiation Protection ISFSI Work Instruction while encountering challenges during the dry runs.
❑ 3. Development of Survey maps and templates for the actual Tech spec surveys and all the different equipment used for the campaign.
❑ 4. Identifying critical survey points during the evolution in the dryer separator and the transfer of the cask into the High Storm.
❑ 5. Addressing RP Concerns for the ISFISI Task Evolutions as follows:

❑ a. Prior to removal of HI-TRAC/MPC from SFP:

Note: Any underwater survey result that indicates ≥ 800 mR/hr @ 30 cm from any surface, requires Stop Work and RPS notification.

- ❑ • Verify underwater survey around MPC lid to verify no streaming.
- ❑ • Underwater survey on annulus seal and horizontal surfaces to verify no fuel fragments present and determine annulus dose rates.
- ❑ • Ensure Neutron stay times are tracked using Neutron Entry Log (67.000.101 Attach 3 or equivalent) from this point forward.

❑ b. During removal of HT/MPC from SFP:

Note: RP Supervision approval is required prior to removal of HI-TRAC/MPC from SFP. Abort dose rate 800 mR/hr @ 30 cm any surface/annulus seal area. If abort dose rate is realized, Stop Work and notify RPS.

- ❑ • Verify non-essential personnel are not lingering at handrail
- ❑ • Perform HI-TRAC/MPC Lid surveys upon removal from SFP.

❑ c. Pump down of MPC (50 gallons) at SFP Handrail:

- ❑ • Verify non-essential personnel are not lingering at pump skid/handrail.
- ❑ • Establish remote monitor at pump skid to warn of elevated dose rates. Use 800 mR/hr as a dose rate set point. If set point is reached, Stop Work and notify RPS.

❑ d. Removal of Diaper from HT:

- ❑ • Verify non-essential personnel are not lingering in work area.
- ❑ • Ensure dose rate survey of diaper prior to handling (tele-pole).
- ❑ • Bag/contain diaper upon removal (change gloves after handling).
- ❑ • Perform dose rate/contamination survey of bottom of HT prior to setting.
- ❑ • Perform work area contamination survey (hot particles).

❑ e. Transfer of HT/MPC to DSP:

- ❑ • Verify non-essential personnel are not lingering in transfer path.
- ❑ • Wet mop travel path during transfer.
- ❑ • Perform survey of travel path to verify no gross contamination/hot particles.

❑ f. Staging of HT/MPC in DSP:

Note: RP approval is required prior to accessing DSP platform going forward.

- ❑ • Verify dose rates (gamma/neutron) around MPC lid and annulus prior to allowing access of personnel. Ensure Neutron Time Tracking is performed.
- ❑ • Perform contamination survey of MPC Lid/Annulus seal and upper section on HT prior to allowing personnel access.
- ❑ • With the help of Holtec, RP, and Decon remove red tape and wipe clean the top of the rubber seal. Then remove the rubber seal.

Note: RP will be LHRA Boundary until snakes are installed and conditions verified/posted.

Note: Brief personnel that shielding may not be handled, moved or relocated without RP approval. Any shielding inadvertently moved requires immediate exit from top of cask and RP notification to perform surveys.

- ❑ • RP to install annulus shielding, perform post shielding annulus survey and update postings and workers on current conditions.
- ❑ • Install additional shielding around top of HI-TRAC to support activities.

Note: RP will perform ongoing (shiftly) contamination surveys on all areas of HI-TRAC to verify no leaching is present. Any detectable contamination on top of HI-TRAC requires work stop, decon effort and RP verification surveys performed.

❑ g. Perform Automated Welding;
- ❑ • Prior to allowing access to DSP in scrubs, verify contamination levels in all areas to be accessed.
- ❑ • Support shimming/tack welding activities by use of temporary shielding as possible.
- ❑ • Support equipment setup with temp lead shielding as available

❑ h. Transfer of MPC into HI-STORM:
- ❑ • Verify non-essential personnel are evacuated.
- ❑ • Verify contact with MCR prior to transfer to warn personnel to stand clear via Hi-Comm.
- ❑ • Control/Post area around CTF as LHRA.

❑ 6. For the first cask of the campaign verify the High Trac neutron shield is filled with demin water.

❑ 7. Perform survey of the High Trac when it is brought out of storage to ensure contamination has not leached out of the surfaces. Decon the High Trac as necessary.

❑ 8. Verify all residual tape has been removed from the High Trac surfaces using denatured alcohol or other approved solutions prior to first use in the campaign.

❑ 9. Verify the necessary MRP-15 paperwork has been completed for moving ISFSI equipment to the refuel floor.

❑ 10. If the Tri nuclear filter is used, ensure shielding has been approved for use and installed.

❑ 11. Ensure the Tri nuclear filter skid, if used is positioned to facilitate removal of high dose rate filter remotely.

❑ 12. Stage the radiologically clean shielding blankets at the cask transfer facility for use during MPC transfers.

❑ 13. Verify shielding is installed on the cask transporter for the operator.

❑ 14. Purchase replacement tarp for the High Trac as a contingency.

❑ 15. Stage radiologically clean blankets on refuel floor for use on the MPC during processing activities.

❑ 16. Decon the dryer separator pit to <50,000 dpm 100cm2 in preparation for installing contamination barrier.

❑ 17. Determine whether the MPC blowdown will be directed to the dryer separator pit drain or the spent fuel pool.

❑ 18. Ensure Orex decon cloths or other suitable decon clothing is stocked in sufficient quantities for the campaign.

❑ 19. Verify method / tools for performing annulus contamination survey is available.

❑ 20. Verify stand offs for performing High Trac lid are available.

❑ 21. Learnings from PCE and issues identified will be communicated during AARs and Pre-Job Briefings as applicable.

❑ 22. During review of Operations entry into the FPCCU Room to cycle valves, it was identified that an opportunity exists for draining Annulus DI water to a floor drain thereby mitigating need to enter FPCCU Room. This should result in a dose savings of 5 mRem per canister, (30 mRem overall for Campaign 1).

❑ 23. The RP controls for ISFSI campaign will be assembled in a new RP work instruction.

❑ 24. After Action review performed by Refuel floor lead supervisor.

- ☐ 25. General Lessen Plan LP-GN-909 -5101A developed.
  Enabling Objectives
  - ☐ • Discuss an overview of the components and their roles in the storage of spent fuel
  - ☐ • Review instructions for performing a removable contamination survey of the Multi-Purpose Canister (MPC)
  - ☐ • Examine requirements for obtaining the external radiation levels of a loaded HI-STORM cask
  - ☐ • Explain obtaining the external radiation levels of a loaded Holtec International 125 Ton Transfer Cask 125D (HI-TRAC)
  - ☐ • Review the evaluation and developed ALARA plans for the Dry Cask loading campaign
  - ☐ • Review Certificate of Compliance No. 1014 for actions required by Radiation Protection.
- ☐ 26. Nuclear Operator Continuing Training developed LP-OP-213-1426 ISFSI Refresher Course
- ☐ 27. Post Campaign Critique performed that identified 190 line items touching on the following areas of improvement :
  - ☐ • Mobilization
  - ☐ • PRWP and place HI-TRAC/ MPC into cask Pit
  - ☐ • Load fuel assemblies into MPC and verification
  - ☐ • Move Loaded HI-TRAC/ MPC from cask pit to CWA
  - ☐ • Welding MPC lid to shell and associated NDE
  - ☐ • Install RVOAs and Hydro of MPC
  - ☐ • Blowdown of MPC
  - ☐ • Vacuum Drying MPC
  - ☐ • Stack-up of Loaded HI-TRAC on HI-STORM and MPC Transfer
  - ☐ • Transfer loaded HI-STORM from Rx Bldg to ISFSI
  - ☐ • Engineering evaluations/ modifications
  - ☐ • Miscellaneous / Training Items
- ☐ 28. Worker dose for removing rigging from the MPC lid after downloading into the H-S is minimal. The use of shielding over the annulus space is not recommended during this activity. There is no meaningful dose savings and the FME risk of dropping something into the H-S annulus is significant.
- ☐ 29. Ensure access to the D/S pit is managed appropriately when a freshly loaded H-T has been lowered. The Scientech platform and the adjacent pit areas need to be maintained as non-CA's.

Specific Methods for reducing exposure on Future Jobs

- ☐ 1. Shielding opportunities Identified during mock up and dry runs for ISFSI Campaign
- ☐ 2. Camera positioning in critical areas to maintain line of site during critical evolutions.
- ☐ 3. Radio communications established with personnel on refuel floor and Radiation protection.
- ☐ 4. Workers briefed with Radiation Protection lead technicians prior to the beginning of shift to outline specific Goals and success paths during the shift this was documented in the HOLTEC Plan of the day and reviewed by RP Supervision daily.
- ☐ 5. Critical (High Risk) evolutions required a job task specific brief with all involved personnel with a take 2 being performed prior to the task commencing.
- ☐ 6. Take Two should be used prior to any item being removed from the Spent Fuel Pool to ensure RP is notified and is providing Continuous Job Coverage (line of sight) for the activity.
- ☐ 7. Questioning Attitude when handling material that has been in SFP, Cavity or Dryer/Separator Pit.
- ☐ 8. Stop When Unsure during all equipment/handling operations on RB5.
- ☐ 9. Cameras positioned in critical areas to aid in monitoring personnel exposure
- ☐ 10. Communications headsets with Holtec personnel and radiation protection provided in field to aid in overall RP coverage to reduce exposure.
- ☐ 11. Mock-up training will be performed for the welding, blowdown, hydro, and backfill activities.
- ☐ 12. Work crews will have a core of individuals who have ISFSI experience.
- ☐ 13. The work plan will contain contingencies for loss of power and for loss of crane function when moving the HI-TRAC.
- ☐ 14. A review following the first cask to evaluate ALARA performance and document improvements and lessons learned should be performed with work crews and RP/ALARA.
- ☐ 15. RP Manager notification is required prior to any MPC unload related activity. A Job Progress ALARA Review that identifies controls, Canister sampling and surface destroying activities. All MPC unloading shall be in accordance with approved procedures, associated work orders and Risk Plans.

ATTACHMENT 4 from WATTS BAR

ALARA Post Job Review

Date: 11/28/2016 **RWP:** Table 5 **WO:** Table 6 **ALARA Plan:** 2016-012

Unit: 0, 1, and 2 **Building:** Aux **Elevation:** 757'/729' **Room:** Various

Job Description: WBN Dry Cask Storage Campaign 1

Estimates

Person-hours: 14428 hours **Person-rem:** 1.873 rem **EDR:** 0.13 mrem/hour

Revision: 1.539 rem **EDR:** 0.11 mrem/hour

Actual

Person-hours: 13074 hours **Person-rem:** 1.280 rem **EDR:** 0.10 mrem/hour

			Estimates		Revisions		Actuals	
	MPC #	Σ kW	RWP hrs.	mrem	R1 mrem	R2 mrem	RWP hrs.	mrem
Pre			5500	39	39	39	3511	24
1	017	29.68	1512	375	375	375	2236	472
2	117	29.95	1386	344	344	344	1411	236
3	019	29.81	1254	312	246	246	1282	175
4	020	29.84	1134	281	221	183	1245	157
5	118	29.97	1071	265	209	172	1154	111
6	022	29.93	1008	250	197	172	1145	105
Post			1500	8	8	8	1088	0
Totals			**14365**	**1873**	**1639**	**1539**	**13074**	**1280**

Summary

The first spent fuel loading campaign at Watts Bar Nuclear Plant completed on schedule and below the estimated dose. After struggling with equipment issues on the first cask system the remaining five systems went very well with continuous improvement in the dose performance each week. Although HOLTEC does not designate a "best" performance due to variations in the sites and the fuel parameters, benchmark data indicates the Watts Bar dose performance to be the best among domestic utilities using the HOLTEC HI-STORM FW cask system. This was accomplished loading high decay heat load fuel up to 29.9 kW aggregate. The dose reduction plan outlines many of the keys to this dose performance. However the key to the success was the engagement and performance of the work crews. Observations and coaching centered on efficiency, body position, and use of temporary shielding. The radiation worker behaviors were very good throughout the campaign demonstrating individual ownership of their dose. In addition to the excellent dose performance the campaign performance achieved the following:

- Zero High Radiation Area Events
- Zero Locked High Radiation Area Events
- Zero Personnel Contamination Events (PCEs)
- Zero RWP Violations
- Zero Radiological Boundary Violations
- Zero Contamination Control Events

Exposure Analysis

The first spent fuel storage campaign was planned for six cask systems and a total revised dose estimate of 1.539 rem. The campaign loaded six cask systems for a total dose of 1.280 rem. The pre-campaign and post campaign activities are included in the campaign estimate and actual doses. The original and revised estimates are shown in table 1 along with the results.

As noted the dose performance showed continuous improved through the entire campaign and continued into demobilization with that phase of the work completing for zero dose.

Table 1

Campaign 1 Project Estimate	Hours	mrem R0	mrem Rev	Actual
Mobilization/Rehearsals	5500	39	39	24
MPC 017	1512	375	375	472
MPC 117	1386	344	344	236
MPC 019	1254	312	246	175
MPC 020	1134	281	183	157
MPC 118	1071	265	172	111
MPC 022	1071	250	172	105
Demobilization	1500	8	8	0
Project Total	**14428**	**1873**	**1539**	**1280**

Accurate projections of work hours and specifically RWP hours are an important tool in developing the dose estimate as well as tracking performance. Table 2 details the estimated RWP hours against the hours used for each phase of the project. The pre-campaign and post campaign activities were over estimated. MPC 017 was impacted by equipment issues and a site stand down. The other MPCs all completed very close to the estimated RWP hours.

Table 2

	Estimate	Actual	% Estimate
Pre-Campaign	5500	3511	64%
MPC 017	1512	2236	148%
MPC 117	1386	1411	102%
MPC 019	1254	1282	102%
MPC 020	1134	1245	110%
MPC 118	1071	1154	108%
MPC 022	1071	1145	107%
Post Campaign	1500	1088	73%
Total	**14428**	**13074**	**91%**

The decay heat load of the MPCs was essentially the same for all MPCs. Using the decay heat loads for each MPC and the accrued dose the mrem/kW was determined for each MPC. These data are presented in Table 2. Benchmark data indicates the best performing PWR sites are loading MPCs for 10 to 12 mrem/kW.

Table 3

	kW	Estimate	Actual	mrem/kW
MPC 017	29.68	472	472	15.90
MPC 117	29.95	236	236	7.88
MPC 019	29.81	175	175	5.87
MPC 020	29.84	183	157	5.26
MPC 118	29.97	172	111	3.70
MPC 022	29.93	172	105	3.51
Average	**29.86**	**235**	**209**	**7.01**

Performance of the dry cask campaign required coordination among multiple organizations and crafts. Tables 4 provides dose break down by craft. The distribution of the dose falls within expectations with the boilermakers, the welders (Technicians in the table), and RP being the highest dose crafts. Of particular note are the low doses for RP and Laborers finishing with 142 mrem and 92 mrem respectively. These values were 181 mrem for RP and 34 mrem for SQN Campaign 10 which loaded five cask systems versus the six loaded during the WBN campaign. Although not a reasonable comparison the last BFN campaign cost RP 605 mrem and the Laborers 920 mrem to load seven cask systems.

Table 4

Craft	Entries	RWP Hours	mrem	mrem/entry	mrem/hour
AUO	4	2.37	0	0.000	0.000
Boilermaker	1277	3149.38	600	0.470	0.191
Carpenter	54	71.72	0	0.000	0.000
Clerk	15	16.05	5	0.333	0.312
Electrician	219	500.53	24	0.110	0.048
Engineer	44	101.24	0	0.000	0.000
Equipment Operator	43	134.06	6	0.140	0.045
Inservice Inspector	2	2.12	0	0.000	0.000
Laborer	1488	2231.73	92	0.062	0.041
Management	162	390.75	4	0.025	0.010
Non Manual	4	8.42	0	0.000	0.000
Operator	18	57.58	0	0.000	0.000
Project Management	89	141.64	0	0.000	0.000
RADCON Specialist	1449	3359.14	142	0.098	0.042
Refueling	87	210.27	5	0.057	0.024
Security Officer	1	4.69	1	1.000	0.213
Specialist	12	10.58	0	0.000	0.000
Supervisor	449	1047.80	37	0.082	0.035
Technician	779	1479.78	362	0.465	0.245
Truck Driver	18	84.05	0	0.000	0.000
Vendor	27	69.95	2	0.074	0.029
Total	**6241**	**13073.83**	**1280**	**0.205**	**0.098**

Radiation Work Permits (RWP) provides the requirements and the dose/dose rate set points for performance of work. For the campaign three RWPs were developed based on radiological risk. The RWPs and the budgets (in mrem) are shown in table 5.

Table 5

RWP Number	RWP Description	Est RWP hours	Est mrem	Act mrem
1051	All Areas - Non HRA Low Rad Risk	10810	144	132
1062	All Areas - HRA	2667	838	505
1063	All Areas LHRA	888	891	643
Totals				**1280**

Dose is also tracked by Work Order. Accurate WO tracking requires personnel to select the correct WO from a list when logging in to the RWP so there is some overlap between WOs. The data presented is directly from HIS-20 and varies somewhat from the reported dose per MPC but in general is in agreement.

Table 6

		Totals	
WORK ORDER	**DESCRIPTION**	**RWP Hours**	**mrem**
117853914	Mobilization	2322.16	17
117638673	NRC Demonstrations	789.90	2
117556597	Inspect/Clean Dummy Assembly	292.78	1
117821329	MPC 017	2382.40	478
117821333	MPC 117	1374.26	233
117821336	MPC 019	1101.30	149
117821338	MPC 020	1279.97	157
117821342	MPC 118	1272.79	111
117821344	MPC 022	1046.60	105
118208567	Demobilization	926.62	0
	Unassigned to a WO	285.06	27

WBN Neutron Tracking for Dry Cask Storage Campaign 1

The neutron monitoring plan issued DMC2000GN electronic dosimeters to personnel entering neutron dose rate areas. The GNs were issued as a separate device and tracked manually. Tracking sheets were developed for individuals to log neutron dose. The neutron dose was tracked but not entered into HIS-20 such that the reported doses for the campaign do not include neutron dose. This was based on the guidance in WBN RCI-111 Special Exposure Monitoring. RCI-111, Section 3.1, B. states:

Neutron dose tracking between primary dosimeter processing periods will be performed if the area dose rate is >100 mrem/hour (gamma + neutron) and the neutron dose is >10 percent of the gamma dose, by calculating the individuals exposure based on area dose rates and elapsed time in the area. The calculated exposure will be used to update the individuals remaining allowable dose limit. Neutron dose tracking will be documented on a form similar to RADCON Form 610 Neutron Dose Calculation Log.

Surveys did not meet the criteria such that by WBN procedure neutron tracking was not required. The dose was tracked as described but not entered into HIS-20. Experience at SQN and BFN indicate the primary dosimeter shows little to no neutron dose for dry cask campaigns. If required, adjustments to the campaign dose will be made based on OSL results.

Dose Reduction Strategy

Prior to the campaign the HI-TRAC VW transfer cask was returned to HOLTEC and an additional 3/16" lead and 5/8" steel were welded to the shell.

The HOLTEC package included a shield shirt constructed of sheet lead encased in steel which fit around the top of HI-TRAC after placement in the cask work area. This provided lateral gamma shielding for the crews on the work platform with a dose reduction factor of around 4. The second part of the package is a composite shield with a layer of tungsten shielding and a layer of borated polyethylene. This was installed after lid to shell welding and remained in place until port cover and closure ring welding. This provided both gamma and neutron dose rate reduction from the top of the MPC including the annulus.

Shield walls were constructed on the east and south sides of the work area platform. These were lead blanket walls provide gamma shielding for all personnel in the general floor areas and provided a low dose waiting area inside the work area zone.

A shadow shield was provided at the FHD operators console. Additionally a shadow shield was provided at the weld console area.

High temperature covered lead blankets were deployed for spot shielding on top of the MPC both in the work platform and after download into the high storm. These blankets were used extensively when working near or on the top of the MPC.

Telemetry was deployed both for personnel and for area monitoring. Both provided good information without expending RP dose.

The cask work platform was maintained as a non-contaminated area eliminating the dress out requirements that had been used at other TVA stations during their dry cask campaigns. This proved to not only be a time/cost savings but a dose savings as well. Personnel were able to move on and off the platform freely and move a greater distance from the cask when not on the platform.

Task based estimation and tracking allowed for better dose accountability during the campaign. In addition this improved process helped to identify tasks to target for additional dose reduction initiatives.

Incorporation of task estimates into the pre-job briefs provided a target for the craft for each discrete task being performed. These also helped foster engagement by the craft and supervision.

Omnicast access was made available to oversight, supervisory, and management personnel to allow monitoring work progress from remote locations. WBN did not have the software or hardware to support Omnicast. The DCS project funded the purchase and installation of the software and purchase of the camera hardware.

Dedicated RP technicians, RP laborers, and ALARA coordinator provided consistent RP standards and support throughout the project.

A "lowest" dose rate area was designated on the work platform and was utilized by personnel. Welders remain on the work platform throughout the welding processes. The designated area allowed the welding personnel to minimize their dose accrual. Observations found this designated area was heavily used by personnel working on the platform.

Process observation and coaching were performed to improve individual awareness and behaviors around radiation exposure. The efforts focused on ensuring each individual was aware of the radiation source and what measures could be taken to minimize individual exposures. Radiation worker behaviors showed continuous improvement through the campaign.

Pre-job briefs and in field coaching were conducted to ensure the workers on the cask work platform were aware the annulus gap between HI-TRAC and the MPC was the highest radiation source on the work platform. As field surveys were obtained it was identified that although the annulus gap was the highest source, the entire top lid was a source. This led to changing location of temporary shielding on top of the MPC to provide shielded pathways and work areas.

Improvements in task estimation and tracking allowed better real time evaluation of how a MPC was progressing against the ALARA plan. The information was communicated to the RP techs for field implementation and was updated each day. The process allowed a MPC to date comparison of the dose accrual versus the estimate at any point in the process. Tracking also accounted for any emergent issues resulting in dose accrual.

RP coverage was consistent and interactive. RP techs were dedicated to the project with minimal changes. The RP techs attended the shift briefs and job specific pre-job briefings. RP provided live time coaching in the field primarily around body position and use of temporary shielding.

MPC Loading and Processing

MPC 017

MPC 017 SAC Approved Goal – 375 mrem

MPC 017 Actual – 472 mrem

MPC 017 was the first cask system loaded and was plagued by equipment issues that cost a collective 108 mrem. Even without these issues there were gaps that required some discussion and correction.

Decontamination took longer and accrued more dose than planned. No specific issues were identified but the Decontamination foremen discussed and agreed on a strategy that proved successful for the remainder of the campaign. This included continued use of pre-wetting the metal surfaces prior to entry into the SFP coupled with the use of dual pressure washers to spray the cask and equipment as it exited the water.

MPC lid to shell fit up required a lot of effort and exceeded the task estimate. Discussion with the welders indicated the gap variations around the lid were larger than normal and required significant shimming to create a uniform weld gap.

General observations identified body position and use of temporary shielding as gaps during work performed in high dose rate areas. The streaming from the annulus gap was well known but the entire top lid is a source such that the temporary shielding plan needed to be adjusted to account for this. Essentially the temporary shielding blankets will be turned lengthwise towards the center of the MPC still covering the annulus but also providing a shielding pathway/work area for any required access on the top.

The FHD chiller failed during the process and cost several days and accrued an additional 34 mrem for repairs. The ultimate issue turned out to be glycol mixture in the chiller. This was not a human performance issue but a material issue in that the labeled material did not meet the specifications of the label.

After final welding and removal of the weld head one of the inserts that threads into the MPC lift cleat holes became stuck. Removal efforts cost 35 mrem some of which could have been avoided by stopping and discussion the issue. This was on top of the MPC lid and the initially efforts did not fully utilize the available temporary shielding. This was corrected and the task completed successfully.

The largest impact was during removal of the MPC lift cleats/slings after MPC download. This was really three issues. First, one of the MPC lift cleat bolts was stuck and required additional effort for removal. Second, one of the inserts that thread into the holes would not fully thread into the hole. These were equipment issues but were exacerbated by the third issue which was body position and work location of the craft.

Typically the craft remain on the pool bottom lid and do not access the top of the MPC. However due to the issues they were having both craft moved over to the MPC lid. There was not adequate shielding installed around the work areas and the craft body position put them in elevated dose rate areas. This series of activities occurred on night shift with an inexperienced RP crew who did not identify this live time and allowed the work to continue to completion. The result was 78 mrem accrued versus a task estimate 23 mrem. There was video footage of the process which was reviewed and task specific briefing information developed.

MPC 117

MPC 117 SAC Approved Goal – 344 mrem

MPC 117 Actual – 236 mrem

MPC 117 went much better than the previous cask with minimal equipment issues and much improved radiation worker practices. Body position and the use of temporary shielding were emphasizes during briefing and in field observation/coaching. MPC lid fit up was again a problem due to variance in the weld gap size.

One observation was equipment issues with the weld head and the body position of the e-tech during repair. The e-tech was leaning out over the MPC lid and annulus area without having the shielding properly configured. His dose rate from telemetry was 191 mrem/hour and he accrued 15 mrem making repairs. This observation was used to further emphasize the need to use shielding and body position.

A task specific briefing was developed for stackup/download with particular focus on removal of the MPC lift cleats/slings. As a result the crew spent only 19 mrem on the tasks that required 78 mrem the previous week.

MPC 019

MPC 019 SAC Approved Goal – 312 mrem

MPC 019 Challenge Goal – 246 mrem

MPC 019 Actual – 175 mrem

No equipment issues were experience and different from MPCs 017 and 117 the lid fit up went smoothly with a more "normal amount of shims required. The crews are becoming more engaged and active in finding ways to reduce dose. A few keys to the performance were:

- Excellent Radiation Worker Behaviors
- Focused Pre-Job Briefings on High Dose Rate Activities which included use of temporary shielding, body position, low/high dose rate areas, and stopping if problems arise
- Good RP interaction/coaching

MPC 020

MPC 020 SAC Approved Goal – 281 mrem

MPC 020 Challenge Goal – 183 mrem

MPC 020 Actual – 157 mrem

During the loading and processing of MPC 020 the Station ALARA Committee reviewed and approved new challenge goals for the remaining MPCs including MPC 020. The challenge goals were 183 mrem for MPC 020 and 172 mrem each for MPCs 118 and 022.

The improvements from the first three cask systems continued for MPC 020 resulting in completing well below the challenge goal. Additional high temperature lead blankets were obtained from SQN to allow even better use of temporary shielding during work activities on the work platform and on top of the MPC. The crews took full advantage of the shielding using the blankets for virtually every task that required proximity to the HI-TRAC/MPC.

MPC 118

MPC 118 SAC Approved Goal – 172 mrem

MPC 118 Challenge Goal – 150 mrem

MPC 118 Actual – 111 mrem

The crews continued the good performance using body position and temporary shielding to maintain work area dose rates as low as possible. Of particular note is the performance of the PCI welding crew. Lid to shell fit up was an issue on the first two MPCs but has gone smooth since. Like the rest of the crew the welders are using the provided temporary shielding to their advantage and have reduced the total welding dose on each successive MPC. Total welding dose including PT and helium leak testing for MPC 118 was 22 mrem. By comparison the welding dose for MCP 017 was 93 mrem.

MPC 022

MPC 022 SAC Approved Goal – 172 mrem

MPC 022 Challenge Goal – 125 mrem

MPC 022 Actual – 105 mrem

The dose was MPC 022 was initially higher than the previous MPC 118 primarily due to higher contamination levels that required additional decontamination. However this was absorbed by very good performance the rest of the way. As with the previous MPCs the crew continued to be engaged and performed each task with proper focus and attention to detail. Briefings during the week included the tendency to get complacent near the end of a job and the crew responded by delivering the best dose performance of the campaign.

Staffing

Staffing for the project included 5 RP Techs and 6 Laborers for each of the two 12 hour shifts.

The RP Technicians consisted of two TVA techs from WBN and three Bartlett contract RP techs. This mix provided consistent leadership and a strong RP presence in the field. This total number per shift provided adequate resources for most of the work although augmentation from the WBN RP staff was necessary during stackup/download due to the LHRA postings.

Laborer staffing consisted of one TVA Plant Services Foreman and five DZ contract laborers per shift. Laborers performed FME monitoring, Fire Watch monitoring, and LHRA monitoring as well as decontamination and temporary shielding. The TVA foremen provided consistency and leadership throughout the campaign.

Improvement Opportunities

Most of the items listed were implemented during the campaign but are listed here to ensure these are included in future campaign planning.

Non-Contaminated Work Platform

Maintaining the work platform as non-contaminated provide a number of benefits during the campaign. Efficiency was improved by eliminating the time required for donning and doffing protective clothing. Not wearing protective clothing also reduced the heat stress on the crews. An ALARA benefit was seen with the crews able to freely move on and off the platform without being constrained to remain near the cask due to a contamination area boundary. This was also a cost savings for the protective clothing that would normally be consumed.

Temporary Shielding

- Ensure there are a minimum of twelve 3' lead blankets with high temperature covers available. Four of these are used in the RR Bay for MPC cleat removal and eight are used on the work platform for annulus and top of MPC situational shielding.
- The composite top of MPC shielding should be only partially installed initially leaving the outer two rings off until MPC hydro testing and post hydro PT are complete.
- Mobile shield racks at the FHD skid and the weld console should be installed to provide reduced dose rates in the areas
- Shield walls on the east and south sides of the work platform should be erected to reduce general area dose rates
- For any work on top of the MPC (including "reach over") the lead blankets should turned lengthwise to provide a shielded pathway and work area. Two to three blankets are necessary for physical entry on top of the MPC.

LHRA Boundary

Based on the experience at all three TVA sites LHRA conditions are expected after MPC blowdown. A permanent and more functional boundary (door at the top of the platform stairs) should be constructed or procured rather than the makeshift scaffold based door that was used for WBN campaign 1.

FHD

- The filters on the FHD skid required changing during drying of each cask. This was not the experience at SQN or BFN but is believed to be due to the higher boron concentration of the WBN SFP. A modification to the skid to either have a second filter or a filter bypass would eliminate having to stop FHD to change these filters.
- Investigation of a chiller failure on the first MPC discovered the glycol was not the proper mixture to allow the chiller to function properly. The labeling of the pre-mixed glycol container was correct but testing of the product found the concentration of glycol was significantly lower than indicated on the label. The use of pre-mixed glycol should be discontinued.

HI-TRAC/MPC Decontamination

- The use of two pressure washers to spray the cask and equipment as it exited the SFP provided a much better decontamination than using DI water pressure.
- The use of extendable mops allowed the crew to decontaminate the entire HI-TRAC prior to placement in the cask work platform.
- Prior to removal of the annulus seal the area should be vacuumed and/or wiped down to remove any residual water from the area.

MPC Lift Cleat Removal/Insert Installation

- The mating device with the pool bottom lid should be closed to near contact with the MPC lift cleats (downloader slings may require movement – use remote tooling if applicable).
- Four lead blankets should be installed over the annulus area – two on each side of the bottom lid.
- Work should be performed from the pool bottom lid with no entry on top of the MPC.
- Workers should remain as low as possible when on the pool bottom lid.

Neutron Monitoring

- Limited number of DMC2000GN available which led to occasional shortages – additional units should be procured for dry cask campaigns
- DMC2000GN were used before and after MPC blowdown – these should only be used after MPC blowdown unless survey data dictates otherwise
- DMC2000GN were not always re-zeroed after each use
- The monitoring plan was well understood at the FLS and Technician level but was not well documented - include in the ALARA Plan for future campaigns

Radiation Worker Engagement

The interaction between RP and the work crews was excellent throughout the campaign. The crews were open to coaching and improving as the campaign progressed. There was genuine ownership of the dose by the crews. This was a result of a number of factors.

- HOLTEC project managers and supervisors openly and honestly promoted the "team" concept including RP in briefings and in field discussions.
- ALARA provided daily briefings on upcoming work and expectations
- RP provided consistent dedicated support throughout the campaign.
- Observations by the ALARA staff identified "tweaks" in how temporary shielding and body position could reduce dose rates and accrued dose.
- Feedback was provided to the crews on a daily basis on how they were performing and the expected dose for the shift/day.

Corrective Action Program Documents

1219173 ISFSI Project - MPC 017 Exceeded the Dose Estimate

Equipment issues caused the dose estimate for MPC 017 to be exceeded. The estimate was 375 mrem and the actual accrued dose is 469 mrem.

Specific issues were:

Forced Helium Dehydration (FHD) equipment failures - 34 mrem

Stuck Threaded Insert in MPC Lid - 35 mrem

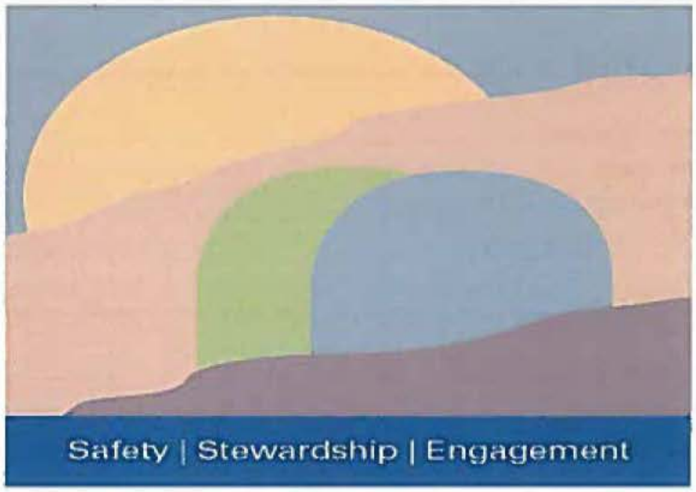
Stuck MPC Lift Cleat Bolt and Insert - 39 mrem

(Note the total dose for MPC 017 was 472 mrem – the CR was initiated prior to the work completing.)

Decommissioning Agent

Pool to Pad Desktop Guide

G-XV93-PTP



Decommissioning
San Onofre
Nuclear Generating Station

	Decommissioning Agent Desktop Guide	
REV.	DESCRIPTION	DATE
2	Decommissioning Agent Pool to Pad Desktop Guide G-XV93-PTP	12/14/17

Prepared By: (b)(7)(C) 12-14-17

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Revision Table

Revision Number	Revision Date	Revision Description	Revision Notes
0	6/14/2017	Original	-
1	9/20/2017	Added qualification card and minor editorial changes throughout	None
2	12/14/2017	Added stop work criteria, process for waivers, deleted a qualification card CBT, added reference to CORC, added reference to oversight schedule plan. Changed COG OM to PTP OM.	

1.0 PURPOSE

The Decommissioning Agent (DA) Organization (DAO) must proactively and periodically review and assess the performance of the Pool to Pad (PTP) Campaign for which HOLTEC is contractually responsible to perform.

This desktop guide helps to define the processes that will be used during oversight of the PTP campaign. The PTP oversight of HOLTEC will be performed using a pilot of the oversight processes (References A-D) that will be used by the SONGS DAO for interactions with SONGS Decommissioning Solutions. In the event of conflicts or uncertainty with this guide or supporting References, the Pool to Pad Oversight Manager (PTP OM) will be notified. The PTP OM will provide a recommendation to the Manager of Project Oversight on the resolution of conflicts and any necessary changes to this desktop guide.

This pilot program will be executed during the PTP activities and as such, changes to the pilot program may necessitate recurring changes to this desktop guide.

Although personnel are expected to apply the guidance provided in this Desktop Guide, it may not cover all situations, is not intended for verbatim compliance, and is not a substitute for good judgment.

2.0 BACKGROUND

In accordance with the Scope of Work (DIA-M-HOLTEC-111914062632), HOLTEC is responsible for the safe and compliant preparations, dry runs and execution of the PTP campaign.

3.0 RESPONSIBILITIES

3.1 Manager, Project Oversight

3.1.1 Reports to the General Manager of Decommissioning Oversight (GMDO).

3.1.2 Manages and oversees the overall ISFSI Project for the DA.

3.1.3 Interfaces with Contractor senior management to provide performance feedback and resolve conflicts.

3.1.4 Resolves escalated Comments or further escalates for Comment resolution.

3.2 Pool to Pad Project Manager (PTP PM)

3.2.1 Reports to the Manager, Project Oversight.

3.2.2 Responsible for managing the PTP Oversight program in conjunction with the PTP OM. Together the PTP PM and the PTP OM perform the responsibilities of the Oversight Manager as discussed in the supporting oversight desktop guides.

3.2.3 Interfaces with HOLTEC management to provide Contractor performance feedback and resolve conflicts.

3.2.4 Ensures adequate resources are provided to support oversight functions.

3.2.5 Ensures individuals providing PTP oversight are prepared and qualified.

3.2.6 In conjunction with the PTP OM, assigns PTP Oversight Specialists to scheduled Oversight Assessments and Tasks (G-XV93-02 Oversight Schedule Desktop Guide, Reference A).

3.2.7 In conjunction with the PTP OM, prepares periodic reports of all Comments to be discussed with HOLTEC (G-XV93-06 Comment Resolution Desktop Guide, Reference D). The periodicity of the reports may depend on identified problems, trends or management's expectations.

3.2.8 In conjunction with the PTP OM, reviews and approves Assessment Plans prepared by PTP Oversight Specialists (G-XV93-04 Perform Assessment Desktop Guide Reference B).

3.2.9 In conjunction with the PTP OM, reviews and approves Assessment Reports prepared by PTP Oversight Specialists (G-XV93-04 Perform Assessment Desktop Guide, Reference B).

3.2.10 Routinely evaluates HOLTEC's performance for adverse trends. When identified, communicates trend to the Manager, Project Oversight and the Contractor counterparts.

3.3 Pool to Pad Oversight Manager (PTP OM)

3.3.1 Reports to the Manager, Project Oversight.

3.3.2 Responsible to manage the PTP Oversight Program which includes preparations, dry runs and execution of the PTP loading campaign.

3.3.3 Supports the PTP PM by measuring Contractor performance and providing observation information and performance trending data to the PTP PM.

3.3.4 Prepares, mentors and qualifies PTP Oversight Specialists to perform oversight observations as discussed in section 4.1.

3.3.5 Provides direction to PTP Oversight Specialists for field observations.

3.3.6 Reviews observations performed by PTP Oversight Specialists as discussed in section 4.3.

3.3.7 Trends and communicates observation results to the PTP PM.

3.3.8 Grants waivers from qualification activities in accordance with Section 4.1

3.3.9 Responsible for managing the PTP Oversight program in conjunction with the PTP PM. Together the PTP PM and the PTP OM perform the responsibilities of the Oversight Manager as discussed in the supporting oversight desktop guides.

3.4 Pool to Pad Oversight Specialists (PTP OS)

3.4.1 Reports to the PTP OM.

3.4.2 Completes assigned training qualifications as discussed in section 4.1.

3.4.3 Plans, performs, and documents oversight Assessments as discussed in section 4.3.

3.4.4 Performs and documents oversight Tasks in accordance with G-XV93-05 Complete Oversight Tasks Desktop Guide (Reference C) and as discussed in section 4.3.

3.4.5 Documents comments pertaining to Oversight Tasks, communicates Comments to PTP OM and HOLTEC (as necessary), and documents any follow-up actions as discussed in section 4.3.

3.4.6 Routinely evaluates HOLTEC's performance for adverse trends. When identified, communicates trend to the PTP OM.

4.0 PROCESS

4.1 Training and Qualification

4.1.1 Oversight of the contractor requires a well-trained and proficient staff of professionals with varying expertise. To be successful in their oversight role, these individuals need to develop an ability to interpret an extensive variety of technical instructions in written, mathematical, or diagram form. Further, the individuals need to integrate several abstract and concrete variables while collecting data, establishing facts, defining problems, and drawing valid conclusions. They also need to have the same understanding of the standards and demonstrate the right oversight behaviors. This is the instinct of a solid PTP Oversight Specialist and ensures the contractor is exposed to a consistent and credible Oversight organization.

4.1.2 The training program outlined in this guide ensures a sound and fundamental level of oversight performance. To be most effective, the PTP Oversight staff need to be immersed in a collaborative environment that promotes cross-discipline learning. PTP Oversight Specialists are expected to share their knowledge and experience openly amongst themselves and during continuous training.

4.1.3 The PTP OM will develop a training and qualification program tailored to each PTP Oversight Specialist.

4.1.3.1 This tailored program ensures adequate technical knowledge, proper oversight behaviors, and alignment of expectations.

4.1.3.2 The qualification program for new oversight specialists will include a final interview with the Manager, Project Oversight prior to the PTP Oversight Specialist performing independent oversight activities.

4.1.3.3 Existing qualified Oversight Specialists will be evaluated by the PTP OM to determine if additional training is necessary prior to performing duties as a PTP Oversight Specialist.

4.1.3.3.1 *During the PTP dry-runs, the PTP OM will determine the training necessary for oversight of the PTP dry-runs and assign qualified Oversight Specialists as necessary.*

4.1.3.4 On a case by case basis, the PTP OM may waive portions of the PTP OS qualification, in whole or part, based on a person's experience and professional pedigree or other circumstances in accordance with Section 4.1.4.

4.1.3.5 The PTP OM may assign Mentors who are responsible for assisting candidates through the qualification process.

4.1.3.5.1 *Mentors help ensure candidates understand technical and behavioral expectations, Mentors should periodically engage candidates in scenario based questions. Mentors should verify basic understanding and proficiency prior to signing off on a given qualification task.*

4.1.3.5.2 *The PTP OM should generally not be assigned as a mentor. In rare instances, the PTP OM may be assigned the duties of a Mentor with the concurrence of the Manager, Project Oversight.*

4.1.4 Waivers from Qualification Requirements

The qualification waiver process is a method of giving credit for equivalent experience, education, training, or qualifications primarily for initial qualification activities.

The PTP OM may waive qualification requirements when justified and supported by the PTP OM's assessment of prior experience, education, training, or qualifications.

Waivers may also be granted for qualification activities that cannot be completed due to other circumstances when, in the assessment of the PTP OM, the activity presents little or no risk to the candidate's ability to perform effective oversight. In such instances, the PTP OM shall satisfy the intent of the qualification activity later, when circumstances allow. For example, training on a procedure that is not yet in effect may be waived until the procedure is issued, at which time the training should be administered to the candidate.

4.1.4.1 The basis of the waiver shall be clearly documented on the qualification form. The basis shall include the following information as applicable.

- Prior experience
- Education
- Prior training
- Prior qualification

4.1.4.2 An interview will be used to evaluate the candidate's knowledge and skill. The evaluation must be sufficiently robust such that a determination of a candidate's prior training and skills provide ample evidence of proficiency.

4.1.4.3 Approval of PTP OM or designee by Signature and Date.

4.1.5 A copy of the completed qualification record will be maintained on the project network.

4.2 HOLTEC Communications

4.2.1 The PTP PM and PTP OM will assess the Contractor's performance and communicate documented oversight Comments and trends to HOLTEC's management using the Comment Resolution Desktop Guide (Reference D), as a guide.

4.2.2 A Contractor Oversight Review Committee (CORC) is used to evaluate and communicate contractor performance as discussed in SO123-XV-50. Specifically:

4.2.2.1 The CORC reviews Contractor performance, events and/or AR equivalents identifying Conditions Adverse to Quality or TRENDS from Observations and ensures Contractor complies with their Corrective Action Program (CAP, HSP-35).

4.2.2.2 Ensures Contractor identified and SCE-identified Conditions Adverse to Quality are documented, resolved, and closed in a timely manner with OBJECTIVE EVIDENCE within the CAP and all associated SCE-actions are closed.

4.3 Pool to Pad Oversight

4.3.1 The PTP PM and PTP OM will develop a schedule of Assessments and Tasks using G-XV93-02 (Reference A), Oversight Schedule Desktop Guide, as a guide.

4.3.2 The repetitive nature of the fuel loading campaign will not require some aspects of the oversight scheduling methodology discussed in G-XV93-02 (Reference A).

4.3.3 HOLTEC's PTP Performance will be evaluated continuously and as outlined the oversight schedule plan.

4.3.4 Oversight Tasks and Assessments will be performed using Complete Oversight Tasks Desktop Guide (Reference C) and Perform Assessment Desktop Guide (Reference B), as a guide.

4.3.5 Be on-station supporting the PTP Oversight role whenever fuel is to be moved from before grapple until after the rigging is uncoupled from the load.

4.3.6 The PTP PM will assess the Contractor's readiness for the NRC dry-runs and PTP campaign by performing Readiness Reviews.

4.4 Stop Work

4.4.1 A condition may arise that meets the Stop Work criteria of Section 2.2 of Appendix J of the Contract. It is incumbent upon the person observing the condition to immediately intervene if personal injury or death could potentially result. It is also important for PTP oversight specialists confronted with Stop Work conditions to take reasonable actions, as time permits, to afford HOLTEC or its subcontractors an opportunity to self-correct. Stopping Work should be considered a significant event and, as such, senior leadership should be consulted as time permits and before initiating a DA directed stop work event. **Once direction to stop work is issued only the General Manager of Decommissioning can authorize release of the stop work.**

4.4.2 Stop Work Criteria

- Imminent danger of injury to a person
- Imminent danger of death of a person

4.4.3 Stop Work Process

4.4.3.1 If there is no time to discuss the deficient condition with Contractor supervision because of an imminent danger of injury or death, inform the Contractor to Stop Work.

4.4.3.2 If there is no imminent danger of injury or death, discuss the deficient condition with Contractor supervision. If the Contractor does not take appropriate action to remedy the deficient condition, escalate issue to DA Management.

4.5 Development, Maintenance, and Use of Checklists

4.5.1 The PTP Oversight Specialists will develop and maintain a set of compliance based checklists for the evaluation of HOLTEC's PTP performance.

4.5.1.1 The PTP PM and PTP OM may add to the checklists at any time to address emerging issues such as lessons learned and changes in the HOLTEC scope.

4.5.1.2 Where checklists have been created, they will normally be used as a guide to evaluate HOLTEC's PTP performance. The use of Checklists aids in establishing a consistent evaluation of HOLTEC responsibilities. **However, Checklists should not be considered all-inclusive and should not be followed blindly. The use of checklists does not reduce accountability for performing effective oversight.**

5.0 REFERENCES

A. G-XV93-02, Oversight Schedule Desktop Guide

B. G-XV93-04, Perform Assessment Desktop Guide

C. G-XV93-05, Perform Oversight Tasks Desktop Guide

D. G-XV93-06, Comment Resolution Desktop Guide

6.0 DEFINITIONS & ACRONYMS

TERM	DEFINITION
DA	Decommissioning Agent
DA Identified Issue	Any DA identified instance or trend of Contractor unsafe work practices or non-compliance with contractual obligations, established standards, laws, regulations, and accepted Contractor processes or programs. Also, referred to as "Comment".
DDT	Decommissioning and Dismantlement Team
GMDO	General Manager of Decommissioning Oversight
OSDB	Oversight Database: the technology solution that is utilized to document oversight tasks, owners, and status, as well as the results of any executed oversight tasks. This is the primary tool for monitoring the performance of the Contractor against the contract.
SCE	Southern California Edison
SONGS	San Onofre Nuclear Generating Station

7.0 TABLES

- PTP Oversight Specialist Qualification

7.1 PTP Oversight Specialist Qualification

Date Assigned	Completion date	Candidate's Name/Badge#	Candidate's Mentor
PTP Oversight Manager Waiver Recommendation (if applicable)			Signature / Date
			PTP OVERSIGHT MANAGER

		Date	Signature
1	Complete basic Site access and Indoctrination Training		PTP OM
2	Complete SCE training Contractor Safety Management		CANDIDATE
3	Discuss SCE-EHS-SAFETY-ST-2, Contractor Safety Management		MENTOR
4	Discuss SCE-EHS-SAFETY-HB-1, Environmental, Health and Safety Handbook for Contractors		MENTOR
5	SCE HR Policy #301 – Professional Conduct		MENTOR
6	Discuss Decommissioning Quality Assurance Program (DQAP) Manual		MENTOR
7	Discuss D-003, Decommissioning Safety Culture and Safety Conscious Work Environment		MENTOR
8	Self-study Contract		CANDIDATE
9	Self-study G-XV93-01 General Contractor Oversight Guideline		CANDIDATE
10	Self-study G-XV93-02 DGC Oversight Schedule Desktop Guide		CANDIDATE
11	Self-study G-XV93-04 Perform Assessment Desktop Guide		CANDIDATE
12	Self-study G-XV93-05 Complete Oversight Tasks Desktop Guide		CANDIDATE
13	Self-study G-XV93-06 Comment Resolution Desktop Guide		CANDIDATE
14	Discuss the HOLTEC Health and Safety Program		MENTOR
15	Self-study Project Risk Oversight Plan		CANDIDATE
16	Self-study of station requirements for Hazard Communications, Emergency Action Plans, Fire Prevention Plans, HAZWOPER awareness, Ergonomics.		CANDIDATE
17	Discuss station requirements for Hazards Assessments, PPE, Exposure Monitoring, Incident Accident Investigation and Reporting and Medical response.		MENTOR
18	Conduct familiarization on the OSDB		OS
19	Discuss Oversight Behaviors and Processes training		MENTOR

Date Assigned	Completion date	Candidate's Name/Badge#	Candidate's Mentor

		Date	Signature
20	Discuss station Corrective Action, Nuclear Oversight, and Safety Culture Programs		MENTOR
21	Discuss HOLTEC event notification and response plan		OS
22	Discuss HOLTEC Lifting and Handling Program		OS
23	Conduct and document (1) Assessment in the OSDB		OS
24	Conduct and document in the OSDB, (2) hours of in-the-field observations of the contractor activities		MENTOR
25	Conduct and document in the OSDB, (2) hours of in-the-field observations of the contractor activities (with a different OS)		OS
26	Conduct and document in the OSDB (1) document review task		MENTOR
27	Conduct and document in the OSDB (1) area inspection task		OS
28	Review licensing documents (FSAR/COC)		CANDIDATE
29	Conduct a self-study of HOLTEC PTP procedure HPP-2464-100 and discuss with OS		OS
30	Conduct a self-study of HOLTEC PTP procedure HPP-2464-200 and discuss with OS		OS
31	Conduct a self-study of HOLTEC PTP procedure HPP-2464-300 and discuss with OS		OS
31	Conduct a self-study of HOLTEC PTP procedure HPP-2464-400 and discuss with OS		OS
33	Conduct a self-study of HOLTEC PTP procedure HPP-2464-500 and discuss with OS		OS
34	Conduct a self-study of HOLTEC PTP procedure HPP-2464-600 and discuss with OS		OS
35	Conduct a review and discussion of recent OEs or problem investigations with the PTP OM		PTP OM
36	Discuss stop work criteria / candidate is ready for Interview		PTP OM
37	Final interview complete. Candidate released to perform PTP OS duties		Manager, Project Oversight
38	I understand my responsibilities as a PTP OS		CANDIDATE

REVIEWS OF DESIGN DOCUMENTATION

OPERATING EXPERIENCE/LESSONS LEARNED/EXPECTATIONS

PURPOSE:

Engineering Training with regard to review new expectations for Engineering review of all Holtec work-products (FCR, RRTI, SMDR, CCR/CoC, etc.)

BACKGROUND:

Holtec and SCE each have a process to address changes to their respective design and licensing bases. Holtec's process focuses on reviewing changes against the content of the Holtec licensing basis documents: CoC, FSAR, and SER. SCE's process focuses on changes more broadly and addresses 10 CFR 50 and 10 CF 72 design and licensing bases.

Until now, SCE review of Holtec Engineering Products has been limited to Technical Review and Owner Acceptance.

During implementation of seismic stop base plate and lift yoke extension modifications, an NRC inspector questioned whether the change had been reviewed against 50.59/72.48. As a result, SCE identified that Holtec's change processes do not always meet our expectations for 50.59/72.48 review. Further, some reviews that may have been done were not documented sufficiently to provide clear objective evidence of those reviews.

Adequate 50.59/72.48 review of Holtec's changes should have occurred prior to implementation of these changes in the plant.

Effective Immediately. SCE will perform review of every FCR, RRTI, SMDR, CoC or any other Engineering Change Document to ensure the requirements of 72.48/50.59 are met. There are no exceptions to this rule. The review can be performed remotely, but cannot be waived.

KEY POINTS:

1. All reviews must address technical as well as regulatory aspects of any that propose change(s). Rework dispositions (reestablishing conformance with the design) do not.

2. Reasonable assurance of compliance with all regulatory requirements is required for all organizations. Required reviewers and approvers must assure adherence to all regulatory requirements before approval and before implementation in the field.

3. Current program/procedure content and interface practices were NOT always sufficient to assure such compliance. Changes to such processes will be developed as part of ongoing causal evaluations within both SCE and Holtec corrective action systems.

4. Both organizations independently performed "extent of condition" reviews of approximately 400 work products over the last several days. Approximately 19 FCRs and several associated SMDRs and CCR/CoC's were revised and/or additional regulatory reviews performed.

5. If there is any uncertainty, Program Owners or Subject Matter Experts within the appropriate organizations should be contacted for guidance.

6. It is essential that both organizations reach a reasoned consensus on actions necessary to provide the requisite level of compliance and objective evidence.

Resolution of Closed FCRs Identified as Requiring Regulatory Reviews

ISFSI Pad and Security Building Construction Related Field Condition Reports

Addressed by this Regulatory Review

FCR Number	Subject	Change Authorized
FCR-2464-CON-142	Block Wall installation deviated from slope requirements as specified in EDCR-2464-NECP 01-04 R4	Use-as-is: Disposition based on technical evaluation of as-built slope. Change was authorized by EDCR-2464-NECP 01-25. Holtec Report HI-2156559 and Drawing 10205 was revised to match new design.
FCR-2464-CON-150	East Wall rebar positioned at too high an elevation which made adequate concrete cover impossible	Repair: Rebar tails were cut to as unnecessary to comply with concrete cover requirements.
FCR-2464-CON-152	East Wall concrete cover less than what was required by drawing 9987 R7.	Use-as-is: Disposition based on verification of compliance with ACI 318-05 code. Change documented in EDCR-2464-NECP 01-27.
FCR-2464-CON-158	Security Building dowel rebar omitted from installation.	Use-as-is: Disposition based on validation that the design change was acceptable for final design requirements. Change documented in Black and Veatch ECN-188507-0015.
FCR-2464-CON-161	Security Building dowels from two interior walls do not tie into roof slab as originally intended.	Use-as-is: Disposition based on validation that design change was acceptable for final design requirements. Change documented in Black and Veatch ECN-188507-0012.
FCR-2464-CON-176	ISFSI Pad deviation from construction specification flatness requirements.	Use-as-is: Disposition based on validation that there were no structural or operational concerns with the deviation.
FCR-2464-CON-182	Shipping damage to divider shell caused chipping of paint and slight bending of divider shell bottom tab.	Rework: Disposition based on completion of corrective actions to repainted chipped areas of Divider Shell and confirmation that critical dimensions were in tolerance.
FCR-2464-CON-184	Unsatisfactory sub grade conditions for ISFSI Pad concrete placement 3.	Use-as-is: Disposition based on verification that there were no structural or shielding impacts to the ISFSI Pad design (see SMDR-2464-2714 and 72.48 #1310).

Loading (Holtec Site Services) Related Field Condition Reports

Addressed by this Regulatory Review

FCR Number	Subject	Change Authorized
FCR-2464-LOA-034	Lift Yoke stand casters (wheels) too high for the lift yoke to be removed from the lift yoke stand with the lift yoke extension attached.	Repair: Original casters replaced with shorter casters with same bolting pattern and sufficient rating for load capacity.
FCR-2464-LOA-044	Diamond plate decking on Unit 3 work platform interfered with existing wall mounted restraints.	Repair: Removed small portion of work platform diamond plate decking for to allow for proper fit up.
FCR-2464-LOA-045	Work platform ladder interfered with the Lift Yoke Extension lift path.	Use-as-is: Removed one of two ladders from work platform to avoid interference with Lift Yoke Extension lift path.
FCR-2464-LOA-064	HI-TRAC seismic restraints (sling) too long making it too loose around HI-TRAC.	Use-as-is: Removed non-critical link to reduce amount of slack in seismic restraint.
FCR-2464-LOA-069	Work platform fit up issue with wall mounted brackets.	Repair: Removed portion of work platform (supporting beam and diamond plate decking) in two locations to avoid interference with wall mounted brackets
FCR-2464-LOA-074	Tri-Nuclear Vacuum Pump Support Platform interface issue for UF-600 model.	Close to Trend: Design drawing revised and 2 new support platforms manufactured to eliminate interface issue with model UF-600 internal housing.
FCR-2464-LOA-083	Unit 2 work platform handrail fit-up problem (vertical post of one handrails did not fit into appropriate slot).	Repair: Vertical post of handrail modified by shaving off 3/32" of the post. Overall impact on structural capacity of the handrail was determined to be negligible.
FCR-2464-LOA-091	Several bolts for the diamond plate decking do not fit-up with their designated holes.	Use-as-is: The As-Built configuration of the work platform with several of the bolts missing was determined to be acceptable due to negligible impact to structural capacity and verification on no impact to functionality.

Additionally: changes to the Mating Device as authorized by FCR-2464-LOA-012 are being addressed in Regulatory Review 0717-76238-50 and changes to the Lift Yoke Extension authorized by FCR-2464-LOA-041 are being addressed in 0717-76238-51.

Decommissioning Authority Oversight Specialist Training

Regulations

The vast majority of personnel working in the nuclear industry are aware of 10CFR50 Appendix B because they worked at some time at an operating plant. What most people are not aware of is that 10CFR71, Packaging and Transportation of Radioactive Material and 10CFR72, ISFSI, each have a requirement for a quality assurance program. The quality assurance program requirements described in each part very closely follows the requirements of Appendix B. SONGS, like other plants in the country, worked with the NRC to take credit for the Appendix B program as meeting the requirements of 10CFR71 and 10CFR72. In doing so, the station actually expanded the Appendix B applicability from safety related to safety related and important to safety. 10CFR73, Physical Protection of Plants and materials, does not have a quality assurance plan requirement but does have a requirement to use the site CAP. This information will be used in a discussion to get alignment on what we currently consider a CAQ.

Appendix B to Part 50—Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants

Nuclear power plants and fuel reprocessing plants include structures, systems, and components that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public. This appendix establishes quality assurance requirements for the design, manufacture, construction, and operation of those structures, systems, and components. <u>The pertinent requirements of this appendix apply to all activities affecting the safety-related functions of those structures, systems, and components</u>; these activities include <u>designing, purchasing, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling, and modifying</u>.

From the definitions section

Safety-related structures, systems and components means those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:
(1) The integrity of the reactor coolant pressure boundary
(2) The capability to shut down the reactor and maintain it in a safe shutdown condition; or
(3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the applicable guideline exposures set forth in § 50.34(a)(1) or § 100.11 of this chapter, as applicable.

From 10CFR71
(a) *Purpose.* This subpart describes quality assurance requirements applying to design, purchase, fabrication, handling, shipping, storing, cleaning, assembly, inspection, testing, operation, maintenance, repair, and modification of components of packaging <u>that are important to safety</u>.

From Reg Guide 7.10 concerning 10CFR71
For the purposes of this regulatory guide, structures, systems, and components important to safety mean the features of a Type B or fissile material package that are intended to (1) maintain the conditions required to safely transport the package contents; (2) prevent damage to the package during transport; or (3) provide reasonable assurance that the radioactive contents can be received, handled, transported, and retrieved without undue risk to the health and safety of the public or the environment.

From 10CFR72 regarding quality assurance
This subpart describes quality assurance requirements that apply to design, purchase, fabrication, handling, shipping, storing, cleaning, assembly, inspection, testing, operation, maintenance, repair, modification of structures, systems, and components, and decommissioning that are important to safety.

Structures, systems, and components important to safety means those features of the ISFSI, MRS, and spent fuel storage cask whose functions are—
(1) To maintain the conditions required to store spent fuel, high-level radioactive waste, or reactor-related GTCC waste safely;
(2) To prevent damage to the spent fuel, the high-level radioactive waste, or reactor-related GTCC waste container during handling and storage; or
(3) To provide reasonable assurance that spent fuel, high-level radioactive waste, or reactor-related GTCC waste can be received, handled, packaged, stored, and retrieved without undue risk to the health and safety of the public.

The licensee and the certificate holder are also simultaneously responsible for these quality assurance requirements through the oversight of contractors and subcontractors.

From 10CFR73.55
The licensee shall use the site corrective action program to track, trend, correct and prevent recurrence of failures and deficiencies in the physical protection program.

Appendix B Criterion XVI. Corrective Action

Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

Decommissioning Agent

Comment Resolution Desktop Guide

G-XV93-06

Safety | Stewardship | Engagement

Decommissioning
San Onofre
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Revision Table

Revision Number	Revision Date	Revision Description	Revision Notes
0	5/10/2017	original	
1	9/11/2017	Revised instruction to require a review of comments for applicability for entry into the SCE Corrective Action Program.	See change synopsis for details

1.0 PURPOSE

The purpose of this desktop guide is to provide instructions for preparing Comments based on the results of Oversight Tasks and resolving these Comments with the Contractor. Comment trending and analysis also provide a means of monitoring and measuring Contractor performance. This desktop guide also includes direction for responding to Nuclear Oversight Division (NOD) identified issues

2.0 BACKGROUND

Oversight Specialists (OSs) and Oversight Managers (OMs) independently measure and report on Contractor performance of contractual obligations with respect to safety and compliance, and will also monitor the project for financial stewardship.

To fulfill their role, OSs and OMs perform and document non-obtrusive and compliance-based Oversight Tasks of Contractor activities and report those observations to the General Manager of Decommissioning Oversight (GMDO). The scope of oversight tasks shall be to verify that Contractor activities are safe and in scope, and comply with contractual obligations, established standards, laws, regulations, and accepted Contractor processes, plans, and programs.

For an Overview of the comment resolution process, see the Simplified Workflow (G1 and G2), Attachment 1 and Attachment 2.

3.0 RESPONSIBILITIES

3.1 Oversight Specialist (OS)

3.1.1 Performs Oversight Tasks and drafts corresponding Comments.

3.1.2 Shares Comments with appropriate OM. Procedure review comments provided in writing to the Contractor will be reviewed by the OM at their discretion.

3.1.3 Updates Comments based on feedback from an OM.

3.1.4 Revises or ~~discards~~ cancels Comments by direction of the OM or GMDO (as necessary).

3.1.5 For Comments evaluated by the Contractor, documents Contractor response and any follow-up actions.

3.1.6 Provides Document Review written comments to Contractor Document owner. Discusses comments with Document owner in parallel with providing written comments if comment is time sensitive.

3.1.7 Review comments for applicability for entry into the SCE Corrective Action Program

3.2 Oversight Manager (OM)

3.2.1 Evaluates the relevance of Comments related to the OM's discipline.

3.2.2 Performs a discretionary review of Document Review written comments provided to the Contractor.

3.2.3 Provides direction to the OS on how to disposition Comments that are not valid – revise or ~~discard~~cancel.

3.2.4 Shares Comments with the cognizant Contractor Manager verbally in an appropriate timeframe.

3.2.5 For Comments that are accepted by the Contractor, shares Contractor response and follow-up actions with the OS.

3.2.6 For Comments that are not accepted by the Contractor:

3.2.6.1 Shares Contractor feedback with the OS and provides direction on how to proceed – revise or ~~discard~~ cancel (as necessary).

3.2.6.2 Escalates Comment to the GMDO for resolution.

3.2.7 For escalated Comments, receives direction from the GMDO on how to proceed and communicates that direction to the responsible OS.

3.2.8 Evaluates Contractor performance for adverse trends and initiates additional Comments requiring Contractor resolution.

3.3 General Manager Decommissioning Oversight (GMDO)

3.3.1 Reviews Comments escalated by the OM when the OM and the Contractor Manager are unable to reach agreement concerning Comment validity and/or the relevance of the issue.

3.3.2 Determines if Comments warrant further escalation based on a review of the facts and the relevance of the issue.

3.3.3 For Comments deemed invalid or not warranting further escalation, provides direction to the OM or OS on how to proceed – revise or ~~discard~~cancel.

4.0 GENERAL GUIDELINES

4.1 Comment Resolution Overview

4.1.1 OSs are required to document any issues encountered as a result of performing Oversight Tasks. These issues are referred to as Comments.

4.1.2 All Comments documented for a given Task are shared with the responsible OM who is responsible for sharing the Comment verbally with the Contractor. The communication of Comments generally occurs in a weekly meeting between the OM and the Contractor. Some Comments may be time-sensitive and for these, the OM needs to communicate them based on ongoing or upcoming events. Document review comments are typically provided to the Contractor in writing. The Contractor will provide written resolution responses for Document Review comments and revise the document as appropriate.

~~4.1.2~~4.1.3 For Issues involving time sensitive or step sensitive safety significance, the OS will communicate the issue to the OM as soon as practical. The OM will notify the contractor as soon as practical and enter the escalation process promptly as the issue warrants.

~~4.1.3~~4.1.4 For Comments that are accepted by the Contractor, the OM shares the Contractor response and follow-up actions with the OS who documents this information.

~~4.1.4~~4.1.5 For Comments that are not accepted by the Contractor, the OM determines whether the Comment should be revised, ~~discarded~~ cancelled or escalated.

~~4.1.5~~4.1.6 Comments are first escalated to the GMDO, and, if necessary, secondly to the CNO, and, if necessary, to the EOC.

4.2 Comment Guidelines

4.2.1 Comments as a result of Oversight Tasks represent the DA exercising it Oversight role and, if done improperly, may undermine the DA's credibility and relationship with SDS. As such, it is particularly important to demonstrate the highest degree of professional standards when providing verbal or written Comments to them. Comment authors should consider the guidance of Attachment 3, Document Review Standard and Attachment 4, Relationship Management, to ensure comments reflect the expectations in the "green".

4.2.2 In addition, Comment authors should ensure each written Comment is accurate and includes perspective by asking themselves the following questions:

- Is it Right, Reasonable and Relevant?
- Is it objective?
- Is there a "So-what"?
- Is it quantifiable (e.g., 1 of 100)?
- Is it mitigated by other requirements?
- Is there an Extent of Condition?
- Was the higher-order intent of the standard met?
- Is it free of emotional language?
- Is there a why?

4.2.3 It should be a priority to make sure Comments are appropriate and well crafted. Inaccurate, unclear, and unfocused comments unnecessarily waste time and resources. For these reasons, before finalizing a Comment, consider the following:

- Obtaining a peer check from another member of the team.
- Socializing the issue with SDS before drafting Comment(s) to better understand their intention and perspective.

4.2.4 Compliance Review Guidelines

4.2.4.1 When performing a compliance based review, take care to ensure the scope of your review covers all relevant compliance materials such as approved programs, permits, procedures, plans, and contract documents.

4.2.4.2 When evaluating contract compliance issues be sure to apply the Order of Precedence as define in the DGC Agreement:

1. the Purchase Order;
2. this Agreement; and
3. Exhibit A – Scope of Work;
4. Exhibit C – Milestones
5. Other Exhibits

4.2.5 Document Review Guidelines

4.2.5.1 When performing technical review of documents, consider the following:

1. Verify scope of the technical activity is defined and accurately represented.
2. Confirm the technical activity is consistent with contractual requirements.

3. Identify applicable source requirements and verify compliance with NRC regulations, codes, standards, and other relevant sources.
4. Evaluate whether the technical strategy could adversely impact the physical plant.
5. Ask yourself the questions:
   - Does it look or feel right?
   - Why wouldn't I do it this way?
   - Has it been done this way before?
6. Comments should be compliance based, but not made in a vacuum. Make sure the technical approach makes sense and pull the thread as needed to undercover what's wrong or assuage your concern.
7. Think ahead about what you're looking for in a response from SDS. Comments should be structured to clearly allow for a response to ultimately close the gap or to explain why that is not necessary.

4.2.5.2 Based on an understanding of the Technical and Contractual requirements, perform a Page-Turn exercise of the document to satisfy yourself of the following:

1. It makes sense. "Common Sense" applies.
2. It is complete in that it covers the entire scope technically, procedurally, and contractually. If you can't trace the technical and contractual requirements to words in the document or its supporting procedures, question its completeness.
3. Understand the interfaces between the DA and SDS and confirm each is addressed. Specifically review all references to the Company, DA, or SCE and confirm agreement and applicability.

4.2.5.3 One of the best methods of examining complex documents is by way of comparison---"Which one of these doesn't look like the other?" Consider performing a Gap Analysis between SONGS procedures or other representative process and the SDS document, identifying any differences. Evaluate each difference:

1. Is the difference compliant with source requirements?
2. Is it a difference of omission; and, if so, should it be omitted?
3. Does the difference represent increased Risk to the Company?
4. Is it reasonable and prudent?
5. Is it covered elsewhere or by other means, methods, or procedures?

4.3 Communications Protocol

4.3.1 In all interfaces with SDS, apply the principles of the Influence Ladder, Attachment 5. Confidently exhibit that you own what has been assigned to you in everything that you do and say (while being a very good listener and making sure you fully understand how SDS plans to perform the work).

4.3.2 Do not mention past problems with your assigned area, except when discussing lessons learned that could help SDS to avoid similar problems. Stay away from blaming others, making excuses or appearing as an expert if you do not know.

4.3.3 Prepare yourself to ask probing questions.

4.3.4 Answer the question that is asked, provided the question is appropriate. If you are asked a question that you cannot accurately answer, say so and quickly get the answer. If you are asked a question that indicates SDS may be wanting to shift responsibility from itself to the DA, then politely remind SDS that the DA is not going to be doing SDS's work. If SDS doesn't seem to get this message, then raise this concern to the cognizant OM.

4.3.5 Demonstrate support for your leaders and other SONGS groups. Avoid tearing down leadership, peers, or co-workers.

4.3.6 For complex issues or contract interpretations, consider crafting a position paper to clearly define the DA position and to request written response from SDS.

4.4 Interface Principles

4.4.1 The Decommissioning Agent (DA) in its oversight role in no way diminishes the Contractor's responsibility for overseeing Contractor activities and ensuring that they are safe and in scope, and comply with contractual obligations, established standards, laws, regulations, and accepted Contractor processes and programs.

4.4.2 The Contractor is required by contract to support the DA in its oversight role by providing their full cooperation and by accommodating reasonable requests.

4.4.3 If DA provides Comments to Contractor, the Contractor shall either promptly agree to resolve them or inform the DA that the Comments are not required by applicable contractual obligations, established standards, laws, regulations, and accepted Contractor processes and programs. If Contractor informs DA that Comments are not required, Contractor shall provide the factual basis for their dispute. In which case, the DA and Contractor should act in good faith and expeditiously resolve such Comments in accordance with 5.3.1.

4.4.4 The Contractor does not have the right to request a Change Order based on Comments provided by the DA. If the Contractor determines a Change Order is needed to comply, then one shall be prepared and provided to the DA for review (See G-XV93-09 Change Order Request Review Desktop Guide). The DA reserves the right to amend or retract its Comment at any time.

4.4.5 When the Contractor agrees with a DA Comment, the Contractor is expected to document and respond to the issue in a manner consistent with how the Contractor responds to self-identified issues and in accordance with Contractor processes.

5.0 PROCESS

5.1 Prepare Comment(s)

5.1.1 OMs shall periodically evaluate Contractor performance for adverse trends. When an OM initiates Comments based on the identification of an adverse trend that warrants escalation to the cognizant Contractor Manager, the Comment(s) shall be prepared using the guidance of Section 5.1.2, and then proceed to Section 5.2.

5.1.2 OSs shall draft comments in the OSDB (see Attachment 6 example) based on a review of the facts and the relevance of the issue, applying the principles of Section 4.2.

5.1.2.1 Comments shall normally be written in a 4-part format:

1. Standard: Related contractual obligation (including Scope of Work), established standards, laws, regulations such as OSHA, and/or accepted Contractor processes, plans, and programs.
2. Observation: What was observed or found while performing the Oversight Task.
3. Deviation: The specific deviation between the Standard and the Observation.
4. Discussion: Amplifying information required to ensure that the Comment is written accurately and with perspective.

5.1.2.2 The OS should review the comment to determine if entry into the SCE Corrective Action Program is warranted. SO123-XV-50 Corrective Action Program provides instructions for the SCE CAP process. Entries into the SCE Corrective Action Program should be conducted the same business day under normal circumstances but no later 24 hours after comment entry has been made in the OSDB if additional time is required to socialize the issue.

5.1.2.3 Once prepared, Comments shall be reviewed with the OM responsible for the area of concern. OM may use discretion for review of written comments provided to the Contractor resulting from document reviews.

5.1.3 The OM shall per their discretion review each Comment and determine whether it is valid and relevant.

5.1.3.1 If a Comment is not valid, the OM shall provide direction to the OS to revise or ~~discard~~ cancel the Comment.

5.1.3.2 When the OM agrees with the Comment, proceed to 5.2.

5.1.3.3 In the rare case in which the OS and the OM cannot agree on the validity or relevance of a comment, then the Comment should be escalated to the GMDO for review.

5.2 Share Comment(s) with Contractor

5.2.1 When OMs review and agree with a Comment, they shall determine whether providing the Comment to the Contractor is time-sensitive based on ongoing or upcoming events. If so, the Comment should be shared with the Contractor as soon as necessary. Otherwise, the Comment should normally be shared within a week or at the next regularly scheduled meeting with their Contractor management counterpart, whichever is sooner.

5.2.2 Comments shall be verbally shared with the Contractor by phone or in person. Comments resulting from document reviews are typically shared with the Contractor in writing.

5.2.2.1 Document review comments are typically provided to the Contractor in writing (see Attachment 7 example). The Contractor will provide written resolution responses for Document Review comments and revise the document as appropriate.

5.2.3 Supporting pictures may be shared with the Contractor so long as it is the picture only (i.e., no written context provided).

5.2.4 For Comments that are not accepted by the Contractor, the OM shall assess the Contractor's feedback and determine whether to escalate the comment to the GMDO or whether to revise or ~~discard~~ cancel the Comment:

5.2.4.1 Direct OS to ~~discard~~ cancel or revise the Comment; or

5.2.4.2 Escalate the Comment to the GMDO and proceed to Section 5.3.1.

5.2.5 Revised Comments shall be shared by returning to the beginning of Section 5.2.

5.2.6 For Comments that are accepted by the Contractor, the Contractor response and any follow-up actions are shared with the responsible OS who documents the information.

5.3 Escalate Comment(s)

5.3.1 GMDO Escalation

5.3.1.1 When an OM and his Contractor counterpart cannot reach agreement on a Comment's validity or relevance, the Comment should normally be escalated to the GMDO for resolution.

5.3.1.2 The GMDO will determine if the Comment warrants further escalation based on a review of the facts and the relevance of the issue.

5.3.1.3 When escalation is deemed necessary, the GMDO shall present the Comment to the cognizant Contractor Senior Representative. Based on the response of the Contractor Senior Representative:

5.3.1.3.1 If the Representative accepts the Comment, the GMDO will provide direction to the OM on how to proceed

OR

5.3.1.3.2 If the Representative does not accept the Comment, the GMDO may either:

A. Direct the Contractor actions,

B. Escalate the Comment further and determine actions necessary to proceed.

C. OR decide the Comment does not warrant further escalation.

5.3.1.4 For Comments deemed invalid or not warranting further escalation, the GMDO will direct the OM or OS on how to proceed – revise or ~~discard~~cancel. Revised Comments shall reenter the process at step 3.2.

5.4 Finalize Comment(s)

5.4.1 Once a final disposition of a Comment is known, the OS is responsible for revising or ~~discarding~~ cancelling it based on the outcome of review with Contractor Management or the Comment escalation process. Once a Comment has been

fully resolved and agreement reached with the Contractor, the corresponding Oversight Task may also require updating.

5.4.2 As applicable, the Task Owner for the Comment shall ensure the Contractor responds to the issue in a manner consistent with how the Contractor responds to self-identified issues and in accordance with Contractor processes, including documenting the comment in the Contractor Problem Identification & Resolution System.

5.5 Responding to ARs generated by Nuclear Oversight Division

NOTE

NOD provides oversight for all quality affecting activities at the site. This includes SCE and various contractor organizations. As such, NOD identified may represent a breakdown in the contractor oversight process, the DA oversight process and SCE line management oversight.

5.5.1 If NOD initiates an AR due to a quality concern or identifies a non-compliance, the cognizant DA OS should act as the issue lead..

5.5.2 The issue lead should meet with the NOD initiator to develop a full understanding of the issue, including: the standard involved, the degree of deviation, NOD's perception of what is required to correct or address the condition, and whether it is a time sensitive or step sensitive issue.

5.5.3 The issue lead will work with the responsible contractor to have a CR (or equivalent) generated that fully captures NOD's concern.

5.5.4 The issue lead will work with the contractor to determine contractor response or develop a schedule for contractor response and provide that feedback to the NOD representative

5.5.5 The issue lead will track progress of contractor response and keep NOD informed and provide prompt NOD notification if there will be a delay in the response.

5.5.6 The issue lead will discuss the contractor response when it becomes available to determine that NOD is satisfied. If NOD is not satisfied, notify the OM and enter the escalation process.

6.0 REFERENCES

- Decommissioning General Contractor Agreement
- G-XV93-01 General Contractor Oversight Guideline
- G-XV93-04 Assessment Desktop Guide
- G-XV93-05 Oversight Tasks Desktop Guide
- G-XV93-07 Stop Work Protocol Desktop Guide
- G-XV93-08 Acceptance of Completed Work Desktop Guide
- G-XV93-09 Change Order Request Review Desktop Guide
- SO-123-XV-50 Corrective Action Program

7.0 DEFINITIONS & ACRONYMS

TERM	DEFINITION
Area Inspection	DA Oversight task to confirm safe and compliant work areas are being maintained with respect to, but not limited to, housekeeping, fire safety, hazardous material storage, radiation protection, and environmental protection.
Assessment	Assessments are DA oversight tasks performed by OSs to gauge the health of programs transitioned to the DGC. Assessments confirm Contractor activities are safe and in scope, and comply with contractual obligations, established standards, laws, regulations, and accepted Contractor processes.
Document Review	DA Oversight task for review of Contractor procedures, processes, reports, and submittals to confirm technical accuracy and incorporation of contractual requirements, standards, and regulations.
DGC Agreement	Refers to Decommissioning General Contractor Agreement dated 20 December 2016, and its Exhibits, and as amended, supplemented, or modified.
GMDO	General Manager of Decommissioning Oversight

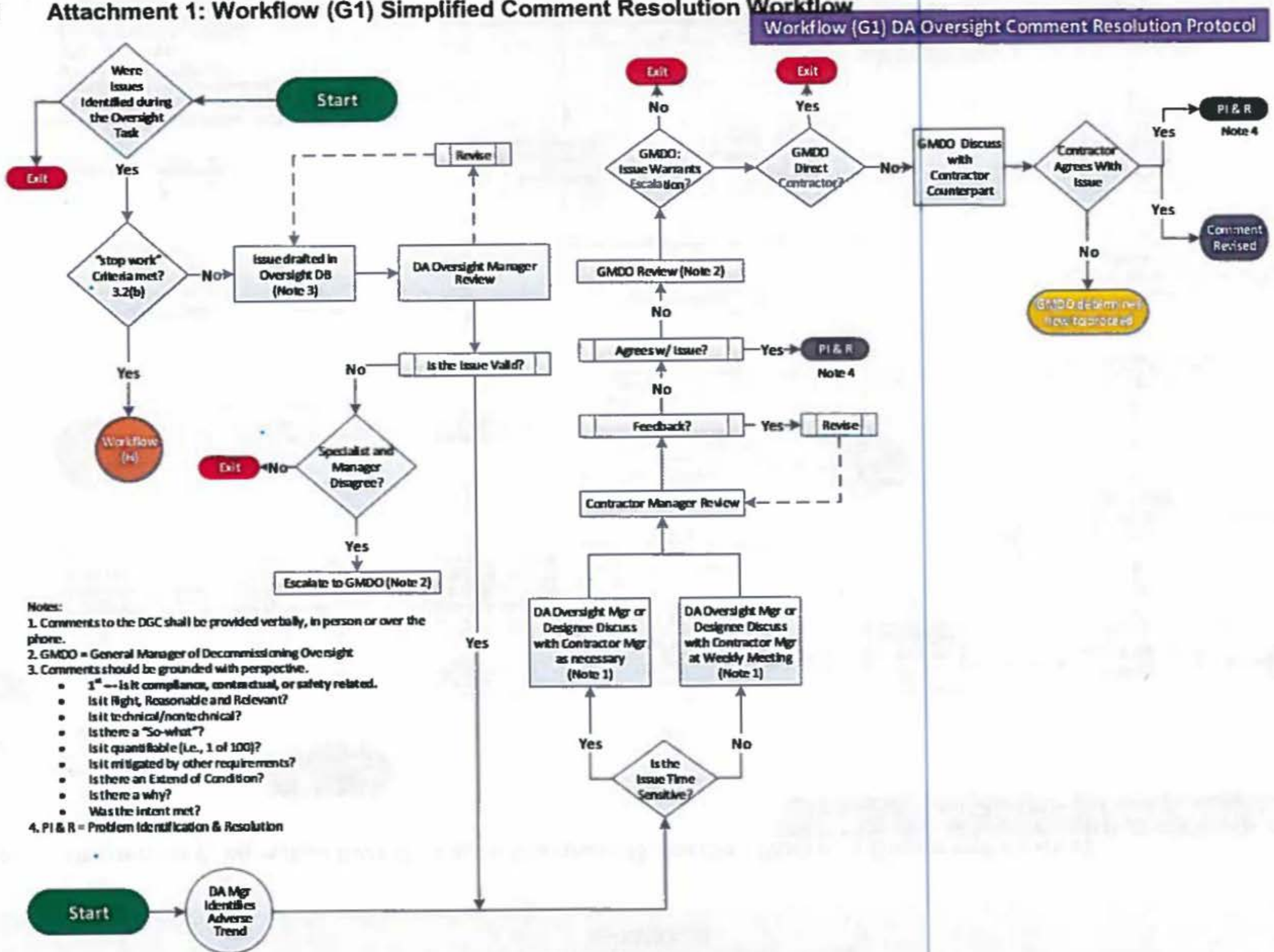
TERM	DEFINITION
Observation	DA Oversight task to assess safe and compliant Contractor work activities through observing the execution of work in-the-field, including associated briefs, staging, and setup.
Oversight Discipline Manager (OM)	(Direct Reports to GMDO) • Manager, Project Oversight • Manager, Radiation Protection and Waste • Manager, Project Controls • Manager, Construction Oversight • Manager, Scope Control (AER) • Contracts Manager • Manager, Integration & Oversight Process • Manager, Engineering Oversight
OM	Oversight Manager
OS	Oversight Specialist
Oversight Specialist	The individual responsible for conducting of DA Oversight activities.
Record Review	DA Oversight task used to examine recorded data and/or conditions related to Contractor contractual obligations. Unlike like document reviews, record reviews focus on the quality of the records of actual work performed instead of the quality of the procedure used to perform the work, and includes reviews to verify compliance with record retention requirements.
SONGS	San Onofre Nuclear Generating Station
Stop Work Criteria	As defined in the agreement between the DA and Contractor, the conditions and/or circumstances in which the DA can exercise its authority to stop Contractor work.

TERM	DEFINITION
Workflows	Workflow (A) Functional Area Assessment Workflow (B) Vertical Assessment Workflow (C) Oversight Tasks Workflow (D) Acceptance of Completed Work Workflow (E) Problem Investigation Critique Workflow (F) Change Order Request Review Workflow (G) Comment Resolution Workflow (H) Stop Work

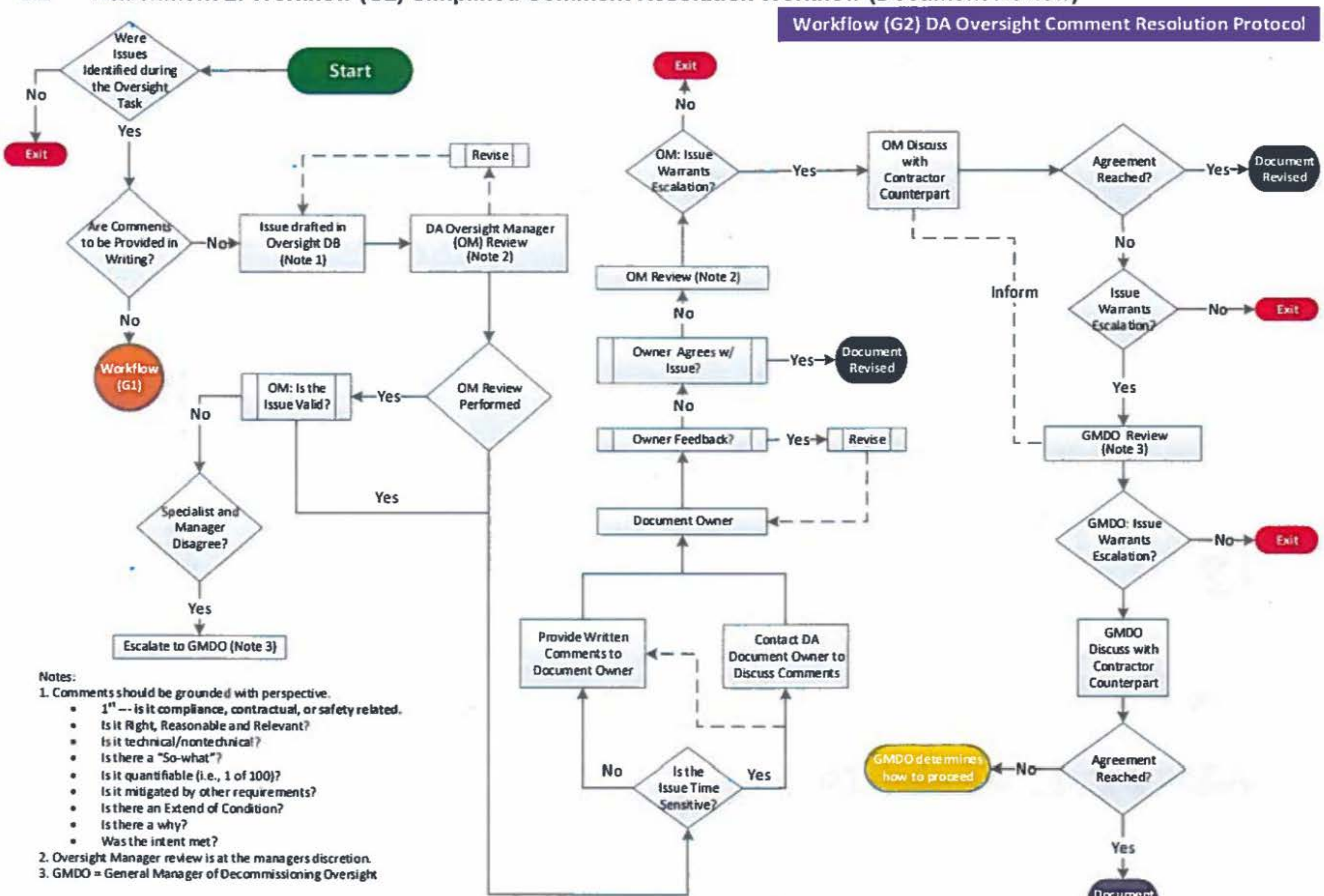
8.0 ATTACHMENTS

- Attachment 1: Workflow (G1) Simplified Comment Resolution
- Attachment 2: Workflow (G2) Simplified Comment Resolution (Document Review)
- Attachment 3: Document Review Standard
- Attachment 4: Relation Management
- Attachment 5: Influence Ladder
- Attachment 6: Comment Form (Example)
- Attachment 7: Written Comment Report (Example)

8.1 Attachment 1: Workflow (G1) Simplified Comment Resolution Workflow



8.2 Attachment 2: Workflow (G2) Simplified Comment Resolution Workflow (Document Review)



Notes:

1. Comments should be grounded with perspective.
   - 1st -- Is it compliance, contractual, or safety related.
   - Is it Right, Reasonable and Relevant?
   - Is it technical/nontechnical?
   - Is there a "So-what"?
   - Is it quantifiable (i.e., 1 of 100)?
   - Is it mitigated by other requirements?
   - Is there an Extend of Condition?
   - Is there a why?
   - Was the intent met?
2. Oversight Manager review is at the managers discretion.
3. GMDO = General Manager of Decommissioning Oversight

8.3 Attachment 3: Document Review Standard

Over-bearing	Standard	Leniency
Comments directive vs objective	Provide Concise Objective Comments	Comments are subjective vs objective
Narrowly interpret requirements without considering intent.	Confirm compliance based on review of source documents and objective understanding of intent.	Assume compliance based on contractor's word. "Not to worry. We know what we're doing."
Use of terms that are not relevant or poorly defined. Use of quantities that lack perspective or are irrelevant.	Define relevant terms in a clear standardized manner. Define quantified values.	Use of vague terms and values without definition or perspective.
Comments encompass all observed deficiencies, regardless of relevance.	Comments are relevant to successfully completing the work	Perform non-technical and cursory spot checks of documents. Assume contractor competence.
Review all source documents and references of reference (i.e., not a graded approach).	Selectively review source documents based on a graded approach (i.e., risk, critical steps)	Limit review to document provided without validating compliance with source documents & references.
Not accepting comment resolutions because they don't meet your personal standards for excellence.	Base acceptance of comment resolution on whether it complies with requirements.	Accept sub-par comment resolution in order to avoid confrontation and conflict.
Inflicting your will. You know best.	Listen and evaluate comments & their resolution on the merits.	Let the contractor live with the consequences.

8.4 Attachment 4: Relation Management

Earned Credibility and Respect

Isolated Environment	DA Organization	Part of the Contractor Team
Closed and missed communications.	Listen more than you speak. SDS keeps you informed of concerns.	Frequent personal non-work related communications.
SDS Defensive on Type "A" Comments.	SDS encourages feedback to incorporate management practices.	Employees reach out to you rather than asking their supervisor.
Hostile/sterile work environment. Defensiveness to feedback.	Their success is our success.	Forfeit independent oversight and accountability.
SDS employees do not own up to mistakes. Lack of candor.	RRR comments addressed with SDS management.	Failure to report trends because you do not want to offend the contractor.
SDS belief that DA adds no value.	SDS respects authority and understands why we are here.	Lost credibility/respect for oversight authority.
Reliant on DA for the project oversight.	SDS appreciates feedback and learns and improves while still demonstrating ownership.	Reliant on DA for the project oversight.

8.5 Attachment 5: Influence Ladder

Influence Ladder

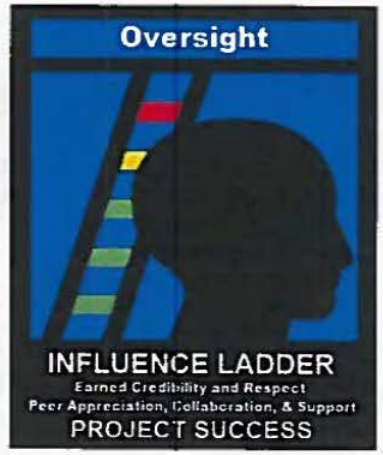
WHY IMPORTANT:

To focus attention on how to effectively interact with the Contractor and peers to ensure the following:

• Safety Adherence • Compliance with Requirements • Financial Stewardship

When:
Apply guidelines whenever interacting with the Contractor or your peers.

How:
Apply hierarchal order and general rules of influence during interactions:

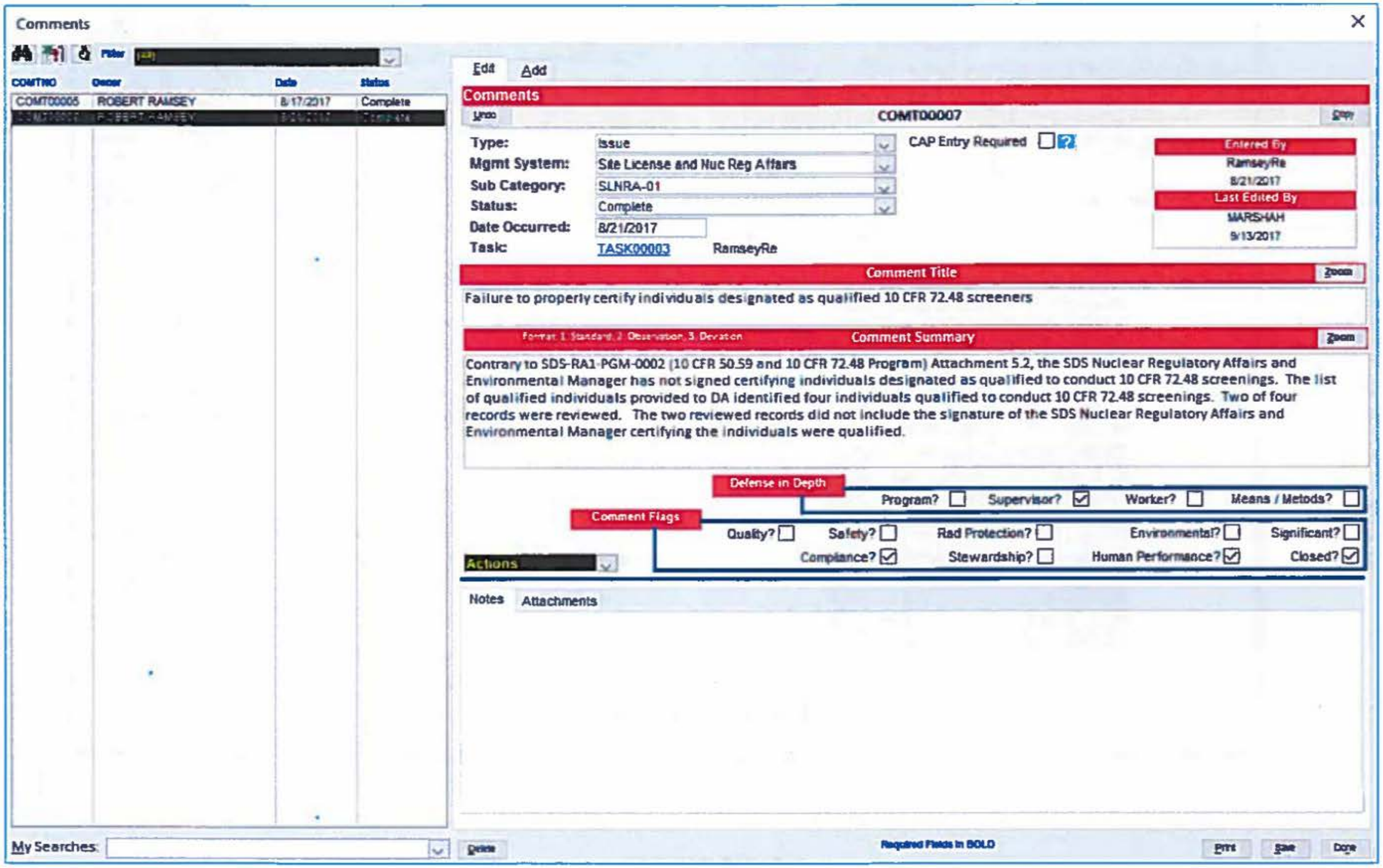


Stay in the Green

Coaching Tips:

1. Referent	**Power of Soft-Skills (5 E's):** Ethical, Engaging, Empowering, Example Setting, **Empathy**	• Referent power is built up over time by your perceived sincerity when applying the **5 E 's.**
2. Expert	Subject Matter **Expertise** — thorough understanding of OE, best practice, rules, procedures, and processes	• Never stop mastering your area of responsibly or the oversight craft. **KNOWLEDGE IS POWER and CREDIBILITY**
3. Reward	Convey your gratitude for support, and keep energy positive, value the opinion of others, **SMILE.**	• Simple Rewards: Attentive listening, acknowledge a person's concerns, letting a person save "face", or a Smile...
4. Legitimate	Authority derived by your Oversight Role: Legal Precedent (Snyder VS SCE) & Contractual	• Avoid the trap of "impatience" causing over reliance on your legitimate authority.
5. Coercive	Last resort, influence by evoking negative consequences. Example: Threatening to Stop Work.	• Practice STAR before using coercive influence to achieve compliance or to change behavior.

8.6 Attachment 6: Comment Form (Example)



8.7 Attachment 7: Written Comment Report (Example)

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

Southern California Edison
San Onofre Nuclear Generating Station
500 Pacific Coast Hwy
San Clemente, CA 926740128

~~Official Use Only~~

Written Comments Report TASK00459

Printed on 4/5/2017 : 8:48:02 AM

Task: Engineering doc review for ACW.

Comment Details

Comment No:	COMT00702	Entered	11/10/2016
Owner	JPM JPM	Last Edited	04/05/2017
Mgmt System:	Acceptance of Completed Work	Date Occurred:	11/10/2016

1. COMT00702	Comment Response
Title: Engineering deficiency discovered during DA review of Acceptance of Completed Work. Summary: Contrary to to 29 CFR 1910 and ASTM Standard D4532 the test method for respirable dust and silica in the Respiratory Protection Plan (RPP) used an outdated set of limitations regarding the maximum loading allowed on the filters used in the cyclone samplers. The RPP allowed 0.5 mg/m2 maximum loading which is greater than the 0.3 mg/m2 loading allowed by the ASTM standard.	

~~Official Use Only~~

4/5/2017 8:48:02 AM - Page 1 of 1

ISFSI Case Study

Read description in AR 0417-96039. Discuss with team members what the most appropriate response by the organization should have been.

Read response to Assignment 1. Discuss with team if it addressed the issue. If not, what else should have been done.

Read description in AR 0417-55905. Discuss with team members what the most appropriate response by the organization should have been.

Read response to Assignment 1. Discuss with team if it addressed the issue. If not, what else should have been done.

Read description in AR 0517-57100. Discuss with team members what the most appropriate response by the organization should have been.

Read response to Assignment 1. Discuss with team if it addressed the issue. If not, what else should have been done.

Read description and notes in AR 0917-74181. Based on information from previous ARs, would you concur with the initiator? If yes, what would it have taken to convince you otherwise? If no, what is the basis? Discuss with team members and come to consensus on organizational response.

Based on AR dates, response dates, and ISFSI Expansion Chronology, do responses meet the term "promptly" as intended in Criterion XVI?

Does section 2 of Management Evaluation of Rebar Installation and Inspection at SONGS clearly indicate what was done?

How does the new guidance in Decommissioning Agent Comment Resolution Desktop Guide G-XV93-06 address the issue?

SOUTHERN CALIFORNIA
EDISON

		AR Number:	0417 - 96039
Due Date:	--	**Status:**	Closed
Priority:	2-High	**Assigned To:**	Decom Project
Equipment Related:	No	**CAP Related:**	No /Sig Level 3/4/5
MRC Review:	Yes	**OPS CFH**	Yes

Description:

While performing an assessment of the rebar installed in Placement Area 3 of the ISFSI Top Pad the Assessor witnessed several personnel safety issues.
1. Rebar was lifted onto the top of the ISFSI by crane without sufficient spotting or warning requiring personnel alert to the movement to quickly move on rebar out of the path of the lifted load.
2. Contractor personnel moved a rubber tired air compressor trailer by himself, lifting by the tongue of the trailer, two other nearby individuals watched but offered no assistance, individual moving the trailer could not see a running generator behind trailer and ran into it stopping his movement.
3. Contractor working on tying rebar was next to a running power washer with no hearing protection when asked stated he had no hearing protection and went back to work. On egressing the ISFSI the Assessor past two individuals inside the Security building work are next a running generator without hearing protection, when coached one put in hearing protection and one left the area.

Assignments:

#	Type	Assigned To	Description	Due Date	Status
0417 - 96039 -1	Generic	(b)(7)(C)	Address reported safety conditions: While performing an assessment of the rebar installed in Placement Area 3 of the ISFSI Top Pad the Assessor witnessed several personnel safety issues. 1. Rebar was lifted onto the top of the ISFSI by crane without sufficient spotting or warning requiring personnel alert to the movement to quickly move on rebar out of the path of the lifted load. 2. Contractor personnel moved a rubber tired air compressor trailer by himself, lifting by the tongue of the trailer, two other nearby individuals watched but offered no assistance, individual moving the trailer could not see a running generator behind trailer and ran into it stopping his movement. 3. Contractor working on tying rebar was next to a running power washer with no hearing protection when asked stated he had no hearing protection and went back to work. On egressing the ISFSI the Assessor past two individuals inside the Security building work are next a running generator without hearing protection, when coached one put in hearing protection and one left the area.	2017-05-04	Closed

Equipments:

Equipment ID	Unit	FLOC	Description

Notes:

Notes	Added By	Date
This is a trending issue. Does not impact installed plant equipment. Not in scope per SO123-XV-50. No IOD/IFA generated.	(b)(7)(C)	2017-4-24
ADDITIONAL NOTE: Associated ARs: AR 0417-96039, AR 0417-55905, and AR 0517-57100 have the following note added, "The rebar issue associated AR 0417 -96039, AR 0417-55905, and AR 0517-57100 is addressed in Assignment 3 of AR 0917-74181 on pages 102 and 103 of the formal report uploaded in the Attachment Section." No further action required.		2017-11-29

Trend Codes:

Trend Code	Added By	Date
Industrial Safety -- [N-PSAFEI]	(b)(7)(C)	2017-4-25

Attachments:

No	Name	Notes

Date Created:	2017-04-24	**Created By:**	(b)(7)(C)

Logo		**Assignment Number:**	0417 - 96039 -1
AR Number:	0417 - 96039	**Due Date:**	2017-05-04
Current Status:	Closed	**Priority:**	3-Normal
Assignment Type:	Generic	**Category:**	--
Assigned To:	(b)(7)(C)	**Work Group:**	DecomProj
SDS Reference:	--	**Reference:**	--

Description of Work:

Address reported safety conditions:
While performing an assessment of the rebar installed in Placement Area 3 of the ISFSI Top Pad the Assessor witnessed several personnel safety issues.
1. Rebar was lifted onto the top of the ISFSI by crane without sufficient spotting or warning requiring personnel alert to the movement to quickly move on rebar out of the path of the lifted load.
2. Contractor personnel moved a rubber tired air compressor trailer by himself, lifting by the tongue of the trailer, two other nearby individuals watched but offered no assistance, individual moving the trailer could not see a running generator behind trailer and ran into it stopping his movement.
3. Contractor working on tying rebar was next to a running power washer with no hearing protection when asked stated he had no hearing protection and went back to work. On egressing the ISFSI the Assessor past two individuals inside the Security building work are next a running generator without hearing protection, when coached one put in hearing protection and one left the area.

Notes:

Notes	Added By	Date
The information was reported by NOD on 4/24/17 about the potential safety violations. This information was communicated to the Holtec Construction Manager on 4/24/17 to address with personnel in the field. The construction manager interviewed the craft to get feedback on the potential safety violations witnessed. In addition, the Construction Manager interviewed the NOD personnel that witnessed the issues. The Construction Manager used the information to communicate with the craft during the morning pre-job brief about expectations for safety. In addition, Holtec has instituted a safety program to reward craft that go above and beyond the minimum requirements for safety on the project. Monitoring of the Holtec safety performance was ongoing in May in which the project experienced the best month in positive observations and the lowest number of negative observations.	(b)(7)(C)	2017-6-19

Attachments:

No	Name	Notes

Date Created:	2017-04-25	**Created By:**	(b)(7)(C)

SOUTHERN CALIFORNIA **EDISON**

		AR Number:	0417 - 55905
Due Date:	--	**Status:**	Closed
Priority:	2-High	**Assigned To:**	Decom Project
Equipment Related:	No	**CAP Related:**	No /Sig Level 3/4/5
MRC Review:	Yes	**OPS CFH**	Yes

Description:

During the performance of an assessment of the rebar in a portion of Placement #3 area of the ISFSI Top Pad using HPP-2464-102, Rebar Placement and Inspection Procedure for San Onofre Nuclear Generating Station (SCE), Exhibit 9.1, Installation Critical Attribute Sign-Off Sheet for UMAX ISFSI Pad Rebar, the following three technical issues were identified (numbering is from the NOD assessment report).
7 Ensure #11 rebar is installed w/ 8'-11" lap (minimum)
Several locations were measured to verify that the Lap Splices were installed on the 8'-11" (107") minimum. One location was noted as being ½" less than the 107". HPP-2464-102, Rebar Placement and Inspection Procedure for San Onofre Nuclear Generating Station (SCE) references; Holtec Report, HI-2146389, San Onofre Nuclear Generating Station Construction Specifications, which in turn references; ACI 117-10, Specification for Tolerances for Concrete Construction and Materials. ACI 117-10 Section 2, Materials, Specification 2.2.8, Embedded length of bars and length of bar laps, allows a (-1") tolerance for #11 rebar. By the referenced code the Lap Splice picture above is within tolerance; however the does not show this tolerance and the procedure shows 8'-11" as a minimum with no tolerance. The difference in the Lap Splice between the ACI 117-10 and the procedure HPP-2464-102 needs to be addressed.
19 Ensure the tail of #11 bent rebar (all side faces) does not infringe upon the cover of the opposing mat (e.g. ensure tail of bar from bottom mat doesn't extend beyond the top of the top mat and vice-versa).
After looking at several location there were no examples of infringement on the bottom mat noted; however, on the upper mat there were locations where the tail of the bar from the bottom mat extended beyond the top mat.
23 Confirm that tie wire is installed per the plans and specifications at no less than 50% of the intersections.
Several locations were identified where there was less than 50% of the rebar intersections tied.

Assignments:

#	Type	Assigned To	Description	Due Date	Status
0417 - 55905 -1	Generic	(b)(7)(C)	Evaluate NOD observations and assure corrective actions taken to address conditions reported: During the performance of an assessment of the rebar in a portion of Placement #3 area of the ISFSI Top Pad using HPP-2464-102, Rebar Placement and Inspection Procedure for San Onofre Nuclear Generating Station (SCE), Exhibit 9.1, Installation Critical Attribute Sign-Off Sheet for UMAX ISFSI Pad Rebar, the following three technical issues were identified (numbering is from the NOD assessment report). 7 Ensure #11 rebar is installed w/ 8'-11" lap (minimum) Several locations were measured to verify that the Lap Splices were installed on the 8'-11" (107") minimum. One location was noted as being ½" less than the 107". HPP-2464-102, Rebar Placement and Inspection Procedure for San Onofre Nuclear Generating Station (SCE) references; Holtec Report, HI-2146389, San Onofre Nuclear Generating Station Construction Specifications, which in turn references; ACI 117-10, Specification for Tolerances for Concrete Construction and Materials. ACI 117-10 Section 2, Materials, Specification 2.2.8, Embedded length of bars and length of bar laps, allows a (-1") tolerance for #11 rebar. By the referenced code the Lap Splice picture above is within tolerance; however the does not show this tolerance and the procedure shows 8'-11" as a minimum with no tolerance. The difference in the Lap Splice between the ACI 117-10 and the procedure HPP-2464-102 needs to be addressed. 19 Ensure the tail of #11 bent rebar (all side faces) does not infringe upon the cover of the opposing mat (e.g. ensure tail of bar from bottom mat doesn't extend beyond the top of the top mat and vice-versa). After looking at several location there were no examples of infringement on the bottom mat noted; however, on the upper mat there were locations where the tail of the bar from the bottom mat extended beyond the top mat. 23 Confirm that tie wire is installed per the plans and specifications at no less than 50% of the intersections. Several locations were identified where there was less than 50% of the rebar intersections tied.	2017-05-04	Closed

Equipments:

Equipment ID	Unit	FLOC	Description

Notes:

Notes	Added By	Date
This AR documents issues on structures that are not turned over to SONGS. No IFA required. T Cusick SM	(b)(7)(C)	2017-4-25

PI CAPCO Note: System/Structure not turned over to SCE. CAP	(b)(7)(C)	2017-5-2
ADDITIONAL NOTE: Associated ARs: AR 0417-96039, AR 0417-55905, and AR 0517-57100 have the following note added, "The rebar issue associated AR 0417-96039, AR 0417-55905, and AR 0517-57100 is addressed in Assignment 3 of AR 0917-74181 on pages 102 and 103 of the formal report uploaded in the Attachment Section." No further action required.		2017-11-29

Trend Codes:

Trend Code	Added By	Date
Decommissioning Contractors - Holtec -- [N-PCONT02]	(b)(7)(C)	2017-4-26
ISFSI - Construction -- [SYS04]		2017-4-26

Attachments:

No	Name	Notes

Date Created:	2017-04-25	**Created By:**	(b)(7)(C)

Logo		Assignment Number:	0417 - 55905 -1
AR Number:	0417 - 55905	Due Date:	2017-05-04
Current Status:	Closed	Priority:	2-High
Assignment Type:	Generic	Category:	--
Assigned To:	(b)(7)(C)	Work Group:	DecomProj
SDS Reference:	--	Reference:	--

Description of Work:

Evaluate
NOD observations and assure corrective actions taken to address conditions reported: During the performance of an assessment of the rebar in a portion of Placement #3 area of the ISFSI Top Pad using HPP-2464-102, Rebar Placement and Inspection Procedure for San Onofre Nuclear Generating Station (SCE), Exhibit 9.1, Installation Critical Attribute Sign-Off Sheet for UMAX ISFSI Pad Rebar, the following three technical issues were identified (numbering is from the NOD assessment report). 7 Ensure #11 rebar is installed w/ 8'-11" lap (minimum) Several locations were measured to verify that the Lap Splices were installed on the 8'-11" (107") minimum. One location was noted as being ½" less than the 107". HPP-2464-102, Rebar Placement and Inspection Procedure for San Onofre Nuclear Generating Station (SCE) references; Holtec Report, HI-2146389, San Onofre Nuclear Generating Station Construction Specifications, which in turn references; ACI 117-10, Specification for Tolerances for Concrete Construction and Materials. ACI 117-10 Section 2, Materials, Specification 2.2.8, Embedded length of bars and length of bar laps, allows a (-1") tolerance for #11 rebar. By the referenced code the Lap Splice picture above is within tolerance; however the does not show this tolerance and the procedure shows 8'-11" as a minimum with no tolerance. The difference in the Lap Splice between the ACI 117-10 and the procedure HPP-2464-102 needs to be addressed. 19 Ensure the tail of #11 bent rebar (all side faces) does not infringe upon the cover of the opposing mat (e.g. ensure tail of bar from bottom mat doesn't extend beyond the top of the top mat and vice-versa). After looking at several location there were no examples of infringement on the bottom mat noted; however, on the upper mat there were locations where the tail of the bar from the bottom mat extended beyond the top mat. 23 Confirm that tie wire is installed per the plans and specifications at no less than 50% of the intersections. Several locations were identified where there was less than 50% of the rebar intersections tied.

Notes:

Notes	Added By	Date
The inspection performed by NOD was prior to final inspection and acceptance by Holtec QC. The issues found and communicated by NOD were incorporated into the ongoing inspections on the afternoon of 4/24/17 and the morning of 4/25/17. Holtec QC completed 100% inspection of steps 7 (Rebar lap), 19 (tails/clear cover), 23 (50% ties) of Exhibit 9.1 from procedure HPP-2462-102 prior to placement of concrete on 4/25/17. The attached Exhibit 9.1 shows QC acceptance of the rebar on 4/25/17 prior to the placement of concrete. Additionally, a witness statement from the Holtec QC is attached indicating he performed 100% inspection as indicated on Exhibit 9.1. Further verification there were no issues with the rebar were confirmed by the Holtec Construction Manager and an SCE oversight specialist that performed 100% verification the areas of issue were in compliance with the requirements. There statements are included in the attachment. The issues was resolved prior to the placement and no additional issues exist related to placement #3 concerning the rebar inspection.	(b)(7)(C)	2017-5-18

Attachments:

No	Name	Notes
1	Exhibit 9.1 placement 3 final sign off record.pdf	
2	Witness statements for rebar inspection on placement 3.pdf	

Date Created:	2017-04-26	Created By:	(b)(7)(C)

SOUTHERN CALIFORNIA EDISON		**AR Number:**	0517 - 57100
Due Date:	--	**Status:**	Closed
Priority:	3-Normal	**Assigned To:**	Decom Project
Equipment Related:	No	**CAP Related:**	No /Sig Level 3/4/5
MRC Review:	Yes	**OPS CFH**	Yes

Description:

Nuclear Oversight Division performed an inspection of the rebar on 4/24/17 prior to placement #3 of the ISFSI top slab (on 4/25/17). NOD wrote AR 0417-55905 as part of some issues identified with the rebar. Another issue identified by NOD after the inspection and placement was a concern over Holtec procedure HPP-2464-102 "Rebar Placement and Inspection Procedure for San Onofre Nuclear Generating Station (SCE)." Exhibit 9.1 of the procedure requires inspection of 39 individual attributes for the rebar by Holtec QC. Exhibit 9.13, "Field Inspection Location Data & Sampling Plan for the ISFSI Pad Rebar," allows QC to determine and document the number of inspection locations for the planned placement. NOD was particularly concerned that Exhibit 9.13 gives the impression all of the inspection points are performed on the day annotated by the signature and date blocks. In the case of placement #3, there were 13728 point inspected among the 39 attributes in Exhibit 9.1. It would not be physically possible for 1 person to perform all of these inspections on 4/25/17, the day of the concrete placement.

~~Recommendation: Generate an assignment to George Munger to address this concern~~

Assignments:

#	Type	Assigned To	Description	Due Date	Status
0517 - 57100 -1	Generic	(b)(7)(C)	Provide response to issue highlighted by NOD about Holtec Procedure HPP-2464-102 regarding rebar inspections.	2017-06-08	Closed

Equipments:

Equipment ID	Unit	FLOC	Description

Notes:

Notes	Added By	Date
The fuel storage system is currently under construction, and no fuel is stored there at this time. The concerns of this AR are currently programmatic and administrative in nature. This is not a tech spec, LCS, FP-1, EP, or ODCM equipment affecting condition. Screens out of the OD program per SO123-XV-50. Chuck Jacobs	(b)(7)(C)	2017-5-22
ADDITIONAL NOTE: Associated ARs: AR 0417-96039, AR 0417-55905, and AR 0517-57100 have the following note added, "The rebar issue associated AR 0417-96039, AR 0417-55905, and AR 0517-57100 is addressed in Assignment 3 of AR 0917-74181 on pages 102 and 103 of the formal report uploaded in the Attachment Section." No further action required.		2017-11-29

Trend Codes:

Trend Code	Added By	Date
Decommissioning Contractors - Holtec -- [N-PCONT02]	(b)(7)(C)	2017-5-23
ISFSI - Construction -- [SYS04]		2017-5-23

Attachments:

No	Name	Notes

Date Created:	2017-05-22	**Created By:**	(b)(7)(C)

Logo		**Assignment Number:**	0517 - 57100 -1
AR Number:	0517 - 57100	**Due Date:**	2017-06-08
Current Status:	Closed	**Priority:**	3-Normal
Assignment Type:	Generic	**Category:**	--
Assigned To:	(b)(7)(C)	**Work Group:**	DecomProj
SDS Reference:	--	**Reference:**	--

Description of Work:

Provide response to issue highlighted by NOD about Holtec Procedure HPP-2464-102 regarding rebar inspections.

Notes:

Notes	Added By	Date
Provide response to issue highlighted by NOD about Holtec Procedure HPP-2464-102 regarding rebar inspections.	(b)(7)(C)	2017-5-22
The Holtec procedure, HPP-2464-102, provides a location in exhibit 9.1for Holtec QC to sign and date when a critical attribute has been inspected. NOD is concerned that the procedure gives the impression all inspections were performed on the day that QC signed the document. In reality, Holtec's QC performs the inspections over several days during the rebar installation process. Holtec's QC may actually complete inspection of an attribute prior to the sign-off date and then the act of signing exhibit 9.1 signifies acceptance of the rebar installation as having met the requirements. As an example, prior to placement #4 on 5/3/17, Holtec's QC performed inspections on several dates. The attached document provides the notes used during the inspections. The inspector performed his initial inspections prior to 4/27 and found several issues as indicated by the "X" marks next to the attributes on the page. On 4/27 (dated at top of the document), he followed up with an additional inspection and found some issued resolved, but not all of them. He performed a follow-up check on 5/2 (dated at top of the document) and found all issues resolved as noted with the "OK". Final inspection was completed on 5/3 for items such as cleanliness prior to final sign-off of the document and acceptance of the rebar placement. The notes for placement #3 were disposed of prior to the authoring of this AR so they were not available as objective evidence of the inspections completed for placement #3. Also attached to this AR are the completed placement #3 and #4 exhibits.		2017-5-24

Attachments:

No	Name	Notes
1	Exhibit 9.1 placement 4 notes.pdf	
2	Exhibit 9.1 placement 4 final sign off record.pdf	
3	Exhibit 9.1 placement 3 final sign off record.pdf	

Date Created:	2017-05-22	**Created By:**	(b)(7)(C)

SOUTHERN CALIFORNIA EDISON		AR Number:	0917 - 74181
Due Date:	--	**Status:**	Closed
Priority:	3-Normal	**Assigned To:**	Decom Project
Equipment Related:	No	**CAP Related:**	No /Sig Level 3/4/5
MRC Review:	Yes	**OPS CFH**	Yes

Description:

Closure of Action Requests (ARs) 0417-55905 for ISFSI Top Pad Rebar installation and 0517-57100 for ISFSI QC Inspections were inadequate.

Issue 1 - AR 0417-55905
AR 0417-55905 cited three examples where rebar was found to be installed not in accordance with the design.

Issue 2 - AR 0517-57100
AR 0517-57100, written by the ISFSI Project Manager, cited the NOD concern with Holtec procedure, HPP-2464-102, Rebar Placement and Inspection Procedure for San Onofre Nuclear Generating Station, Exhibit 9.1, which showed the inspection of 39 individual attributes for the rebar in over 26,000 locations for the ISFSI Top Pad on 4/25/2017.

Further Information is contained in the attached Notes.

Assignments:

#	Type	Assigned To	Description	Due Date	Status
0917 - 74181 -1	Generic	(b)(7)(C)	Evaluate NOD observation and take action as appropriate.	2017-10-04	Closed
0917 - 74181 -2	Generic		Present evaluation of NOD observation at the 10/5/17 MRC.	2017-10-05	Closed
0917 - 74181 -3	Generic		Provide Management Evaluation of Rebar Installation and Inspections at SONGS.	2017-11-29	Closed

Equipments:

Equipment ID	Unit	FLOC	Description

Notes:

Notes	Added By	Date
Issue 1 - AR 0417-55905 AR 0417-55905 cited three examples where rebar was found to be installed not in accordance with the design. The response to the AR stated: "The inspection performed by NOD was prior to final inspection and acceptance by Holtec QC. The issues found and communicated by NOD were incorporated into the ongoing inspections on the afternoon of 4/24/17 and the morning of 4/25/17. Holtec QC completed 100% inspection of steps 7 (Rebar lap), 19 (tails/clear cover), 23 (50% ties) of Exhibit 9.1 from procedure HPP-2462-102 prior to placement of concrete on 4/25/17." This does not address any of the three issues but refutes them based on a QC Inspector performing over 26,000 inspections in a few hours and not identifying the assessor's findings even though photographs were provided. The response continued: "The attached Exhibit 9.1 shows QC acceptance of the rebar on 4/25/17 prior to the placement of concrete. Additionally, a witness statement from the Holtec QC is attached indicating he performed 100% inspection as indicated on Exhibit 9.1." The attached Exhibit 9.1 shows all signatures for the approximately 26,000 inspections signed off on 4/25/17. Conservatively, work commences on the ISFSI project at 6:00am and the concrete pour began between 7:00am and 9:00am. Therefore, best estimate would have given the inspector 3 hours to complete the 26,000 inspections or 2.4 inspections per second. Assuming the final inspections were performed the pervious afternoon after the assessor's issues were identified, as stated in the attached affidavits, with a conservative time of 8 hours that would require inspection of .9 locations per second. The response continues: "Further verification there were no issues with the rebar were confirmed by the Holtec Construction Manager and an SCE oversight specialist that performed 100% verification the areas of issue were in compliance with the requirements. There statements are included in the attachment. The issues was resolved prior to the placement and no additional issues exist related to placement #3 concerning the rebar inspection." The final to affidavits attest to the QC inspector performing 100% inspection of rebar locations yet no field notes of the QC inspector's finding could be located and provided. No field notes of any previous QC rebar inspections, for top pad pours 1 or 2 or for any of the bottom support pad were provided as objective evidence of the work being performed. Issue 2 - AR 0517-57100 AR 0517-57100, written by the ISFSI Project Manager, cited the NOD concern with Holtec procedure, HPP-2464-102, -Rebar Placement and Inspection Procedure for San Onofre Nuclear Generating Station, Exhibit 9.1, requiring inspection of 39 individual attributes for the rebar for the ISFSI Top Pad by Holtec on 4/25/2017.The response states: "The Holtec procedure, HPP-2464-102, provides a location in exhibit 9.1 for Holtec QC to sign and date when a critical attribute has been inspected. NOD is concerned that the procedure gives the impression all inspections were performed on the day that QC signed the document." This is a fair restatement of the issue; however, the response continues: "In reality, Holtec's QC performs the inspections over several days during the rebar installation process. Holtec's QC may actually complete inspection of an attribute prior to the sign-off date and then the act of signing exhibit 9.1 signifies acceptance of the rebar installation as having met the requirements. As an example, prior to placement #4 on 5/3/17, Holtec's QC performed inspections on several dates. The attached document provides the notes used during the inspections. The inspector performed his initial inspections prior to 4/27 and found several issues as indicated by the "X" marks next to the attributes on the page. On 4/27 (dated at top of the document), he followed up with an additional inspection and found some issued resolved, but not all of them. He performed a follow-up check on 5/2 (dated at top of the document) and found all issues resolved as noted with the "OK". Final inspection was completed on 5/3 for items such as cleanliness prior to final sign-off of the	(b)(7)(C)	2017-9-25

document and acceptance of the rebar placement." The Exhibit 9.1 for the rebar in section #4 does in fact have the 4/27/17 and 5/2/17 written on the top of the page; however, none of the specific attributes has a date or initials of the QC inspector showing when it was inspected or re-inspected. There is no legend or explanation as to what the "X" indicates nor the locations and numbers of items to be corrected. The response continues: "The notes for placement #3 were disposed of prior to the authoring of this AR so they were not available as objective evidence of the inspections completed for placement #3. Also attached to this AR are the completed placement #3 and #4 exhibits." If the notes were disposed of for placement #3, what about placement #1 and #2, or any of the other QC inspections that were performed for the ISFSI. Finally, why wasn't better care taken to clearly document the inspections performed on placement #4 after the issues on placement #3 had been identified?		
This AR documents issues on structures that are not turned over to SONGS. No IFA required. Chuck Jacobs	(b)(7)(C)	2017-9-25
ADDITIONAL NOTE: Associated ARs: AR 0417-96039, AR 0417-55905, and AR 0517-57100 have the following note added, "The rebar issue associated AR 0417-96039, AR 0417-55905, and AR 0517-57100 is addressed in Assignment 3 of AR 0917-74181 on pages 102 and 103 of the formal report uploaded in the Attachment Section." No further action required.		2017-11-29

Trend Codes:

Trend Code	Added By	Date
P-Contractor (Decommissioning)	(b)(7)(C)	2017-9-27
P-ISFSI		2017-9-27
P-Corrective Action Program		2017-9-27

Attachments:

No	Name	Notes

Date Created:	2017-09-25	**Created By:**	(b)(7)(C)

Logo		**Assignment Number:**	0917 - 74181 -1
AR Number:	0917 - 74181	**Due Date:**	2017-10-04
Current Status:	Closed	**Priority:**	3-Normal
Assignment Type:	Generic	**Category:**	--
Assigned To:	(b)(7)(C)	**Work Group:**	Decom Project
SDS Reference:	--	**Reference:**	--

Description of Work:

Evaluate NOD observation and take action as appropriate.

Notes:

Notes	Added By	Date
Assignment #1 is hereby closed to the formal, "MANAGEMENT EVALUATION OF REBAR INSTALLATION AND INSPECTIONS AT SONGS" response uploaded to Assignment 3.	(b)(7)(C)	2017-11-29

Attachments:

No	Name	Notes

Date Created:	2017-09-29	**Created By:**	(b)(7)(C)

Logo		**Assignment Number:**	0917 - 74181 - 2
AR Number:	0917 - 74181	**Due Date:**	2017-10-05
Current Status:	Closed	**Priority:**	3-Normal
Assignment Type:	Generic	**Category:**	--
Assigned To:	(b)(7)(C)	**Work Group:**	Decom Project
SDS Reference:	--	**Reference:**	--

Description of Work:

Present evaluation of NOD observation at the 10/5/17 MRC.

Notes:

Notes	Added By	Date

Attachments:

No	Name	Notes
1	2017-10-05 MRC Agenda - ISFSI NOD Observation.pdf	October 5, 2017 MRC Agenda Item #1 - ISFSI PM address NOD Issues

Date Created:	2017-09-29	**Created By:**	(b)(7)(C)

Decommissioning
San Onofre
Nuclear Generating Station

Management Review Committee

Time: 07:15hrs **Date: 10/5/17** **Location: D-1**

SAN ONOFRE NUCLEAR GENERATING STATION

Purpose of Meeting & Expected Outcome(s)::

The purpose of the MRC is to review, challenge and provide comments to Action Requests, Cause Evaluations and Human Performance events. The expected outcome is to identify areas of concern for further evaluation, as well as to approve Cause Evaluations and administrative documents as required by SO123-XV-50 (CAP Program).

MRC MEETING – The MRC shall meet as required per SO123-XV-50

Requirements for Every Meeting:

1. No texting or laptop computing during MRC, exception is portable device used to access MRC documents.
2. Verify quorum, (Per SO123-XV-50 Att. 2, 2.6.1.1 "…minimum of 4 members" from organizations.)
3. Take two for Safety
4. Attendance record
5. SO123-XV-50 available for review
6. Carry-over discussions from previous meeting

Expectations when presenting LLEIs to MRC or documenting vendor issues:

1. Present LLEIs in simple format: Problem Statement, Interim Action, Cause(s), Corrective Action(s),
2. Identify Lessons Learned from LLEI discussed in Item #1 above,
3. SONGS initiated ARs for vendor issues remain open until vendor action or cause evaluation is complete,
4. LLEI Due Date Extensions require Manager Approval and basis added to AR Assignment.

Carry over discussions, actions, or emergent issue since prior MRC

Item	Topic	Who	MRC Date
1	ISFSI PM to evaluate NOD observation and take action as appropriate	R. Munger	10/5/2017
2	SDS CAP to come to MRC, update status on response to VA door violation.	Steve Mannon	10/12/2017

#	Topic	Who	Expected Outcome
1	Corrective Action Program (CAP) 50 Day Lookahead.	J. Carey	Identify late or non-conforming CE/CAs
2	Management Review Committee Report.	J. Carey	Challenge Sig-Level NN content & Cause

ISFSI Expansion Top Pad Rebar and Holtec QC Issues Chronology

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4/24/17 Approximately 1:30pm NOD Assessor completed assessment of ISFSI Top Pad Rebar for Placement #3

Identified the following technical issues:

- One Lap Splice was photographed being out of tolerance 106.5" (107" -0")
- Several pieces upward bent rebar photographed above top of the mat.
- Several locations photographed with less than 50% install tie wires.

4/24/17 Approximately 1:45pm issues were discussed with SCE Project personnel

4/24/17 Approximately 3:30pm issues and picture shared with SCE Project personnel via email.

4/25/17 Approximately 7:30am NOD assessor Observed concrete being poured in Placement #3 area.

4/25/17 AR 0417-550905, Technical Issues with Rebar installation in Placement #3 Area was created.

4/25/17 Assessment Report 394 issued by NOD.

4/25/17 note on AR 0417-550905: This AR documents issues on structures that are not turned over to SONGS. No IFA required. (b)(7)(C)

4/26/17 Action #1 assigned to AR 0417-550905, assigned to (b)(7)(C) to evaluate NOD observations

4/26/17 2:09pm email from (b)(7)(C) to (b)(7)(C) providing QC checklist for closure of issues.

QC Inspection showed that all 39 inspection criteria were signed off as complete on 4/25/2017. The QC inspection also noted that there were 13,728 locations of the bottom grid and 13,728 locations on the top grid both showed that 100% inspection was performed and was signed off on 4/25/2017.

4/26/17 Approximately 3:00pm discussed inadequate response with (b)(7)(C) as checklist did not address the three technical issues identified in AR 0417-55905.

4/26/17 Approximately 4:00pm, briefly described issues to (b)(7)(C)

4/27/17 Approximately 9:00am met with (b)(7)(C), asked when pour started on 4/25/17. (b)(7)(C) stated it 7:07am after looking at his phone. Set up a meeting at 12:00pm.

4/27/17 12:00pm (b)(7)(C) met with (b)(7)(C) and (b)(7)(C) (SCE-Project). Assessors were told concrete was not poured until 9:00am and that SCE-Projects witnessed Holtec QC performed the inspections and that all locations (~26,000) were inspected not just a sample. Stated inspections were performed over time and just signed off on 4/25/27 and findings were documented on field

Responsible functional area

notes. (b)(7)(C) requested to see field notes was told they would get them to him.

5/2/17 AR 0417-55905 Note: PI CAPCO Note: System/Structure not turned over to SCE. CAP, (b)(7)(C)

5/3/17 Concrete Placement #4 was performed.

5/16/17 11:20am (b)(7)(C) had a meeting in (b)(7)(C) office to discuss the closure of AR 0417-55905. (b)(7)(C) (NOD) was also in attendance. Produced affidavits from (b)(7)(C) (SCE Project Oversight) (b)(7)(C) (Holtec Project Management) and (b)(7)(C) (Holtec QC) all affirming that the inspection took place over a period of time and not at the date signed in Exhibit 9.1. (b)(7)(C) stated that the documentation was in the daily field notes of (b)(7)(C). These notes were requested but were not provided. (b)(7)(C) asked if (b)(7)(C) was satisfied with the documentation (b)(7)(C) stated, "no," and the meeting concluded.

5/16/17 1:05pm met with (b)(7)(C) and (b)(7)(C) and relied the previous conversation with (b)(7)(C). (b)(7)(C) stated that he fully expected Decommissioning project to initiate an AR or FCR on the issue and resolve the problem. He requested that I schedule a meeting as soon as possible with (b)(7) (b)(7)(C) and (b)(7)(C).

5/16/17 4:00pm meeting with (b)(7)(C) to discuss the issues. (b)(7)(C) stated that these issues would be addressed at project closeout and as the ISFSI had not been turned over to SCE it was a Holtec issue to address. Conclusion of the meeting was to address the three technical issues from an engineering standpoint and review other QC inspections for field notes.

5/18/17 AR 0417-55905 was closed with the following note:

"The inspection performed by NOD was prior to final inspection and acceptance by Holtec QC. The issues found and communicated by NOD were incorporated into the ongoing inspections on the afternoon of 4/24/17 and the morning of 4/25/17. Holtec QC completed 100% inspection of steps 7 (Rebar lap), 19 (tails/clear cover), 23 (50% ties) of Exhibit 9.1 from procedure HPP-2462-102 prior to placement of concrete on 4/25/17. The attached Exhibit 9.1 shows QC acceptance of the rebar on 4/25/17 prior to the placement of concrete. Additionally, a witness statement from the Holtec QC is attached indicating he performed 100% inspection as indicated on Exhibit 9.1. Further verification there were no issues with the rebar were confirmed by the Holtec Construction Manager and an SCE oversight specialist that performed 100% verification the areas of issue were in compliance with the requirements. These statements are included in the attachment. The issues were resolved prior to the placement and no additional issues exist related to placement #3 concerning the rebar inspection."

Three statements were attached and the completed Exhibit 9.1 showing all inspections completed on 4/25/17.

5/22/17 AR 0517-57100 was issued by the ISFSI Project Manager stating:

Nuclear Oversight Division performed an inspection of the rebar on 4/24/17 prior to placement #3 of the ISFSI top slab (on 4/25/17). NOD wrote AR 0417-55905 as part of some issues identified with the rebar. Another issue identified by NOD after the inspection and placement was a concern over Holtec procedure HPP-2464-102 "Rebar Placement and Inspection Procedure for San Onofre Nuclear Generating Station (SCE)." Exhibit 9.1 of the procedure requires inspection of 39 individual attributes for the rebar by Holtec QC. Exhibit 9.13, "Field Inspection Location Data & Sampling Plan for the ISFSI Pad Rebar," allows QC to determine and document the number of inspection locations for the planned placement. NOD was particularly concerned that Exhibit 9.13 gives the impression all of the inspection points are performed on the day annotated by the signature and date blocks. In the case of placement #3, there were 13728 point inspected among the 39 attributes in Exhibit 9.1. It would not be physically possible for 1 person to perform all of these inspections on 4/25/17, the day of the concrete placement.

5/22/17 Assessment Report 397 was issued documenting the meetings held on the rebar issues and addressing the QC inspection issue.

5/22/17 AR 0517-57100 Note: The fuel storage system is currently under construction, and no fuel is stored there at this time. The concerns of this AR are currently programmatic and administrative in nature. This is not a tech spec, LCS, FP-1, EP, or ODCM equipment affecting condition. Screens out of the OD program per SO123-XV-50. (b)(7)(C)

5/24/17 AR 0517-57100 was closed with the following statement:

The Holtec procedure, HPP-2464-102, provides a location in exhibit 9.1for Holtec QC to sign and date when a critical attribute has been inspected. NOD is concerned that the procedure gives the impression all inspections were performed on the day that QC signed the document. In reality, Holtec's QC performs the inspections over several days during the rebar installation process. Holtec's QC may actually complete inspection of an attribute prior to the sign-off date and then the act of signing exhibit 9.1 signifies acceptance of the rebar installation as having met the requirements. As an example, prior to placement #4 on 5/3/17, Holtec's QC performed inspections on several dates. The attached document provides the notes used during the inspections. The inspector performed his initial inspections prior to 4/27 and found several issues as indicated by the "X" marks next to the attributes on the page. On 4/27 (dated at top of the document), he followed up with an additional inspection and found some issues resolved, but not all of them. He performed a follow-up check on 5/2 (dated at top of the document) and found all issues resolved as noted with the "OK". Final inspection was completed on 5/3 for items such as cleanliness prior to final sign-off of the document and acceptance of the rebar placement. The notes for placement #3 were disposed of prior to the authoring of this AR so they were not available as objective evidence of the inspections completed for

placement #3. Also attached to this AR are the completed placement #3 and #4 exhibits.

Response contained no engineering evaluations nor review of past Holtec QC records for field notes showing evidence of the performance of full QC inspections.

09/18/17 Nuclear Oversight Board Visit to SONGS

9/25/17 AR 0917-74181 was initiated because closure of Action Requests (ARs) 0417-55905 for ISFSI Top Pad Rebar installation and 0517-57100 for ISFSI QC Inspections were inadequate.

10/05/17 Assignment 2 Present Issue to MRC - ISFSI PM to evaluate NOD observation and take action as appropriate

10/19/17 09:55am MANAGEMENT EVALUATION OF REBAR INSTALLATION AND INSPECTIONS AT SONGS – issued to (b)(7)(C)

10/19/17 One-on-one meeting with (b)(7)(C) in his Office to review evaluation.

10/25/17 7:18am Email from (b)(7)(C) stating: Attached is (b)(7)(C) response to the "inadequate rebar response" identified in AR 0917 – 74181. Would you please review the response for adequacy and provide comments, if any, to support closure of the associated AR and AR Assignments.

10/25/17 12:19pm Email response to (b)(7)(C) stating: This is the same document I reviewed prior to my meeting with (b)(7)(C) in his office on 10/19/17 with no changes. I expressed to (b)(7)(C) at that meeting that it appeared to have sufficient information for answering the concerns and what change I would make. I do not at this time plan on re-reviewing the document.

11/29/17 Assignment 1 Closed: Assignment #1 is hereby closed to the formal, "MANAGEMENT EVALUATION OF REBAR INSTALLATION AND INSPECTIONS AT SONGS" response uploaded to Assignment 3.

11/29/17 Assignment 3 Closure Statement

CLOSURE STATEMENT / AR 0917-74181 Rebar Issue: Assignments 1 and 2 are closed to the formal "MANAGEMENT EVALUATION OF REBAR INSTALLATION AND INSPECTIONS AT SONGS" response uploaded to Assignment 3. The report was acknowledged by the initiator of AR 0917-74181 as, "... appeared to/ have sufficient information for answering the concerns", this email is uploaded as the second attachment to Assignment #3. AR 0917 - 74181 was intended to be closed on October 25, 2017 but was held open for comments, as of November 29, 2017 none have been received. This closure stands until such time as additional information is provided by NOD, or others, since the October 25, 2017 email requesting a review and/or comments to expedite closure. OBJECTIVE EVIDENCE for Assignment 3 is uploaded as two files consisting of: 1 – The formal Management Report in respond and resolve this AR and, 2 – NOD email response. No further action required. Associated ARs AR

0417–55905, AR 0417–96039 and AR 0517–57100 have the following note added, " The rebar issue associated AR 0417–55905, AR 0417–96039 and AR 0517–57100 is addressed in Assignment 3 of AR 0917-7418 and the 103 page formal report uploaded in the Attachment Section."

Assessment Report 423 & 425 Update

NOD provided the project with 2 separate assessments concerning the recent MPC deliveries. A summary of those assessments and corrective actions are summarized below.

Overall, the governing procedure for MPC delivery HPP-2464-035, has been revised, commented on by SCE and comments have been incorporated pending approval.

HSP-315, the standard for MPC storage at HMD, has been fully replaced by HPP-2464-315 which clarifies SONGS site storage requirements

AR#	AR Description	AR Response Summary
Assessment 423 1017-58905	Receipt status failed to be applied to and MPC unit and MPC not stationed in section off area of the QC storage location	Additional barriers have been placed around the MPC. (Action 1) No additional tagging was needed as the MPC is not a procured component, but a Holtec owned fabricated component which is QC inspected and a CoC supplied by HMD prior to use.
Assessment 423 1017-87587	All work order steps not appropriately circle/slashed	A training session has been provided to the supervisor staff on the proper approach to circle/slash work orders moving forward. (Action 2) The process along with the repeated documentation of additional receipts captured under the work done section of the work plan has been further reviewed with SCE Oversight to ensure alignment as of 11/6/2017
Assessment 423 1017-21714	Serial number for lifting lug marked UNSAT with no further explanation	Lifting Lug design did not require a serial number HPP-2464-035 has been revised to remove this requirement as it is not mandated in the fabrication documents or specification. (Action 4) This has been resolved and closed via FCR-2464-LOA-027. (Action 3)

Assessment 423 1017-21868	Receipt inspections were performed by individuals other than QC personnel as designated in HPP-2464-081 Section 6.10	HPP-2464-035 has been revised to amend the terminology from inspection to verification. This change has been made in the document title and affected locations of the body (Action 4) Note that the NOD inspector should have referred to Section 6.10.3 of HPP-2464-081, which aligns with the work performed onsite, and states, "Safety significant equipment or materials supplied or manufactured by one of Holtec's manufacturing divisions, such as HMD, will be verified to be free of any shipping damage upon delivery to site. This verification of shipping damage shall be documented by a Holtec Project Manager, QC Inspector or designee. Any equipment or materials showing shipping damage shall be tagged with a HOLD tag, as shown in Exhibit [7.2] and the shipping damage shall be documented on a FCR per [5.5]."
Assessment 423 Supplement	Documentation package not included with MPC per HI-2156506	HI-2156506 specifically calls out "as required" for shipment of documentation package and Holtec received authorization to ship from SCE prior to shipment However, Holtec has taken the action to revise HI-2156506 to provide additional clarification (Action 5) Additional MPC's will not be sent in the future without documentation packages unless written approval is received from the SCE Project team
Assessment 425 1017-28743	Lack of MPC covering. Unit shall not be used until SCE Engineering direction provided that issue has been resolved	The MPC in question will be returned to HMD for cleaning in accordance with HSP-314 and rewrapped in accordance with HSP-315. Photography and removing dawg marks will also be performed while at HMD.

Assessment 425 1017-52259	Inspection criteria and storage criteria from HSP 315 need clarification	HPP-2464-035 has been revised to reference HPP-315, a new site specific procedure to address storage of canisters (Action 6) Step has been added to ensure the MPC is wrapped to prevent moisture intrusion. (Action 4) The condition of the protective wrap in good condition may be used as evidence of freedom from shipping damage. (Action 4) A periodicity for periodic inspections may be established by the project team, however based on the short duration (<1 yr) that the canisters will be wrapped at site until they are loaded. FCR-2464-LOA-028 has been generated and will be closed pending HPP acceptance (Action 7) The mechanism to ensure periodic inspections occur as prescribed is currently being finalized (Action 8)

ACTIONS

Action	Description	Status
1.	Place additional barriers around MPC	Complete
2.	Provide additional training regarding WO compliance	Complete
3.	Issue FCR to address UNSAT condition of Lifting Lug serial number	Complete FCR-2464-LOA-027 has been issued and closed
4.	Revise HPP-2464- 35 to address: -Removal of lug serial number requirement -Clarification for receipt verification requirements only -Modify HPP to reference HPP-315 -Add step to ensure moisture intrusion is prevented -Clarify inspections are for shipping damage only	Revision complete and submitted to SCE. Currently in review and approval cycle
5.	Holtec will revise HI-2156506 to provide additional clarification	Revision complete and submitted to SCE. Currently in review and approval cycle
6.	Provide HPP-2464-315 for site specific storage	Revision complete and submitted to SCE. Currently in review and approval cycle
7	Close FCR-028 which was generated due to the onsite storage concern	FCR will be closed when HPP-2464-035 is approved by SCE
8.	Finalize mechanism to ensure periodic inspections occur over a discreet period of time or after a specific event such as extreme weather	Open

Assessment Report

Assessment Information

Assessment Number: 423
Date of Observation: 10/10/2017
MAP: Modifications
Approver/Manager: GRAY, ALAN W
Overall Rating: Adequate
Activity Observed: Expectations: Components such as Cavity Enclosure Container (CECs) Lids and Multi-Purpose Canister (MPCs) are shipped to SONGS after final inspection and packaging is performed at Holtec Manufacturing Division (HMD) with all SCE Witness Point completed or formally waived in accordance with Holtec procedures. All Document Packages associated with the components being shipped have been completed and provided to SONG Project Management for storage in order to meet the dual storage requirements for QA Record storage. Component shipped to SONGS will be received, stored or i9nstalled in accordance with approved procedures.

Assessor Information

#	Assessor	Title
1	Clark Vanderniet	Lead Auditor

Elements Assessed

#	Element	Ratings	Notification #
1	GN1.4Task / Job Qualifications	Unsatisfactory	101721868
2	GN1.3Quality Assurance Records	Satisfactory	
3	MD2.2Work Package Accuracy	Unsatisfactory	101787587
4	MD2.4Installation Activities	Satisfactory	
5	MD2.5Material Control	Satisfactory	101758905
6	MD3.0Performance of Verification	Satisfactory	

Assessment Comments

Assessment of the shipping and offloading of last 10 CEC Lids and the MPC

Expectations: Components such as Cavity Enclosure Container (CECs) Lids and Multi-Purpose Canister (MPCs) are shipped to SONGS after final inspection and packaging is performed at Holtec Manufacturing Division (HMD) with all SCE Witness Point completed or formally waived in accordance with Holtec procedures. All Document Packages associated with the components being shipped have been completed and provided to SONG Project Management for storage in order to meet the dual storage requirements for QA Record storage. Component

shipped to SONGS will be received, stored or i9nstalled in accordance with approved procedures.

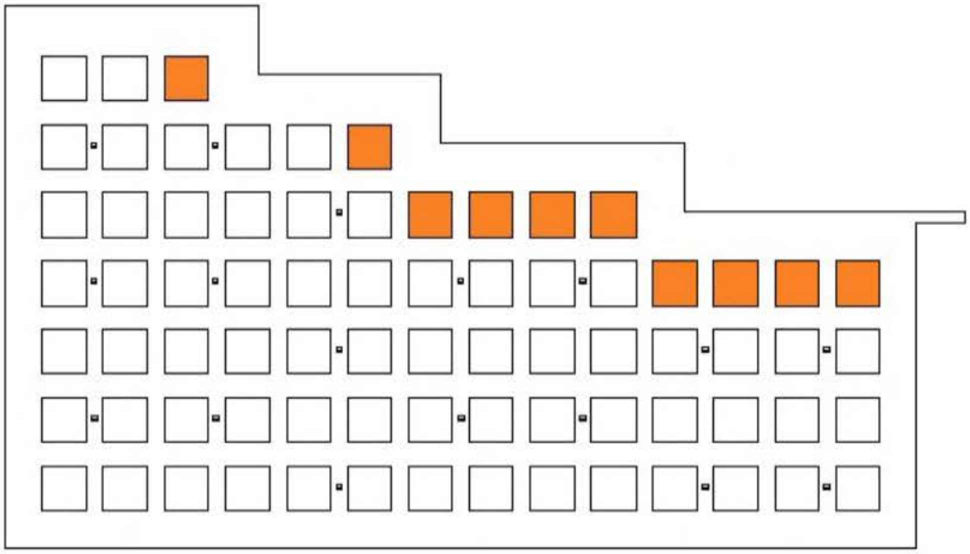
Ten CEC Lids were shipped without Document Packages, they included the following:

Document ID	CEC Lid S/N	SCE Lid #
DOC 2464-146	0113	65
DOC 2464-147	0114	66
DOC 2464-148	0115	67
DOC 2464-149	0116	68
DOC 2464-150	0117	69
DOC 2464-151	0118	70
DOC 2464-152	0119	71
DOC 2464-153	0120	72
DOC 2464-154	0121	73
DOC 2464-155	0122	74

The Assessor attempted to ascertain the location of the missing records and if proper record storage requirements were being maintained. The Assessor asked several Holtec personnel associated with the control and management of project records the location of the ten missing CEC Lid Document Packages. Personnel asked could not verify the status of the duplicate records or where those records were actually located. This was also true for the location of the original Document Packages.

The SCE project engineer was asked and knew the originals were on the Hotec main server in New Jersey and that the duplicate copies of the Document Packages for the CEC Lids had been received on-site and had already been stored in eDMRM. The Project Engineer produce a screen print from document control verifying the documents were in eDMRM. Later in the day the Assessor did receive confirmation of the location of the original document packages from Holtec QC.

Since delivery of the ten Document Packages, SCE Projects states that they have been reviewed satisfactorily therefore removing any risk to the acceptability of the ten CEC Lids. The diagram below shows the location of the ten CEC Lids.



Since the dual storage requirement for QA Records was met and the remaining issue was the review of the CEC Lid and MPC-37 Document Packages and the waiving of the witness point. At the time of shipping of the last ten CEC Lids and MPC-37, the Document Packages had not been reviewed by SCE's on-site third-party QC personnel (IQC). The review of the CEC Lid and MPC-37 Document Packages was a QC witness point, based on emails from IQC, and as such needed to be formally waived by SCE for the CEC Lids and the MPC to be shipped. It was stated that SCE Engineering waived the witness point and the Lids were delivered to the job site and installed on the respective CECs at risk and the MPC was placed in the Lot 4 Holding area..

SCE ISFSI Project Management responded to questions regarding waiving the CEC Lids and MPC=-37 QC Witness Point stating that SCE Projects gave verbal permission to ship the CEC

Lids and MPC-37 without a completed review of the Document Packages. This was allowed because the review of the Document Packages was not an SCE QC Witness Point as thought by the IQC Inspections.

The Assessor reviewed Holtec Manufacturing Division (HMD) Job Travelers for the Fabrication of the CEC Lids (15295-1000) and MPC-37 (ps1593-998699) noting that there were no QC Witness Points for IQC in either fabrication Job Traveler. The HMD Job Traveler for Closure Lid Final Cleaning and Packaging (15295-1001) was also reviewed and there was no QC Witness Point listed in the package for IQC. Therefore, with regard to the ten CEC Lids the verbal release would have been acceptable for at risk installation.

The MPC HMD Job Traveler for MPOC-37 Peening (ps1593-9986100) contained a QC Witness Point for IQC on the last step in the traveler (140). The step was titled, "Production to package MPC for shipment," and referenced Holtec Procedure HSP-315, *Packaging Shipping Storage of Fabricated and Finished Products.* HSP-315 was review and was determined to be a generic shop procedure for the packaging and shipping of components and contained no QC Witness Points or direction on the review of Document Packages...

Therefore the conclusion is that there was no QC Witness Point for the review Document Packages by IQC for the CEC Lids or the MPC that was shipped to the site. The review of Document Packages was a task assigned to IQC but there was not procedural or written direction for this to be performed. This means no formal written or documented phone conversation was necessary for the task to be waived and the components to be shipped without the review of the Document Packages. With regards to the CEC Lids with the Document Packages in eDMRM dual record storage requirements were met and their installation on the respective CECs would constitute delivery and installation provided adequate QC receipt inspection was performed. A review of the documentation for the installation of the lids show that the QC receipt inspection was performed but at the time of the assessment had not been formally written up on the final exhibits in the procedure. Therefore no issues or deviations were identified for this concern.

Of the hardcopies located in the Holtec Offices here the following Document Packages could not be located in the two storage locations:

DOC 2464-009	0050	2
DOC 2464-042	0063	15
DOC 2464-048	0069	21
DOC 2464-053	0074	26
DOC 2464-054	0075	27
DOC 2464-059	0080	32
DOC 2464-123	0090	42
DOC 2464-124	0091	43
DOC 2464-128	0095	47
DOC 2464-145	0112	64

Because they all reside electronically on the share drive, which was verified by the assessor, this is of minimal concern. This is further mitigated by the fact that copies of the CEC Lid Document Packages reside in two separate locations satisfying the dual storage requirement for QA Records making the hardcopies redundant and no longer necessary. No issues or deviations were identified for this concern

Holtec Multi-Purpose Canister (MPC) #37 was offloaded and stored in the Holtec Storage Area in SONGS parking lot #4 on September 27, 2017; however, when observed by the Assessor on October 06, 2017, there are no tags on the MPC, Lid or cribbing that shows the receipt status of the MPC. There is also not a dedicated QA Storage Area sectioned off for safety-related items. **AR 1017-58905** has been initiated to track the resolution this issue.

Shipping Labels on MPC Lid

Holtec Work Plan (ISFSI-Fuel-564-038) had steps 30, 40, 40.1, 40.2, 40.3, 40.4, circled in accordance with direction provided in Holtec Procedure HPP-2464-82 step 6.4.1.B. However,

none of the above listed steps are slashed per step 6.4.1.C. These steps cover the Receiving, Rigging and Off-loading of the MPC and associated Equipment into a storage area.

Holtec Procedure HPP-2464-35, *MPC Offload and Receipt Inspection,* has been circled and slashed through step 8.4.1 which states:

> "PLACE the MPC and associated components in the designated Storage Area. Wooden or other cribbing may be used on unfinished or unpaved MPC laydown areas"

The first MPC was received, rigged and offloaded into the Holtec Storage area in SONGS Parking Lot #4 on September 27, 2017 as demonstrated by numerous signatures in HPP-2464-035. Work Plan steps 30, 40, 40.1, 40.2, 40.3, 40.4 have been slashed showing completion of the offloading of the MPC per HPP-2464-82, steps 6.4.1.A and 6.4.1.C. **AR 1017-87587** was initiated to track the resolution this issue.

Additionally, HPP-2464-035, Attachment 9.11 step 7, "Serial Number scribed on lifting lug (or rigging attachment point)," was marked as UNSAT with no comments. **AR 1017-21714** was initiated to track the resolution this issue.

Holtec procedure HPP-2464-035 Rev. 3 MPC Offload and Receipt Inspection is not in compliance with Section 10 Inspection of Holtec Internationals Quality Assurance Manual (QAM) Revision 14.

Procedure dictates that Receipt Inspections are being performed by other (Holtec Project Manager or designee) then Holtec Inspection Personnel (QC). This is contrary to requirements in paragraph 4.1 of section 10 the QAM and procedure HPP-2464-81 Implementation of Holtec's QA Program for Safety Significant Site Activates, section 6.10 Inspections. **AR 1017-21868** has been written to track this issue.

SOUTHERN CALIFORNIA EDISON		AR Number:	1017 - 21868
Due Date:	--	**Status:**	Open
Priority:	3-Normal	**Assigned To:**	Decom Project
Equipment Related:	No	**CAP Related:**	No /Sig Level 3/4/5
MRC Review:	Yes	**OPS CFH**	Yes

Description:

Nuclear Oversight identified Holtec procedure HPP-2464-035 Rev. 3 MPC Offload and Receipt Inspection is not in compliance with Section 10 Inspection of Holtec Internationals Quality Assurance Manual (QAM) Revision 14.

• Procedure dictates that Receipt Inspections are being performed by other (Holtec Project Manager or designee) then Holtec Inspection Personnel (QC). This is contrary to requirements in paragraph 4.1 of section 10 the QAM and procedure HPP-2464-81 Implementation of Holtec's QA Program for Safety Significant Site Activates, section 6.10 Inspections.

Requirements:

Holtec QAM states in section 10 Inspection section

Section 1.0 PURPOSE "To establish measures to perform inspections of materials, components and equipment, and examination/monitoring of activities that bear upon quality to assure that items designed, manufactured, and shipped adhere to applicable requirements.

Section 2.0 APPLICABILITY "The provisions of this section apply to all inspections of safety-significant material, items and components."

Section 3.1 states "Measures shall be established to surveil and/or inspect activities that bear upon quality by or for the organization performing the activity, to verify conformance with documented instructions, procedures, and drawings for accomplishing the activity."

Section 3.3 states "Inspections shall be performed by individuals determined to be qualified to conduct the specific type of inspection by the Company's Quality Department. Inspections must be performed by individuals other than those who performed the activity being inspected."

Section 4.1 states; "The Company's Quality Department shall be responsible for qualification of Holtec inspection personnel."

Recommend: Holtec to implement section 10 of their QAM and include Certified Quality Control personnel in the final receipt inspection of MPC's. Assign to Projects PER 54347

Assignments:

#	Type	Assigned To	Description	Due Date	Status
1017 - 21868 -1	Generic	(b)(7)(C)	Address procedural discrepancies. Assign task to appropriate person to incorporate procedural changes. Track issue to closure.	2017-12-30	Closed
1017 - 21868 -2	Generic		Per MRC; Perform final receipt inspection of MPC related to this AR.	2018-02-28	Open

Equipments:

Equipment ID	Unit	FLOC	Description

Notes:

Notes	Added By	Date

Trend Codes:

Trend Code	Added By	Date
P-ISFSI	(b)(7)(C)	2017-10-6
M-Procedure change		2017-10-6

Attachments:

No	Name	Notes

Date Created:	2017-10-05	**Created By:**	(b)(7)(C)

Logo		Assignment Number:	1017 - 21868 - 1
AR Number:	1017 - 21868	**Due Date:**	2017-12-30
Current Status:	Closed	**Priority:**	3-Normal
Assignment Type:	Generic	**Category:**	--
Assigned To:	(b)(7)(C)	**Work Group:**	Decom Project
SDS Reference:	--	**Reference:**	--

Description of Work:

Address procedural discrepancies. Assign task to appropriate person to incorporate procedural changes. Track issue to closure.

Notes:

Notes	Added By	Date
On September 27, 2017, the first Multipurpose canister (MPC) was delivered to SONGS in Parking Lot 4. The MPC was offloaded, receipted and stored in accordance with work order ISFSSI-FUEL-038 and procedure HPP-2464-035 Rev 3. ISFSI Project oversight witnessed the offload and wrote a satisfactory observation, Task 055, in the oversight database. Pictures of the up righted MPC with wrapping were taken. The MPC was stored in the Holtec designated storage area with wrapping on when the observation was done on September 27, 2017. Discussions with Holtec personnel indicated that the wrapping was removed late on September 27, 2017, to finish the verification that there was no shipping damage. On October 10, 2017 NOD conducted an assessment (Assessment 423) of the MPC to look at the shipping and offloading of CEC lids and the MPC. Out of that assessment, 4 ARs were written on the MPCs to document findings with receipt inspection, work order/procedure place keeping, and markings. On October 18, 2017, another NOD assessment (Assessment 425) was conducted again looking at MPC packaging, shipping, receipt inspection and storage requirements and the procedures directing that work. An AR was written to document issues with the MPC being unwrapped and requiring a hold tag be applied until the effect of being unwrapped is completed. A second AR was generated to address generic issues with procedure HSP-315 and the packaging, inspection and storage of the MPCs in the future. In addition, during a visit to the manufacturer of the MPCs on October 23, 2017, visible depressions near the open end of the MPC shell were identified. An AR was written to document this discovery and track resolution. This visible depression is also on the first MPC delivered and therefore will require the MPC to be returned to the Holtec fabrication facility for rework. This MPC will be cleaned, packaged and returned to SONGS as if a new MPC. The ISFSI project, based on the above issues, placed a hold on any further MPC shipments until these issues were addressed. The ISFSI project, ISFSI project oversight and Holtec have been working on resolutions to the above issues and have identified the appropriate corrective actions to resolve the ability to properly package, ship, receive and store the MPCs. These corrective actions are being inserted into the specific ARs identified above, to document with objective evidence that the issues have been completed and the hold on MPC shipment can be lifted. In regards to this AR 1017-21868 assignment 1, this issue was discussed with Holtec QA. Since the MPC is a fabricated component there is no receipt inspection required once the MPC is received onsite. The QA inspections are preformed at the fabrication facility and a document package is prepared for each MPC which includes a C of C to ensure the MPC was fabricated to the PO requirements. Therefore, Holtec procedure HPP-2464-035 is in compliance with the Holtec QA program. However, in order to remove any future confusion, HPP-2464-035 has been revised (see attached revision and SCE acceptance letter) to change the wording from "receipt inspection" to "receipt verification". No further work for this assignment is required.	(b)(7)(C)	2017-11-9
Due Date revision of this AR is intended to reflect ISFSI schedule and/or milestone dates to revise the applicable Holtec procedures.		2017-11-29
Close to Actions Taken above and objective evidence included in the attachement section of this AR		2017-12-22

Attachments:

No	Name	Notes
1	HPP-2464-035R7 - MPC Offload and Receipt Verification.pdf	
2	ISFSI-L-C-HOLTEC-110917071022_0.pdf	

Date Created:	2017-10-06	Created By:	(b)(7)(C)

Logo		Assignment Number:	1017 - 21868 -2
AR Number:	1017 - 21868	**Due Date:**	2018-02-28
Current Status:	Open	**Priority:**	3-Normal
Assignment Type:	Generic	**Category:**	--
Assigned To:	(b)(7)(C)	**Work Group:**	Decom Project
SDS Reference:	--	**Reference:**	--

Description of Work:

Per MRC; Perform final receipt inspection of MPC related to this AR.

Notes:

Notes	Added By	Date
Closure documentation for AR 1017-21868 assignment 2. Based on the information provided in assignment 1 of this AR, the MPC does not need to have a final receipt inspection. Howeve, due to other issues, this MPC-086 will be sent back to HMD for rework. This MPC will be cleaned, packaged and shipped back to SONGS. When the MPC is received, a receipt verification will be performed in accordance with HPP-2464-035 R7. No further work is required for this AR assignment	(b)(7)(C)	2017-11-9
Due Date revision of this AR is intended to reflect ISFSI schedule and/or milestone dates to revise the applicable Holtec procedures.		2017-11-29
As stsated above, Receipt Verification will be performed upon receipt of MPC-86 from HMD. A copy of the completed receipt verification is required to be submitted and will be included as a part of the loading documentation package for MPC-86. Close this AR to the actionstaken above as well as Task 1 of this AR.		2017-12-22
AR reopened and will remain open until MPC-86 has copleted receipt verification at SONGS.		2017-12-22

Attachments:

No	Name	Notes

Date Created:	2017-10-13	**Created By:**	(b)(7)(C)

SOUTHERN CALIFORNIA EDISON	AR Number:	1017 - 58905

Due Date:	--	**Status:**	Open
Priority:	3-Normal	**Assigned To:**	Decom Project
Equipment Related:	No	**CAP Related:**	No /Sig Level 3/4/5
MRC Review:	Yes	**OPS CFH**	Yes

Description:

Holtec Multi-Purpose Canister (MPC) #37 was offloaded and stored in the Holtec Storage Area in SONGS parking lot #4; however, there are no tags on the MPC, Lid or cribbing that shows the receipt status of the MPC. There is also not a dedicated QA Storage Area sectioned off for safety-related items

Assignments:

#	Type	Assigned To	Description	Due Date	Status
1017 - 58905 -1	Generic	(b)(7)(C)	Address MPC QA receipt concern.	2018-01-31	Open

Equipments:

Equipment ID	Unit	FLOC	Description

Notes:

Notes	Added By	Date

Trend Codes:

Trend Code	Added By	Date
P-ISFSI	(b)(7)(C)	2017-10-10
O-NOD Identified		2017-10-10

Attachments:

No	Name	Notes

Date Created:	2017-10-09	**Created By:**	(b)(7)(C)

Logo		Assignment Number:	1017 - 58905 - 1
AR Number:	1017 - 58905	**Due Date:**	2018-01-31
Current Status:	Open	**Priority:**	3-Normal
Assignment Type:	Generic	**Category:**	--
Assigned To:	(b)(7)(C)	**Work Group:**	Decom Project
SDS Reference:	--	**Reference:**	--

Description of Work:

Address MPC QA receipt concern.

Notes:

Notes	Added By	Date
Closure documentation for AR 1017-58905 assignment 1 On September 27, 2017, the first Multipurpose canister (MPC) was delivered to SONGS in Parking Lot 4. The MPC was offloaded, receipted and stored in accordance with work order ISFSSI-FUEL-038 and procedure HPP-2464-035 Rev 3. ISFSI Project oversight witnessed the offload and wrote a satisfactory observation, Task 055, in the oversight database. Pictures of the up righted MPC with wrapping were taken. The MPC was stored in the Holtec designated storage area with wrapping on when the observation was done on September 27, 2017. Discussions with Holtec personnel indicated that the wrapping was removed late on September 27, 2017, to finish the verification that there was no shipping damage. On October 10, 2017 NOD conducted an assessment (Assessment 423) of the MPC to look at the shipping and offloading of CEC lids and the MPC. Out of that assessment, 4 ARs were written on the MPCs to document findings with receipt inspection, work order/procedure place keeping, and markings. On October 18, 2017, another NOD assessment (Assessment 425) was conducted again looking at MPC packaging, shipping, receipt inspection and storage requirements and the procedures directing that work. An AR was written to document issues with the MPC being unwrapped and requiring a hold tag be applied until the effect of being unwrapped is completed. A second AR was generated to address generic issues with procedure HSP-315 and the packaging, inspection and storage of the MPCs in the future. In addition, during a visit to the manufacturer of the MPCs on October 23, 2017, visible depressions near the open end of the MPC shell were identified. An AR was written to document this discovery and track resolution. This visible depression is also on the first MPC delivered and therefore will require the MPC to be returned to the Holtec fabrication facility for rework. This MPC will be cleaned, packaged and returned to SONGS as if a new MPC. The ISFSI project, based on the above issues, placed a hold on any further MPC shipments until these issues were addressed. The ISFSI project, ISFSI project oversight and Holtec have been working on resolutions to the above issues and have identified the appropriate corrective actions to resolve the ability to properly package, ship, receive and store the MPCs. These corrective actions are being inserted into the specific ARs identified above, to document with objective evidence that the issues have been completed and the hold on MPC shipment can be lifted. In regard to this specific AR assignment, discussions with Holtec QA identified that the MPC is a fabricated item and the QC inspections are completed at the fabrication facility. Once the MPC is complete and inspected to meet the purchase order requirements, the document package is finalized with a C of C that ensures the MPC conforms to the requirements. Therefore, since the MPC is not shipped until the C of C is complete, there is no tag on the items to show the receipt status. In addition, since the MPC and components are not receipt inspected at the Site, there is no dedicated QA storage area sectioned off for safety related items. The MPCs are offloaded and stored in the Holtec designated storage area in accordance with HPP-2464-035 Rev 3 step 8.4.1. When MPC-68 was identified with manufacturing marks that needed to be fixed (AR1017-10229) a hold tag was put on the MPC and additional barriers were installed around the MPC. (see attached picture). In addition, HPP-2464-035 was revised (see attachment for Rev 7 and acceptance letter) to better identify the storage area for the MPCs. No further action is required for this AR.	(b)(7)(C)	2017-11-9
Due Date revision of this AR is intended to reflect ISFSI schedule and/or milestone dates.		2017-11-29
Due Date revision of this AR is intended to the reflect current ISFSI schedule and/or Holtec milestone dates.		2017-12-22

Attachments:

No	Name	Notes
1	Additional barrier around MPC-68.jpg	
2	HPP-2464-035R7 - MPC Offload and Receipt Verification.pdf	
3	ISFSI-L-C-HOLTEC-110917071022_0.pdf	

Date Created:	2017-10-10	**Created By:**	(b)(7)(C)

SOUTHERN CALIFORNIA EDISON		AR Number:	1017 - 87587
Due Date:	--	**Status:**	Open
Priority:	3-Normal	**Assigned To:**	Decom Project
Equipment Related:	No	**CAP Related:**	No /Sig Level 3/4/5
MRC Review:	Yes	**OPS CFH**	Yes

Description:

5. Holtec Work Plan (ISFSI-Fuel-564-038) had steps 30, 40, 40.1, 40.2, 40.3, 40.4, circled in accordance with direction provided in Holtec Procedure HPP-2464-82 step 6.4.1.B. However, none of the above listed steps are slashed per step 6.4.1.C. These steps cover the Receiving, Rigging and Off-loading of the MPC and associated Equipment into a storage area.
Holtec Procedure HPP-2464-35, MPC Offload and Receipt Inspection, has been circled and slashed through step 8.4.1 which states:
"PLACE the MPC and associated components in the designated Storage Area. Wooden or other cribbing may be used on unfinished or unpaved MPC laydown areas"
The first MPC was received, rigged and offloaded into the Holtec Storage area in SONGS Parking Lot #4 on September 27, 2017 as demonstrated by numerous signatures in HPP-2464-035. Work Plan steps 30, 40, 40.1, 40.2, 40.3, 40.4 have been slashed showing completion of the offloading of the MPC per HPP-2464-82, steps 6.4.1.A and 6.4.1.C.

Assignments:

#	Type	Assigned To	Description	Due Date	Status
1017 - 87587 -1	Generic	(b)(7)(C)	Assess Procedure place-keeping issue and resolve/set expectations with staff for procedural place-keeping practices as appropriate.	2017-12-30	Closed

Equipments:

Equipment ID	Unit	FLOC	Description

Notes:

Notes	Added By	Date

Trend Codes:

Trend Code	Added By	Date
P-ISFSI	(b)(7)(C)	2017-10-10
HU - Process - Incomplete Work Plan/Procedure		2017-10-10
O-NOD Identified		2017-10-10

Attachments:

No	Name	Notes
1	100517 Work Plan for MPC Offloading.pdf	
2	100517 Copy of HPP 2464-035 MPC Offloading.pdf	

Date Created:	2017-10-09	**Created By:**	(b)(7)(C)

Logo		Assignment Number:	1017 - 87587 - 1
AR Number:	1017 - 87587	**Due Date:**	2017-12-30
Current Status:	Closed	**Priority:**	3-Normal
Assignment Type:	Generic	**Category:**	--
Assigned To:	(b)(7)(C)	**Work Group:**	Decom Project
SDS Reference:	--	**Reference:**	--

Description of Work:

Assess Procedure place-keeping issue and resolve/set expectations with staff for procedural place-keeping practices as appropriate.

Notes:

Notes	Added By	Date
On September 27, 2017, the first Multipurpose canister (MPC) was delivered to SONGS in Parking Lot 4. The MPC was offloaded, receipted and stored in accordance with work order ISFSSI-FUEL-038 and procedure HPP-2464-035 Rev 3. ISFSI Project oversight witnessed the offload and wrote a satisfactory observation, Task 055, in the oversight database. Pictures of the up righted MPC with wrapping were taken. The MPC was stored in the Holtec designated storage area with wrapping on when the observation was done on September 27, 2017. Discussions with Holtec personnel indicated that the wrapping was removed late on September 27, 2017, to finish the verification that there was no shipping damage. On October 10, 2017 NOD conducted an assessment (Assessment 423) of the MPC to look at the shipping and offloading of CEC lids and the MPC. Out of that assessment, 4 ARs were written on the MPCs to document findings with receipt inspection, work order/procedure place keeping, and markings. On October 18, 2017, another NOD assessment (Assessment 425) was conducted again looking at MPC packaging, shipping, receipt inspection and storage requirements and the procedures directing that work. An AR was written to document issues with the MPC being unwrapped and requiring a hold tag be applied until the effect of being unwrapped is completed. A second AR was generated to address generic issues with procedure HSP-315 and the packaging, inspection and storage of the MPCs in the future. In addition, during a visit to the manufacturer of the MPCs on October 23, 2017, visible depressions near the open end of the MPC shell were identified. An AR was written to document this discovery and track resolution. This visible depression is also on the first MPC delivered and therefore will require the MPC to be returned to the Holtec fabrication facility for rework. This MPC will be cleaned, packaged and returned to SONGS as if a new MPC. The ISFSI project, based on the above issues, placed a hold on any further MPC shipments until these issues were addressed. The ISFSI project, ISFSI project oversight and Holtec have been working on resolutions to the above issues and have identified the appropriate corrective actions to resolve the ability to properly package, ship, receive and store the MPCs. These corrective actions are being inserted into the specific ARs identified above, to document with objective evidence that the issues have been completed and the hold on MPC shipment can be lifted. In regards to this specific AR -2017-87587 assignment 1, Holtec's plan for receiving and offloading all 73 MPCs was to cover all 73 MPCs with one work order - ISFSI-FUEL-564-038 (attached to the AR already) and leave the specific steps open until the last MPC was received and have one procedure filled out (HPP--2464-035 - already attached to this AR) for each MPC. That is why you can have steps circled in the work order but not slashed and have steps in procedure circled and slashed. Therefore, there is no deviation regarding the placekeeping method used for the MPCs in accordance with the work order and procedure. However, a refresher session was provided to the Holtec supervisory staff regarding the proper approach to the use of circle/slash work orders. No further work is required on this AR.	(b)(7)(C)	2017-11-9
Holtec Refresher training ginen on 10/3/2017. A copy of the training roster is provided in the Attachment. Close AR to Actions Taken.		2017-12-22

Attachments:

No	Name	Notes
1	Placekeeping and Workpackage Retraining.pdf	Holtec Retraining Roster

Date Created:	2017-10-10	**Created By:**	(b)(7)(C)

SOUTHERN CALIFORNIA EDISON	AR Number:	1017 - 21714

Due Date:	--	**Status:**	Open
Priority:	3-Normal	**Assigned To:**	Decom Project
Equipment Related:	No	**CAP Related:**	No /Sig Level 3/4/5
MRC Review:	Yes	**OPS CFH**	Yes

Description:

Holtec procedure HPP-2464-035, MPC Offload and Receipt Inspection, Attachment 9.11 (attached) step 7, "Serial Number scribed on lifting lug (or rigging attachment point)," was marked as UNSAT with no comments.

Assignments:

#	Type	Assigned To	Description	Due Date	Status
1017 - 21714 -1	Generic	(b)(7)(C)	Address NOD concern over incomplete procedure.	2017-12-30	Closed

Equipments:

Equipment ID	Unit	FLOC	Description

Notes:

Notes	Added By	Date

Trend Codes:

Trend Code	Added By	Date
P-ISFSI	(b)(7)(C)	2017-10-10
O-NOD Identified		2017-10-10

Attachments:

No	Name	Notes

Date Created:	2017-10-10	**Created By:**	(b)(7)(C)

Logo		**Assignment Number:**	1017 - 21714 - 1
AR Number:	1017 - 21714	**Due Date:**	2017-12-30
Current Status:	Closed	**Priority:**	3-Normal
Assignment Type:	Generic	**Category:**	--
Assigned To:	(b)(7)(C)	**Work Group:**	Decom Project
SDS Reference:	--	**Reference:**	--

Description of Work:

Address NOD concern over incomplete procedure.

Notes:

Notes	**Added By**	**Date**
Closure text for AR 1017-21714 assignment 1. On September 27, 2017, the first Multipurpose canister (MPC) was delivered to SONGS in Parking Lot 4. The MPC was offloaded, receipted and stored in accordance with work order ISFSSI-FUEL-038 and procedure HPP-2464-035 Rev 3. ISFSI Project oversight witnessed the offload and wrote a satisfactory observation, Task 055, in the oversight database. Pictures of the up righted MPC with wrapping were taken. The MPC was stored in the Holtec designated storage area with wrapping on when the observation was done on September 27, 2017. Discussions with Holtec personnel indicated that the wrapping was removed late on September 27, 2017, to finish the verification that there was no shipping damage. On October 10, 2017 NOD conducted an assessment (Assessment 423) of the MPC to look at the shipping and offloading of CEC lids and the MPC. Out of that assessment, 4 ARs were written on the MPCs to document findings with receipt inspection, work order/procedure place keeping, and markings. On October 18, 2017, another NOD assessment (Assessment 425) was conducted again looking at MPC packaging, shipping, receipt inspection and storage requirements and the procedures directing that work. An AR was written to document issues with the MPC being unwrapped and requiring a hold tag be applied until the effect of being unwrapped is completed. A second AR was generated to address generic issues with procedure HSP-315 and the packaging, inspection and storage of the MPCs in the future. In addition, during a visit to the manufacturer of the MPCs on October 23, 2017, visible depressions near the open end of the MPC shell were identified. An AR was written to document this discovery and track resolution. This visible depression is also on the first MPC delivered and therefore will require the MPC to be returned to the Holtec fabrication facility for rework. This MPC will be cleaned, packaged and returned to SONGS as if a new MPC. The ISFSI project, based on the above issues, placed a hold on any further MPC shipments until these issues were addressed. The ISFSI project, ISFSI project oversight and Holtec have been working on resolutions to the above issues and have identified the appropriate corrective actions to resolve the ability to properly package, ship, receive and store the MPCs. These corrective actions are being inserted into the specific ARs identified above, to document with objective evidence that the issues have been completed and the hold on MPC shipment can be lifted. In regards to this specific AR assignment, an FCR (FCR-2464-LOA-027) was generated when step 7 in HPP-2464-035 Attachment 9.11 was marked unsat. Holtec Engineering dispositioned the FCR stateing that no serial number was required per the design drawing and that the procedure was in error (see attached FCR). Holtec has revised procedure HPP-2464-035 to remove this step from the procedure (see attached revision and SCE acceptance letter. No further action is required.	(b)(7)(C)	2017-11-9
Due Date revision of this AR is intended to reflect ISFSI schedule and/or milestone dates to revise the applicable Holtec procedures.		2017-11-29
Close to Actions Taken above		2017-12-22

Attachments:

No	**Name**	**Notes**
1	FCR-2464-LOA-027.pdf	
2	HPP-2464-100R0 - DRAFT H.pdf	
3	HPP-2464-035R7 - MPC Offload and Receipt Verification.pdf	
4	ISFSI-L-C-HOLTEC-110917071022_0.pdf	

Date Created:	2017-10-10	**Created By:**	(b)(7)(C)

Assessment Report

Assessment Information

Assessment Number:	425	Date of Observation:	10/18/2017
MAP:	Modifications	Approver/Manager:	CHURCHILL, BRADLEY S
Overall Rating:	Unsatisfactory		
Activity Observed:	Verify that MPC shipped to the site will be packaged, shipped, receipt inspected, stored and handled in accordance with approved procedures.		

Assessor Information

#	Assessor	Title
1	Clark Vanderniet	Lead Auditor

Elements Assessed

#	Element	Ratings	Notification #
1	MD2.5Material Control	Unsatisfactory	101728743
2	MD3.0Performance of Verification	Unsatisfactory	101752259

Assessment Comments

Expectation: MPC shipped to the site will be packaged, shipped, receipt inspected, stored and handled in accordance with approved procedures.

Issue 1:

The Holtec Multi-Purpose Canister (MPC-37) was offloaded and stored in the Holtec Storage Area in lot #4 on September 27, 2017. This is evident from dates on Holtec Procedure HPP-2464-35, *MPG Offload and Receipt Inspection,* which was circled and slashed through step 8.4.1 which states:

> "PLACE the MPC and associated components in the designated Storage Area. Wooden or other cribbing may be used on unfinished or unpaved MPC laydown areas"

This is critical as the assessment for report #423 was performed on 10/5/17; one week after the MPC was delivered and placed into Holtec temporary storage. At the time of the NOD assessment the picture below of the MPC was taken:

From the picture you can see that the MPC has a Foreign Material cover in place on the top of the MPC but that there is no additional protective wrap on the outside of the Cask.

Further review of HPP-2464-35, Attachment 9.12, Component Attribute 7 states: “If MPC is stored outside, the shell must be covered.” This attribute was marked as satisfactory and dated on 9/27/17 which from the photographic evidence was not the case.

Action Request (AR) 1017-28743 has been initiated to evaluate the effect of the lack of covering on the MPC-37 and requires that a "Hold" tag applied to the MPC in lot 4 until the issue is resolved. The MPC should not be "used" until "recovered", following SCE Engineering direction for the cleaning, chloride free verification, and immediately wrapping & storage. This would also include the resolution of the acceptance as satisfactory of the MPC as documented in HPP-2464-35, Attachment 9.12.

Issue 2:

The Holtec Manufacturing Division (HMD) Job Traveler for MPC-37 Final Assembly states in step 420: "as required, clean MPC shell OD per referenced procedure (HSP-314), criteria C." Procedure HSP-314 needs to be reviewed to determine if the final cleaning satisfies cleanliness requirements sufficient for the SONGS environment. Step 430 calls for QC verification of the cleanliness prior to packaging and step 460 calls for production to install a spider and package for shipment. Step 460 references two documents HSP 315 and PSP HS-15; HSP 315, *Packaging Shipping Storage of Fabricated and Finished Products*, Describes the general requirements for packaging, shipping, receiving, storage and handling of Fabricated components and finished products.

Under HSP 315, Section 4.0 is the following paragraph:

"Additionally, equipment stored in a marine environment may be subjected to significantly greater corrosive and destructive forces. Therefore, additional storage and maintenance precautions are typically required. These requirements most commonly include measures to reduce salt air exposure on areas prone to corrosion. For example the HI-STORM, HI-TRAC and MPC casks require a covering system to inhibit excessive moisture intrusion."

HSP 315 continues to discuss to define the four levels (A-D) and listing the criteria for each level for packaging, shipping, receiving, storage and handling of items. Section 4.3 classifies MPCs as level C items. Step 6.1.3, Level C Criteria, sub-step 7 states: "Items shall be packaged with a waterproof enclosure so that water, salt spray, dust dirt and other forms of contamination do not penetrate to the item. Step 6.4.3 Storage of Level C Items, sub-step 7 states:

"The following additional requirements apply for Level C items stored in a marine environment

a. Items shall be stored in a temperature and humidity controlled building to prevent condensation.
b. If indoor storage facilities are not available, items shall be thoroughly wrapped in a vaper barrier to prevent moisture intrusion.
c. All items potentially exposed to a marine environment shall be inspected periodically for signs of corrosion.
d. Holtec International may require additional storage criterial to be determined on an individual site basis."

AR 1017-52259 has been initiated to address the generic concern for all MPCs that are being shipped to the site in the future; they must be properly packaged while in route, and they must be properly receipt inspected; including verification of non-damaged covering and properly stored. Additionally, periodic inspects, called out in HSP-315, need to have their frequency and acceptance criteria defined and where covering damage is found it shall be assessed and left in an acceptable condition.

SOUTHERN CALIFORNIA EDISON		AR Number:	1017 - 28743
Due Date:	--	**Status:**	Open
Priority:	2-High	**Assigned To:**	Decom Project
Equipment Related:	No	**CAP Related:**	No /Sig Level 3/4/5
MRC Review:	Yes	**OPS CFH**	Yes

Description:

The Holtec Multi-Purpose Canister (MPC-37) was offloaded and stored in the Holtec Storage Area in lot #4 on September 27, 2017 and was left unwrapped until after 10/5/17 contrary to HPP-2464-35, MPC Offload Receipt Inspection, Attachment 9.12, Component Attribute 7 states: "If MPC is stored outside, the shell must be covered." Additionally, attribute was marked as satisfactory and dated on 9/27/17 which was not the case.
This is an NOD Finding as the condition is not in accordance with HI-2156506, Technical Specification for the ISFSI Expansion Project at SONGS, section 9.7 Shipping and Storage Requirements and NQA-1, 1994 subpart 2.2

Assignments:

#	Type	Assigned To	Description	Due Date	Status
1017 - 28743 -1	Generic	(b)(7)(C)	Evaluate NOD finding and address report of technical Specification non-compliance.	2017-12-30	Closed

Equipments:

Equipment ID	Unit	FLOC	Description

Notes:

Notes	Added By	Date
This equipment is not yet plant equipment. Falls out of the OD program per SO123-XV-50.	James Vrla	2017-10-18

Trend Codes:

Trend Code	Added By	Date
O-NOD Identified	(b)(7)(C)	2017-10-20
P-ISFSI		2017-10-20

Attachments:

No	Name	Notes

Date Created:	2017-10-18	**Created By:**	(b)(7)(C)

Logo		Assignment Number:	1017 - 28743 - 1
AR Number:	1017 - 28743	**Due Date:**	2017-12-30
Current Status:	Closed	**Priority:**	3-Normal
Assignment Type:	Generic	**Category:**	--
Assigned To:	(b)(7)(C)	**Work Group:**	Decom Project
SDS Reference:	--	**Reference:**	--

Description of Work:

Evaluate NOD finding and address report of technical Specification non-compliance.

Notes:

Notes	Added By	Date
Closure documentation for AR 1017-28743 Assignment 1 On September 27, 2017, the first Multipurpose canister (MPC) was delivered to SONGS in Parking Lot 4. The MPC was offloaded, receipted and stored in accordance with work order ISFSSI-FUEL-038 and procedure HPP-2464-035 Rev 3. ISFSI Project oversight witnessed the offload and wrote a satisfactory observation, Task 055, in the oversight database. Pictures of the up righted MPC with wrapping were taken. The MPC was stored in the Holtec designated storage area with wrapping on when the observation was done on September 27, 2017. Discussions with Holtec personnel indicated that the wrapping was removed late on September 27, 2017, to finish the verification that there was no shipping damage. On October 10, 2017 NOD conducted an assessment (Assessment 423) of the MPC to look at the shipping and offloading of CEC lids and the MPC. Out of that assessment, 4 ARs were written on the MPCs to document findings with receipt inspection, work order/procedure place keeping, and markings. On October 18, 2017, another NOD assessment (Assessment 425) was conducted again looking at MPC packaging, shipping, receipt inspection and storage requirements and the procedures directing that work. An AR was written to document issues with the MPC being unwrapped and requiring a hold tag be applied until the effect of being unwrapped is completed. A second AR was generated to address generic issues with procedure HSP-315 and the packaging, inspection and storage of the MPCs in the future. In addition, during a visit to the manufacturer of the MPCs on October 23, 2017, visible depressions near the open end of the MPC shell were identified. An AR was written to document this discovery and track resolution. This visible depression is also on the first MPC delivered and therefore will require the MPC to be returned to the Holtec fabrication facility for rework. This MPC will be cleaned, packaged and returned to SONGS as if a new MPC. The ISFSI project, based on the above issues, placed a hold on any further MPC shipments until these issues were addressed. The ISFSI project, ISFSI project oversight and Holtec have been working on resolutions to the above issues and have identified the appropriate corrective actions to resolve the ability to properly package, ship, receive and store the MPCs. These corrective actions are being inserted into the specific ARs identified above, to document with objective evidence that the issues have been completed and the hold on MPC shipment can be lifted. This AR was written to address a concern that the MPC received on 9/27/17 (MPC-86) was offloaded and left unwrapped until 10/5/17 which does not meet the requirements of HPP-2463-035, Attachement 9.12, Step 7 which requires the MPC shell be covered if the MPC is to be stored outside. As stated above, ISFISI oversight was present during the offload of MPC-86 on 9/27/17. Task number 55 in the oversight database was written to document the observation and several pictures (see attached photos) were taken that show the MPC was covered when offloaded and stored in the Holtec material storage area in Parking Lot #4. Discussions with Holtec determined that to ensure there was no damage under the wrapping, it was removed late on 9/27/17 to finish that inspection and prepare the MPC for use in Dry Run #4. Holtec supervision reviewed Step 7 of Attachment 9.12 and decided that putting on the FME cover and wrapping the top of the MPC met the intent of the procedure. That work was done as evidenced by the photos in NOD assessment #423. However, based upon further review of the requirements of the Technical Specification, Section 9.7.2.1, HSP-315, section 6.4.3 and HPP-2464-81, section 6.13.1, the MPC should have remained wrapped while stored outside. Based on the conflicting requirements to complete the MPC inspection for damage as required by HPP-2464-035 Attachments 9.11 and 9.12 and the requirement to keep the MPC wrapped while outside, HPP-2464-035 has been revised to inspect the MPC wrapping for evidence of damage and if there is no indication of damage the MPC can be accepted. The revised HPP-2464-035 and the SCE acceptance letter is attached. Therefore, the MPCs received from now on will remain wrapped until ready to be used in the plant for fuel movement and the MPC damage inspection will be looking at damage to the wrapping once delivered. If there is no damage to the wrapping, the MPC will be accepted. In addition, MPC-86 is being returned to Holtec for removal of fabrication marks and will be re-cleaned and packaged as if a new MPC when returned to SONGS. Since this MPC will be returned to Holtec and clean and re-package and was not used to load fuel, there is no Technical Specification violation.	(b)(7)(C)	2017-11-9
Due Date revision of this AR is intended to reflect ISFSI schedule and/or milestone dates.		2017-11-29
Close AR to the Actions Taken above. HPP-2464-035R7 is provided as objective evidence of the of the changes to the inspection verification process recommended above.		2017-12-22

Attachments:

No	Name	Notes
1	ISFSI-L-C-HOLTEC-110917071022_0.pdf	
2	MPC Wrapped in Lot 4 on 9-27-17.jpg	
3	HPP-2464-035R7 - MPC Offload and Receipt Verification.pdf	

Date Created:	2017-10-20	**Created By:**	(b)(7)(C)

SOUTHERN CALIFORNIA EDISON

AR Number:	1017 - 52259		
Due Date:	--	**Status:**	Open
Priority:	3-Normal	**Assigned To:**	Decom Project
Equipment Related:	No	**CAP Related:**	No /Sig Level 3/4/5
MRC Review:	Yes	**OPS CFH**	Yes

Description:

All MPCs that are being shipped to SONGS must be properly packaged while in route, and must be properly receipt inspected; including verification of non-damaged covering and properly stored in accordance with technical specifications, procedures and standards. Based on issues identified in AR 1017-28743 a review and evaluation of the process Holtec has employed needs to be completed to ensure compliance. Additionally, periodic inspects, called out in HSP-315, need to have their frequency and acceptance criteria defined and where covering damage is found it shall be assessed and left in an acceptable condition.

Assignments:

#	Type	Assigned To	Description	Due Date	Status
1017 - 52259 -1	Generic	(b)(7)(C)	Review and evaluate the process Holtec has employed to ensure compliance, based on issues identified in AR 1017-28743. Additionally, evaluate the periodic inspects, called out in HSP-315, and the need to have their frequency and acceptance criteria defined related to where damage is found, it will be assessed and left in an acceptable condition.	2018-01-17	Open

Equipments:

Equipment ID	Unit	FLOC	Description

Notes:

Notes	Added By	Date
This an AR to document an Admin issue, not a DNC. No IFA required. Martin(CFH)	(b)(7)(C)	2017-10-19

Trend Codes:

Trend Code	Added By	Date
O-NOD Identified	(b)(7)(C)	2017-10-20
P-ISFSI		2017-10-20

Attachments:

No	Name	Notes

Date Created:	2017-10-18	**Created By:**	(b)(7)(C)

Logo		**Assignment Number:**	1017 - 52259 -1
AR Number:	1017 - 52259	**Due Date:**	2018-01-17
Current Status:	Open	**Priority:**	3-Normal
Assignment Type:	Generic	**Category:**	--
Assigned To:	(b)(7)(C)	**Work Group:**	Decom Project
SDS Reference:	--	**Reference:**	--

Description of Work:

Review and evaluate the process Holtec has employed to ensure compliance, based on issues identified in AR 1017-28743. Additionally, evaluate the periodic inspects, called out in HSP-315, and the need to have their frequency and acceptance criteria defined related to where damage is found, it will be assessed and left in an acceptable condition.

Notes:

Notes	**Added By**	**Date**
Closure documentation for AR 1017-52259 assignment 1. On September 27, 2017, the first Multipurpose canister (MPC) was delivered to SONGS in Parking Lot 4. The MPC was offloaded, receipted and stored in accordance with work order ISFSSI-FUEL-038 and procedure HPP-2464-035 Rev 3. ISFSI Project oversight witnessed the offload and wrote a satisfactory observation, Task 055, in the oversight database. Pictures of the up righted MPC with wrapping were taken. The MPC was stored in the Holtec designated storage area with wrapping on when the observation was done on September 27, 2017. Discussions with Holtec personnel indicated that the wrapping was removed late on September 27, 2017, to finish the verification that there was no shipping damage. On October 10, 2017 NOD conducted an assessment (Assessment 423) of the MPC to look at the shipping and offloading of CEC lids and the MPC. Out of that assessment, 4 ARs were written on the MPCs to document findings with receipt inspection, work order/procedure place keeping, and markings. On October 18, 2017, another NOD assessment (Assessment 425) was conducted again looking at MPC packaging, shipping, receipt inspection and storage requirements and the procedures directing that work. An AR was written to document issues with the MPC being unwrapped and requiring a hold tag be applied until the effect of being unwrapped is completed. A second AR was generated to address generic issues with procedure HSP-315 and the packaging, inspection and storage of the MPCs in the future. In addition, during a visit to the manufacturer of the MPCs on October 23, 2017, visible depressions near the open end of the MPC shell were identified. An AR was written to document this discovery and track resolution. This visible depression is also on the first MPC delivered and therefore will require the MPC to be returned to the Holtec fabrication facility for rework. This MPC will be cleaned, packaged and returned to SONGS as if a new MPC. The ISFSI project, based on the above issues, placed a hold on any further MPC shipments until these issues were addressed. The ISFSI project, ISFSI project oversight and Holtec have been working on resolutions to the above issues and have identified the appropriate corrective actions to resolve the ability to properly package, ship, receive and store the MPCs. These corrective actions are being inserted into the specific ARs identified above, to document with objective evidence that the issues have been completed and the hold on MPC shipment can be lifted. In regards to this specific AR assignment, the ISFSI Technical Specification (HI-2156506), Corporate QA procedures (HQP-02, 07 and 13), Corporate procedure (HSP-315), Site procedures (HPP-2464-081 and 035), and work order ISFSI-FUEL-564-038, were reviewed by Holtec and the ISFSI Project Oversight to evaluate the process Holtec is using to package, ship, receipt and store MPCs at SONGS is in compliance. Upon this review several actions were undertaken by Holtec to ensure compliance, provide clarification and correct confusing wording. The following documents were revised or created to accomplish those actions identified and those documents are attached to this AR assignment - ISFSI Technical Specification (HI-2156506), HPP-2464-315, HPP-2464-035 and work order ISFSI-FUEL-564-038. These changes will be used for all future MPC deliveries and will ensure compliance with the Holtec program. In regards to the requirement now in HPP-2464-315 to conduct periodic inspections in the storage yard, ISFSI-FUEL-564-038 work order was revised. The walk down is required every 14 days or within 24 hours after extreme weather. An attachment was added to document the walkdowns. See the attachment. No further action is required for this AR assignment.	(b)(7)(C)	2017-11-9

Attachments:

No	**Name**	**Notes**
1	HPP-2464-315R0 - Storage of Fabricated and Finished Products.pdf	
2	ISFSI-L-E-HOLTEC-110817112425_0.pdf	
3	HPP-2464-035R7 - MPC Offload and Receipt Verification.pdf	
4	MPC Protective covering insp..xlsx	
5	HI-2156506R4.PDF	
6	ISFSI-L-C-HOLTEC-110917071022_0.pdf	
7	Work Plan ISFSI-FUEL-564-038.pdf	
8	ISFSI-L-P-HOLTEC-110817170151_0.pdf	

Date Created:	2017-10-20	**Created By:**	(b)(7)(C)

Training Document Title/Encode: MNTTLMM - MECHANICAL MAINTENANCE TASK LIST	
Revision: 3	Department: MAINT

PREPARED BY: (b)(7)(C) [redacted] 9-14-16

Instructor/SME — Date

APPROVED BY: [redacted] (b)(7)(C) 9/14/16

Training Progra[redacted]er or designee — Date

MAINTENANCE TRAINING TASK LIST

Task List and Training Information

Task Number	Task Title	Training Requirement	Selection
Function: Mechanical Maintenance (MM)			
SS-MM-03	Maintain HVAC System	SS-MM-03, Maintain HVAC System	Initial/Lifetime
SS-MM-07	Rigger	SS-MM-07, Rigger	Initial/Lifetime
SS-MM-09	Oxy-Acetylene Torch	SS-MM-09, Oxy-Acetylene Torch	Initial/Lifetime
SS-MM-12	Mobile Crane Operator	SS-MM-12, Mobile Crane Operator	Initial / 5 year
SS-MM-13	Gantry / Overhead Crane Operator	SS-MM-13, Gantry / Overhead Crane Operator	Initial / 5 year
SS-MM-14	Inspect Rigging	SS-MM-14, Inspect Rigging	Initial/Lifetime
SS-MM-15	Overhaul Chainfalls / Come-Alongs	SS-MM-15, Overhaul Chainfalls / Come-Alongs	Initial/Lifetime
SS-MM-16	NUREG 0612 Program	SS-MM-16, NUREG 0612 Program	Initial/18 months

List of Changes / Revision History

Revision	Date	Description of Changes
0	3/4/2014	Transition from accredited training task list to decommissioning task list. Reduction in tasks and lifetime qualification selection are due to the relative decline in task difficulties in the decommissioning state.
1	7/9/2014	Added task SS-MM-16, NUREG 0612 Program (equivalent legacy eQIS qualification MT7072, NUREG 0612 Program) based on a review of decommissioning activities with SME Mike Orewyler.
2	2/4/2015	Eliminated tasks SS-MM-06 (combined with SS-MM-07) and SS-MM-11, modified tasks SS-MM-12, SS-MM-13, and SS-MM-16 expiration dates based on a review of decommissioning activities by SME Mike Orewyler.
3	9/14/2016	Deleted training deemed unnecessary due to the Cold and Dark status of SONGS. This included deleting the following from the task list: SS-MM-01, Maintain Pumps, SS-MM-02, Maintain Valves, SS-MM-04, Maintain Air Compressors, SS-MM-05, Maintain Diesels, and SS-MM-10, Plasma Arc Cutting.

NUREG 0612 CRANES, RIGGING AND LIFTING CONTROLS

TABLE OF CONTENTS

SECTION **PAGE**

1.0 OBJECTIVES

1.1 This procedure provides the administrative requirements for NUREG 0612 station commitments.

1.2 This procedure outlines the controls required for lifts of **HEAVY LOADS OVER OR NEAR IRRADIATED FUEL**.

1.3 This procedure applies to **HEAVY LOADS** lifted with **NUREG 0612 CRANES**.

1.4 This procedure applies to **HEAVY LOADS** lifted with **NON-CRANE RIGGING** (such as chain-falls, come-a-longs, etc.) that will pass **OVER OR NEAR IRRADIATED FUEL**.

1.5 This procedure **DOES NOT** apply to **ROUTINE LIFTS**.

2.0 REFERENCES

2.1 NRC Commitments

2.1.1 Various NUREG 0612 related documents, refer to Developmental Resources Attachment 3

2.1.2 Unit 1 Post Defueled Technical Specification D3.3

2.1.3 Certificate of Compliance NO. 72-1029, and Technical Specifications for Dry Cask Storage System, VPL SO1-207-1-M210

2.2 Procedures

2.2.1 SO123-I-7.10, Periodic Inspection and Testing of Rigging and Accessories

2.2.2 SO123-I-7.13, Inspection of Chain-Falls, Come-A-longs, other Portable Hoists and Hoisting Accessories

2.2.3 SO123-I-7.14, Maintenance and Inspection of Cranes

2.2.4 SO123-I-7.22, Mobile Crane Checkout and Operation in the Protected Area or ISFSI

2.2.5 SO123-I-7.24, Rigging Manual

2.2.6 SO123-I-7.102, Dry Fuel Storage Special Lifting Devices

2.2.7 SO2-I-3.32, Unit 2 Cask Handling Crane Checkout and Operation

2.2.8 SO23-I-3.21, New Fuel Crane Checkout and Operation

2.2.9 SO23-I-6.157, Spent Fuel Pool Gate Removal/Reinstallation

2.2.10 SO3-I-3.32, Unit 3 Cask Handling Crane Checkout and Operation

2.2.11 SO123-XV-HU-3, Human Performance Program

2.3 Other

2.3.1 Updated Final Safety Analysis Report (UFSAR), Table 9.1-5, NUREG-0612 Heavy Load Handling Systems

2.3.2 UFSAR Chapter 15

2.3.3 SCE Accident Prevention Manual

2.3.4 ANSI N14-6-1993, American National Standard for Special Lifting Devices

2.3.5 716031, Fuel Handling Building Cask handling Crane Travel Path Requirements Plan

2.3.6 716032, Fuel Handling Building Cask Crane Hook Height Requirements

2.3.7 716033, Fuel Handling building Cask Lift at Storage Pool

2.3.8 716036, Fuel Handling Building New Fuel Handling Crane Safe Load Path

2.3.9 MNTTLMM, Mechanical Maintenance Task List

2.3.10 SSMMCL, Safe Store Mechanical Maintenance Check List

2.3.11 SSMM16, NUREG 0612 Program (Computer Based Training)

2.3.12 SSMM07, Rigger

3.0 PREREQUISITES

3.1 **VERIFY** this document is current by using one of the methods described in SO123-XV-HU-3.

3.2 **VERIFY** Level of Use requirements on the first page of this procedure.

4.0 PRECAUTIONS

4.1 The **requirements** of SO123-I-7.24, Rigging Manual, apply to the rigging activities of this procedure.

4.2 **When** handling **NUREG 0612** loads, the administrative controls and requirements of this procedure and each **NUREG 0612 CRANE** check out and operation procedure **SHOULD** be followed without deviation.

5.0 CHECKLISTS

5.1 None

6.0 PROCEDURE

NOTE

SHOULD is implied, if **SHALL** or **MAY** are **NOT** specifically called out in procedure steps.

6.1 NUREG 0612 Overhead Handling Systems

NOTE

Cranes subject to the requirements of NUREG 0612 are listed in Table 1 (derived from Reference 2.3.1). Cranes **NOT** listed in Table 1 are **NOT** subject to the requirements of NUREG 0612.

6.1.1 Table 1 below lists all cranes subject to the requirements of NUREG 0612 and the qualifications needed to operate them.

TABLE 1 NUREG 0612 CRANES

	Crane	Unit	Required Qualification
1.	Cask Handling Crane	2-3	**NUREG 0612 CRANE OPERATOR**
2.	New Fuel Crane	2-3	**NUREG 0612 CRANE OPERATOR**
3.	Mobile Hydraulic Cranes/Lattice Boom Cranes (ONLY when operated **OVER OR NEAR IRRADIATED FUEL**)	123	**NUREG 0612 CRANE OPERATOR**

6.0 PROCEDURE (Continued)

6.2 **General NUREG 0612 Commitments**

6.2.1 Miscellaneous NUREG 0612 Commitments

NOTE

Some cranes are equipped with bypass controls which **MAY** be used in accordance with the crane's checkout and operation procedure.

.1 Interlocks and protective devices **SHALL NOT** be overridden or bypassed (by means of field expedient or temporary modification) unless authorized by an approved Work Order (WO).

.1.1 The WO **SHALL** include a step for authorization from the Manager, Maintenance and the Manager, Engineering.

.1.2 After the evolution is complete, the WO **SHALL** include the step(s) to restore the interlocks and protective devices to normal as soon as possible.

.2 In **AREAS OVER OR NEAR IRRADIATED FUEL**, **HOOK SPEEDS SHALL** be maintained as low as is practical to reduce the dynamic load induced during movement.

.2.1 For all lifts **OVER OR NEAR IRRADIATED FUEL**, slings and lifting devices **SHALL** have additional capacity to account for dynamic loading as follows:

- **HOOK SPEED** less than 20 feet per minute: 10%
- **HOOK SPEED** equal to or greater than 20 feet per minute: 50%

.3 For **HEAVY LOADS** lifted with **NON-CRANE RIGGING** that will pass **OVER OR NEAR IRRADIATED FUEL,** the rigging capacity **SHALL** be rated a minimum of 200% of the load lifted (including sling angle).

NOTE

In accordance with good rigging practice, **NO** load, regardless of weight, **SHOULD** be passed over any equipment or personnel if it can be avoided.

.4 On all cranes empty hooks and loads weighing less than 1500 lbs. are considered **ROUTINE LIFTS** and **DO NOT** receive special consideration or treatment as **HEAVY LOADS**.

.5 **HEAVY LOADS** that will pass **OVER OR NEAR IRRADIATED FUEL** that have **NOT** been evaluated and are **NOT** addressed in an approved procedure **SHALL** receive an assessment to determine whether the lift activity requires prior NRC approval in accordance with 10 CFR 50.59 or 10 CFR 72.48.

6.0 PROCEDURE (Continued)

6.2.2 Units 2 and 3 Cask Handling (Single Failure Proof) Cranes

.1 Metallic slings such a chain or wire rope are to be used for NUREG 0612 lifts and **SHOULD** satisfy ASME B30.9-2003, when using the Cask Handling Cranes. The slings **SHOULD** be either configured to provide dual or redundant load paths or selected to support a load twice the weight of the handled load.

.2 The Unit 2 cask handling crane **SHALL** be operated in accordance with SO2-I-3.32, Cask Handling Crane Checkout and Operation. The Unit 3 Cask Handling Crane **SHALL** be operated in accordance with SO3-I-3.32, Cask Handling Crane Checkout and Operation.

.3 Lifts of **HEAVY LOADS** by the cask handling crane **SHALL** be restricted to the **SAFE LOAD PATH** shown on drawings 716031, 716032, and 716033. (Refer to SO2-I-3.32 or SO3-I-3.32)

.4 Spent fuel pool weir gate lifts at Units 2 & 3 **SHALL** be performed in accordance with SO23-I-6.157, Spent Fuel Pool Gate Removal/Installation, which contains the specific lifting requirements.

.5 **IRRADIATED FUEL** cask rigging **SHALL** be inspected to meet the requirements of ANSI N14.6-1993, Radioactive Materials, Special Lifting Devices. The SONGS procedure for this inspection is SO123-I-7.102. The cask lifting device **SHOULD** have either dual, independent load paths, or a single load path with twice the design safety factor (as specified by ANSI N14.6-1993). Casks **SHALL** be handled in accordance with approved procedures.

6.2.3 Units 2 and 3 New Fuel Cranes

.1 The new fuel crane **SHALL** be operated in accordance with SO23-I-3.21, New Fuel Crane Checkout and Operation.

.2 Lifts of **HEAVY LOADS** by the new fuel handling crane **SHALL** be restricted to the **SAFE LOAD PATH** shown on drawing 716036 (Refer to SO23-I-3.21).

.3 Spent fuel pool weir gate lifts at Units 2 & 3 **SHALL** be performed in accordance with SO23-I-6.157, Spent Fuel Pool Gate Removal/Installation, which contains the specific lifting requirements.

6.2.4 Mobile Hydraulic Cranes

.1 Mobile hydraulic cranes and Lattice Boom Cranes, **SHOULD** be operated in accordance with SO123-I-7.22, Mobile Crane Checkout and Operation in the Protected Area or ISFSI.

6.0 PROCEDURE (Continued)

6.3 SAFE LOAD PATHS

6.3.1 Attachment 1 lists the drawings which identify all **NUREG 0612 CRANE** locations and **SAFE LOAD PATHS**.

6.3.2 Prior to lifting any **HEAVY LOAD** (with a **NUREG 0612 CRANE**) over a designated or calculated load path, the following requirements **SHALL** be met:

.1 The **SAFE LOAD PATH SHALL** be clearly defined by the use of permanent or temporary markings, OR,

> **NOTE**
>
> The assigned rigger usually carries the procedure or drawing that defines the **SAFE LOAD PATH**.

.2 The procedure or drawing that defines the **SAFE LOAD PATH** and restricted or **NO** path areas **SHALL** be carried (in hand) by a second person assigned to "walk down" the lift and guide the **NUREG 0612 CRANE OPERATOR**.

.3 A preliminary walkdown of the lift travel path **SHALL** be performed to identify and remove (if practical) any obstructions which might interfere with or deflect the lifted object if dropped.

6.3.3 **HEAVY LOADS** that have established **SAFE LOAD PATHS** or zones in a procedure **SHALL** follow that load path.

.1 **DEVIATION** from an established **SAFE LOAD PATH** is prohibited.

6.3.4 **HEAVY LOADS** that will pass **OVER OR NEAR IRRADIATED FUEL** and that do **NOT** have a load path or zone established in an approved drawing and maintenance procedure **SHALL** require a load path or zone be established as follows:

> **NOTE**
>
> An NECP with 10 CFR 50.59 screen or 10 CFR 72.48 screen is required to issue a new controlled drawing.

.1 Generate an Action Request requesting that a controlled drawing and maintenance procedure to govern the lift be created.

6.0 PROCEDURE (Continued)

6.4 Load Handling Procedures

6.4.1 **RIGGERS SHALL** be trained, qualified, and conduct themselves in accordance with SSMMCL, Safe Store Mechanical Maintenance Check List.

6.4.2 Refer to the individual **NUREG 0612 CRANE'S** check out and operation procedure for specific rigging and load handling requirements for each crane's service area.

6.4.3 Table 2 below lists all **NUREG 0612 CRANES**. When handling NUREG 0612 loads, the administrative controls and requirements of this procedure and each **NUREG 0612 CRANE** check out and operation procedure **SHOULD** be followed without deviation.

.1 The **NUREG 0612 CRANE OPERATOR** have the crane check out and operation procedure in his/her possession when operating a **NUREG 0612 CRANE**.

TABLE 2 NUREG 0612 CRANES/Procedures

	Crane	**Unit**	**Procedure No.**
1.	Cask Handling Crane	2	SO2-I-3.32
2.	Cask Handling Crane	3	SO3-I-3.32
3.	New Fuel Crane	2/3	SO23-I-3.21
4.	Mobile Crane (when operated **OVER OR NEAR IRRADIATED FUEL** in the PA or ISFSI)	123	SO123-I-7.22

NOTE

The Maximum Hook Heights listed in Table 3 are in reference to Plant Elevations.

6.4.4 Table 3 below provides **NUREG 0612 CRANE** Maximum Hook Heights. When handling **NUREG 0612** loads, these Maximum Hook heights **SHOULD** be referred to which will provide a reference to crane operator for maximum hook height limits.

TABLE 3 NUREG 0612 CRANES Maximum Hook Height

	Crane	**Unit**	**Maximum Hook Height**
1.	Cask Handling Crane Main Hook	2/3	95 ft. 6 in.
2.	Cask Handling Crane Aux Hook	2/3	90 ft. 2-1/2 in.
3.	New Fuel Crane	2/3	101 ft. 3 in.

6.0 PROCEDURE (Continued)

6.5 NUREG 0612 CRANE OPERATOR Training

6.5.1 **NUREG 0612 CRANE OPERATORS SHALL** be trained and qualified, and conduct themselves in accordance with CBT SSMM16, NUREG 0612 Program.

.1 An individual is qualified as a **NUREG 0621 CRANE OPERATOR** if that individual has the NUREG 0612 Program (SSMM16) qualification AND the associated crane qualification from the Mechanical Maintenance Task List (SAP Training Document MNTTLMM).

6.5.2 **NUREG 0612 CRANE OPERATORS SHALL** be re-qualified via a crane operator medical exam annually.

6.5.3 Records on **NUREG 0612 CRANE OPERATOR** training, qualification and requalification **SHALL** be maintained on file.

6.5.4 If a qualified **NUREG 0612 CRANE OPERATOR** is determined **NO** longer to possess the requisite proficiency or physical qualifications, then steps **SHALL** be taken to assure that the identified deficiencies are corrected.

.1 Deficiencies that **CAN NOT** be corrected **MAY** be sufficient reason for disqualification.

6.6 SPECIAL LIFTING DEVICES

6.6.1 Prior to use, **SPECIAL LIFTING DEVICES SHALL** be inspected and tested in accordance with SO123-I-7.102, Dry Fuel Storage Special Lifting Devices. **SPECIAL LIFTING DEVICES** include the following:

.1 NUHOMS Transfer Cask Trunnions

.2 NUHOMS Transfer Cask Yokes

.3 NUHOMS Transfer Cask Extension

.4 Dry Shielded Canister (DSC) Shield Plug Slings

6.6.2 Vendor **SPECIAL LIFTING DEVICES SHALL** be inspected and tested in accordance with an approved Vendor procedure.

6.0 PROCEDURE (Continued)

6.7 Rigging

NOTE

1. Rigging components are manufactured to ASME B30 standards which have inherent safety factors; for example, slings are manufactured to ASME B30.9 and have a design factor of 5. Thus at 100% of rated capacity, a sling has an ultimate stress safety factor of 5.
2. A sling application at 200% of rated capacity, has an ultimate stress safety factor of 10. For example, if the determined rigging load is 2000 pounds, a 2 x 2000 or 4000 pound rated sling will provide the required safety factor of 10.
3. Rigging any load must always include increasing the rigging capacity to account for sling angle and dynamic loading for **HOOK SPEED**.

6.7.1 The **RIGGER SHALL** calculate the load weight or determine a "**NOT** greater than" load weight and ensure rigging has the necessary capacity (NUREG 0612, Bulletin 96-02).

NOTE

For example, if a load is to be lifted **OVER OR NEAR IRRADIATED FUEL** using the auxiliary or accessory hoist of the cask cranes, the rigging **SHALL** be rated to 150% of the load to be lifted unless the **HOOK SPEED** is less than 20 feet per minute. (NUREG 0612, Bulletin 96-02)

6.7.2 If crane **HOOK SPEED** is **20 feet per minute or greater,** add a dynamic load factor of 50% to the load to be lifted, including sling angle. For example, if using the auxiliary or accessory hoist of the cask crane, or mobile crane at a speed of 20 feet per minute, the rigging **SHALL** be rated to 150% of the load to be lifted.

6.7.3 If crane **HOOK SPEED** is **less than 20 feet per minute**, add a dynamic load factor of 10% to the load to be lifted, including sling angle. For example, if using the main hook of the cask crane, or mobile crane at a speed of less than 20 feet per minute, rigging **SHALL** be rated to 110% of load to be lifted.

6.7.4 For **HEAVY LOADS** lifted with **NON-CRANE RIGGING** that will pass **OVER OR NEAR IRRADIATED FUEL,** the rigging capacity **SHALL** be rated a minimum of 200% of the load lifted (including sling angle).

6.7.5 All slings **SHALL** meet the requirements of ANSI B30.9-1971.

6.0 PROCEDURE (Continued)

6.7.6 Periodic Inspection metal tags, marks, stencils, or a manufacturer supplied tag/label installed in accordance with SO123-I-7.10, suffices for rigging control verification of wire rope slings, hooks, personnel lifting devices, cargo container lifting devices, beams, spreaders, and steel chain slings provided the tags, marks or stencils are in place and the next required inspection due date has **NOT** been exceeded.

6.7.7 Periodic Inspection tags and color codes are **NO** longer required on nylon slings, shackles, eye bolts, eye nuts, turnbuckles and miscellaneous accessories.

NOTE

Rigging is defined as anything used to connect a load to a lifting device, such as slings, shackles, eye bolts, spreader bars, chain falls, and any special lift fixture.

6.7.8 All rigging **SHALL** be included in the preventive maintenance program. The preventive maintenance requirements and frequencies **SHALL** be as defined in SO123-I-7.10 or SO123-I-7.13.

6.7.9 For unique or one time lifts, hoisting equipment (excluding cranes) **MAY** be re-rated, or modified and re-rated, upon approval by the manufacturer or if the manufacturer's specifications are **NOT** available, the limitations assigned to the equipment **SHALL** be based on the determinations of the Manager, Maintenance and the Manager, Engineering. Re-rated equipment **SHALL** be given a dynamic load test over the full range of the lift using a test weight at least equal to the lift weight.

.1 Create an Action Request to establish and document the requirements of NUREG 0612 when re-rating equipment used for lifts of **HEAVY LOADS OVER OR NEAR IRRADIATED FUEL**.

6.0 PROCEDURE (Continued)

6.8 Crane Inspection, Testing, and Maintenance

6.8.1 All **NUREG 0612 CRANES**/hoists **SHALL** be included in the preventive maintenance program. The preventive maintenance requirements and frequencies **SHALL** be as defined in procedures listed in SO123-I-7.14.

6.8.2 All **NUREG 0612 CRANES** and hoists over 3 tons rated capacity **SHALL** be certified annually as evidenced by records attesting to compliance with applicable CAL/OSHA standards, except in the case of inaccessible cranes addressed below.

6.8.3 All **NUREG 0612 CRANES** and hoists over 3 tons rated capacity **SHALL** be proof load tested every four years in conjunction with the crane or hoist certification and in the presence of the certifying agent, except in the case of inaccessible cranes addressed below.

6.8.4 **NUREG 0612 CRANES** or hoists which are inaccessible during the time requiring certification or proof load testing **SHALL** be certified or proof load tested at the next available opportunity or prior to use.

6.8.5 All **NUREG 0612 CRANES** are subject to prior-to-use inspections in accordance with their checkout and operation procedure (Refer to Table 2).

NOTE

A crane load test is not required for modifications or replacement of the wire rope provided the wire rope is tested separately and appropriately certified.

6.8.6 All **cranes** in which load sustaining parts have been altered, replaced or repaired **SHALL** be proof load tested prior to use.

6.8.7 **Various** procedures and WOs **SHALL** be used to document completion of inspections, tests, etc., as provided on the respective form. (See SO123-I-7.14 for details of use.)

6.9 Specifications for the Spent Fuel Pool

6.9.1 Loads in excess of 2000 pounds **SHALL** be prohibited from travel over fuel assemblies in the storage pool except for the following two cases:

.1 Spent fuel pool gates **SHALL NOT** be carried at a height greater than 30 inches (elevation 36'4") over the fuel racks and all fuel assemblies removed from fuel racks in the predicted drop zone (see SO23-I-6.157, Spent Fuel Pool Gate Removal / Reinstallation). (UFSAR Chapter 15)

.2 Test equipment skid (4500 pounds) **SHALL NOT** be carried at a height greater than 72 inches (elevation 39'10") over fuel rack cells which contain fuel assemblies. (UFSAR Chapter 15)

7.0 RECORDS

7.1 None

SAFE LOAD PATH DRAWING/PROCEDURE APPLICABILITY LIST

Drawing	Title	Location	Procedure
SAFE LOAD PATH / ZONE DRAWING / PROCEDURE APPLICABILITY UNITS 2/3			
716031	Fuel Handling Building Cask Handling Crane Travel Path Requirements Plan	Fuel Handling Building	SO2-I-3.32 SO3-I-3.32
716032	Fuel Handling Building Cask Crane Hook Height Requirements	Fuel Handling Building	SO2-I-3.32 SO3-I-3.32
716033	Fuel Handling Building Cask Lift At Storage Pool Requirements	Fuel Handling Building	SO2-I-3.32 SO3-I-3.32
716036	Fuel Handling Building New Fuel Handling Crane	Fuel Handling Building	SO23-I-3.21

DEFINITIONS

NOTE: See SO123-I-7.24, Rigging Manual, for General Rigging Definitions.

HEAVY LOAD	Load greater than 1500 lbs at the hook, including all rigging hardware.
RIGGER	A Rigger is qualified for all Lifts, **MAY** operate certain designated **NUREG 0612 CRANES**/hoists per Table 1and satisfies the training requirements of SSMMCL to receive qualification ENCODE SSMM07, Rigger.
HOOK SPEED	Vertical movement of the hook and block.
INADVERTENT DEVIATION	Failure to follow a **SAFE LOAD PATH** called out in a maintenance procedure or work order (WO).
INTERVENING STRUCTURE	A civil structure between the **IRRADIATED FUEL** and the lift; e.g., the roof or wall that has the strength to withstand the force of the load should the load be dropped.
IRRADIATED FUEL	Fuel that has been critical in the core. This includes spent fuel stored in the spent fuel pool, and fuel in transit to the ISFSI, or at the ISFSI.
LIGHT LOAD	Load less than 1500 lbs. at the hook, including all rigging hardware.
MANLIFT	The term encompasses several types of aerial work platforms which include telescoping boom lifts, tele-handlers or scissor lifts. A manlift could also be a single non-motorized man-basket.
NON-CRANE RIGGING	**NON-CRANE RIGGING** is manual rigging such as chain-falls, come-a-longs, etc.
NUREG 0612 CRANE	Cranes and hoists that can move **HEAVY LOADS** horizontally **OVER OR NEAR IRRADIATED FUEL**. Tables 1-3 list the SONGS **NUREG 0612 CRANES**.
NUREG 0612 CRANE OPERATOR	A crane operator qualified to operate **NUREG 0612 CRANES** in accordance with SSMMCL and this procedured.
OVER OR NEAR	Lifts, which if dropped, could hit an object or could bounce, roll, or fall over and hit the object under consideration (height of lift, shape of load, and load material will affect "Near").

DEFINITIONS (Continued)

NOTE: See SO123-I-7.24, Rigging Manual, for General Rigging Definitions.

ROUTINE LIFT	Any lift of a **LIGHT LOAD**, or any lift of a **HEAVY LOAD** that is **NOT** made **OVER OR NEAR IRRADIATED FUEL** . **ROUTINE LIFTS** are made in accordance with SO123-I-7.24.
SAFE LOAD PATH	The physical route of a **HEAVY LOAD OVER OR NEAR IRRADIATED FUEL**. A **SAFE LOAD PATH** is required when any **HEAVY LOAD** (loads more than 1500 lbs.) is lifted with **NUREG 0612 CRANES** or **NON-CRANE RIGGING** over a designated or calculated load path. For NUREG 0612 lifts, there is a requirement for marking the load path or having a load path drawing in hand during the lift. For a list of **SAFE LOAD PATH** drawings/procedures for NUREG 0612 lifts, refer to Attachment 1 of this procedure.
SPECIAL LIFTING DEVICES	Rigging devices dedicated to a specific NUREG 0612 lifting activity; a specific piece of rigging equipment used for **NO** other purpose, e.g., cask yoke, yoke extension.

DEVELOPMENTAL RESOURCES

A. Actions

NOTE: The following resources are **NOT** applicable to all Units in all cases, hence, the applicable Unit(s) are in bold print preceding each resource.

1. **Units 1,2,3** - Letter from V. Stello, Jr. (NRC), to All Licensees, Task A-36, Control of Heavy Loads, dated May 17, 1978 (Requested information on control of heavy loads, responses to this letter were used to develop NUREG 0612)

2. **Units 1,2,3** - NUREG 0612, NRC, Control of Heavy Loads at Nuclear Power Plants, Dated July 1980 (Established guidelines to reduce the potential for uncontrolled movement or dropping of a load)

3. **Units 1,2,3** - ANSI N14.6-1993, Special Lifting Devices for Shipping Containers Weighing 10,000 pounds (4500 kg) or More for Nuclear Materials

4. **Units 1,2,3** - ANSI/ASME N45.2.2-1978, Packaging Shipping, Receiving, Storage, and Handling of Items for Nuclear Power Plants.

5. **Units 1,2,3** - ANSI B30.2-1976, Overhead and Gantry Cranes (for Operator qualification and crane design, inspection, testing and maintenance)

6. **Units 1,2,3** - ANSI B30.9-2003, Slings

7. **Units 2/3** - ANSI B30.11-1973, Monorail Systems and Underhung Cranes

8. **Units 2/3** - ANSI B30.16-1973, Overhead Hoists

9. **Units 2/3** - ANSI MH27.1-1981, Specifications for Underhung Cranes and Monorail Systems

10. **Unit 1** - CMAA-70-1975, Specifications for Electric Overhead Traveling Cranes

11. **Units 2/3** - CMAA-70-1971, Specifications for Electric Overhead Traveling Cranes

12. **Units 1,2,3** - Letter from D.G. Eisenhut (NRC), to All Licensees, Control of Heavy Loads, dated December 22, 1980 (Requested SONGS to perform evaluation of Heavy Loads Program)

13. **Units 1,2,3** - Letter from D.G. Eisenhut (NRC), to All Licensees, Control of Heavy Loads (Generic Letter 81-07), dated February 3, 1981 (Provided information missing from previous letter and requested SONGS to perform evaluation of Heavy Loads Program)

14. **Units 2/3** - Letter from K.P. Baskin to F. Miraglia (NRC), Docket 50-361 and 50-362, Units 2 and 3, dated July 7, 1981 (Transmitted Control of Heavy Loads for SONGS Units 2 & 3, TERA Corporation, dated June 10, 1981 in response to the information specified in Section 2.1 of Enclosure 3 of the December 22, 1980 letter)

15. **Unit 1** - Letter from K.P. Baskin to D.M. Crutchfield (NRC), Docket 50-206, NUREG 0612, Unit 1, February 5, 1982 (Provided status and submittal schedule for Unit 1)

16. **Unit 1** - Letter from K.P. Baskin to D.M. Crutchfield (NRC), NUREG 0612, Unit 1, February 22, 1982 (Placed load handling restrictions on the turbine gantry crane and reactor service cranes for Unit 1)

DEVELOPMENTAL RESOURCES (Continued)

A. Actions (Continued)

17. **Unit 1** - Letter from K.P. Baskin to D.M. Crutchfield (NRC), Docket 50-206, NUREG 0612, Unit 1, dated April 1, 1982 (Transmitted six month TERA report for Unit 1)

18. **Unit 1** - Letter from K.P. Baskin to D.M. Crutchfield (NRC), Docket 50-206, NUREG 0612, Unit 1, April 9, 1982 (Provided notification of pending implementation of operator procedures for the turbine gantry crane and reactor service crane for Unit 1)

19. **Units 2/3** - Letter from K.P. Baskin to F. Miraglia (NRC), Docket 50-361 and 50-362, Units 2 and 3, dated April 30, 1982 (Transmitted Control of Heavy Loads for SONGS Units 2 & 3, TERA Corporation, dated April 1982 in response to the information specified in Sections 2.2; 2.3 and 2.4 of Enclosure 3 of the December 22, 1980 letter, also provided lift rig evaluations and identified & evaluated the TGC side boom and several small jib cranes)

20. **Unit 1** - Letter from R.W. Krieger to D.M. Crutchfield (NRC), Docket 50-206, NUREG 0612, Unit 1, May 10, 1982 (Provided notification that the nine month TERA report would **NOT** be submitted until June 18, 1982)

21. **Units 2/3** - Letter from K.P. Baskin to F. Miraglia (NRC), Docket 50-361 & 50-362, Units 2 and 3, dated June 30, 1982 (Responded to the information specified in Section 2.1 of Enclosure 3 of the December 22, 1980 letter in regard to the additional cranes identified in the previous report)

22. **Unit 1** - Letter from K.P. Baskin to D.M. Crutchfield (NRC), Docket 50-206, NUREG 0612, Unit 1, July 6, 1982 (Submitted nine month TERA report for Unit 1)

23. **Unit 1** - Letter from R.W. Krieger to H.B. Ray, NUREG 0612, Unit 1, dated August 3, 1982 (Summarized procedural requirements to be implemented)

24. **Unit 1** - Letter from D.M. Crutchfield (NRC) to R. Dietch, NUREG 0612, Unit 1, dated August 3, 1982 (Submitted NRC's draft Technical Evaluation Report [Franklin Report] and requested additional clarification of some items)

25. **Units 2/3** - Letter from K.P. Baskin to F. Miraglia (NRC), Docket 50-361 and 50-362, Units 2 and 3, dated August 3, 1982 (Submitted Supplemental TERA Report dated July 1982, provided responses to telephone conversations concerning the July 7, 1981 Heavy Loads Submittal, provided RV head load drop analysis.

26. **Units 2/3** - Letter from K.P. Baskin to F. Miraglia (NRC), Docket 50-361 and 50-362, Units 2 and 3, dated August 25, 1982 (Provided additional information concerning the turbine gantry crane side boom in accordance with Section 5.1, Part IV of NUREG 0612)

27. **Unit 1** - Letter from K.P. Baskin to D.M. Crutchfield (NRC), Docket 50-206, NUREG 0612, Unit 1, October 21, 1982 (Submitted the Supplemental Information Report to resolve and clarify issues from the Franklin Report)

28. **Unit 1** - Letter from D.M. Crutchfield (NRC) to K.P. Baskin, Control of Heavy Loads (Phase I), Unit 1, dated February 24, 1984 (Submitted NRC's revised draft Technical Evaluation Report [Franklin Report] and requested additional information)

DEVELOPMENTAL RESOURCES (Continued)

A. Actions (Continued)

29. **Units 2/3** - Letter from G.W. Knighton (NRC) to K.P. Baskin, Control of Heavy Loads (Phase I) at SONGS 2 and 3, dated August 27, 1984 (Submitted NRC's final Safety Evaluation Report and Technical Evaluation Report [EG&G Idaho Report])

30. **Units 2/3** - Letter from M.O. Medford to G.W. Knighton (NRC), Docket Nos. 50-361 and 50-362, Units 2 and 3, dated October 5, 1984 (Provided SCE's evaluation of NRC's final Safety Evaluation Report to ensure SCE implementation is consistent with Safety Evaluation Report)

31. **Unit 1** - Memorandum, K.A. Benguiat to L. Bennett, NUREG 0612, Unit 1, dated July 22, 1985 (Requested clarification of commitments)

32. **Unit 1** - Letter, M. O. Medford to J. A. Zwolinski, Control of Heavy Loads, Unit 1, dated August 29, 1985 (Transmitted the Report on the Resolution of Issues Related to Control of Heavy Loads at SONGS Unit 1 [Tenera Report], dated July 1985 which addressed additional information requested by revised draft Technical Evaluation Report)

33. **Units 2/3** - Memorandum from J.T. Reilly to D.E. Shull, Extension of Reactor Coolant Pump Safe Load Path for Miscellaneous Heavy Loads, dated September 21, 1985

34. **Units 1,2,3** - Memorandum J.L. Rainsberry to K.A. Benguiat, Control of Heavy Loads, Unit 1, dated October 4, 1985 (Provided clarification of commitments related to NUREG 0612 guidelines 1, 2, 4 and RCP hatch/motor lifts, also provided clarification applicable to Units 2 and 3)

35. **Unit 1** - Letter from J.A. Zwolinski, NRC, to K.P. Baskin, Control of Heavy Loads Phase I, Unit 1, dated November 4, 1985 (Submitted final Safety Evaluation Report and final Technical Evaluation Report [Franklin Report])

36. **Units 2/3** - Memorandum R.J. St Onge to T.D. Mercurio, Response to Licensing Questions on Spent Fuel Pool Gates, dated October 28, 1986

37. **Units 2/3** - Memorandum D.E. Shull to D.L. Cox, Unit 2/3 Special Lift Rigs, dated October 31, 1986 (Requested changes to special lift rig inspection/test program)

38. **Units 2/3** - Letter M.O. Medford to US NRC, Docket Nos. 50-361 and 50-362, Lifts of Spent Fuel Pool Gates, dated February 18, 1987

39. **Units 2/3** - Memorandum from D.E. Shull to D.L. Cox, Need for Expedited Action of previous request ..., dated April 24, 1987

40. **Units 2/3** - DCP 6570.OC, Rev 0, NUREG 0612 Evaluation For Containment Jib Crane Lifts, dated July 1987

41. **Units 2/3** - Preliminary 10 CFR 50.59 Safety Evaluation, SONGS Units 2 and 3 Inspection of Special Lifting Devices, dated July 1987 (To verify continuing compliance with ANSI N14.6-1978)

DEVELOPMENTAL RESOURCES (Continued)

A. Actions (Continued)

42. **Units 2/3** - Nuclear Licensing Telephone Discussion with NRC, Spent Fuel Pool Reracking, dated March 22, 1990 (Required two procedures to be completed regarding heavy load drops and open hatches)

43. **Units 1,2,3** - Rigging Standards Manual, SCE Occupational Safety and Health Division, Revised September 1988

44. **Units 1,2,3** - SCE Accident Prevention Manual, March 1992

45. **Units 2/3** - Memorandum from J.R. Tate to J.J. Wambold, SCE Commitments in Response to NUREG 0612 Control of Heavy Loads at Nuclear Power Plants, Units 2 and 3, dated February 8, 1984 (Discussed procedural measures for RCP motor lifts)

46. **Units 2/3** - Memorandum from H.L. Richter to H.B. Ray, Interim Procedures for Reactor Coolant Pump Motor Lift, Units 2 and 3, dated February 18, 1984 (Discussed procedural measures for RCP motor lifts)

47. **Unit 1** - Memorandum from J.J. Wambold and M.O. Medford to B. Katz, Turbine Gantry Crane Restrictions, Unit 1, dated September 9, 1987 (This memo superseded)

48. **Unit 1** - Memorandum from R.M. Rosenblum to H.E. Morgan, Turbine Gantry Crane Restrictions, dated October 12, 1989

49. **Unit 1** - Post Defueled Technical Specifications

50. **Units 2/3** - Licensee Controlled Specifications

51. **Units 1,2,3** - Procedures listed in the References Section of this procedure

52. **Units 2/3** - Letter from Walter C. Marsh to U.S. Nuclear Regulatory Commission, Response to NRC Bulletin 96-02. "Movement of Heavy Loads Over Spent Fuel, Over Fuel in the Reactor Core, or Over Safety Related Equipment, Units 2 and 3, dated May 14, 1996 (Discussed handling heavy loads while the reactor is at power)

53. **Units 2/3** - Penetration Area 480V Transformer Replacement NUREG 0612 Heavy Loads Evaluation for MMP 2&3-6974.00SE

54. **Units 2/3** - DCN No. 24, Revision 4, TCN 4-7 of Document No. DBD-SO23-TR-HZ, Revision 4, Hazards Analysis Topical DBD, issued 4-9-97, regarding the general use restrictions of the Unit 2 & 3 polar crane jib hoist for maintenance activities.

55. **Units 2/3** - Action Request (AR) 970301383; to include Polar Crane Jib Hoist in SO123-I-1.13.

56. **Units 1,2,3** - Action Request (AR) 960500415; included simplified, general guidance of similar requirements provided in SONGS (Maintenance) crane procedures and safe load path drawings for slings to account for dynamic loads based on hoist speed.

DEVELOPMENTAL RESOURCES (Continued)

A. Actions (Continued)

57. **Unit 1** - Reactor Service Bridge Crane; AR 991200917-3; NUREG 0612 designation for Unit 1 Reactor Service Bridge Crane is **NO** longer applicable. **NO** impact to Defueled Safety Analysis Report (DSAR).

58. **UNIT 1** - AR 991200917-6, cancellation of SO1-I-7.102 Inspection and Testing of Special Lifting Devices. Unit 1 Special Lifting devices inspected in accordance with ANSI N14-6-1993, American National Standard for Special Lifting Devices.

59. **UNITS 2/3** - AR 991200917-7, Change procedure, SO123-I-1.13, to coincide with TCN 6-1, SO123-I-7.24.

60. **Units 1/2/3** - AR 011000966, For heavy loads, lifted with non-crane rigging over or near safe shut down equipment or irradiated fuel, **MUST** follow the NUREG 0612 program.

61. **Units 2/3** - AR 030500453-1, Update procedure with superseded procedure numbers for Cask Handling Crane. Added references and commitments. Removes the Tankers as Seismic water sources, refer to ECP 000301540-6. Al Ockert

62. **Units 2/3** - AR 021000477-24, Update procedure with superseded procedure numbers for new Jib Crane Installation. Added references and commitments. Refer to ECP 021000477-14.

63. **Unit 1** - AR 031001485-34, Remove Unit 1 Turbine Gantry Crane from NUREG 0612 list after Spent Fuel is removed from Unit 1 Spent Fuel Pool.

64. **Units 2/3** - AR 040900417-2, Update procedure with Method "B" load test requirements for the Penetration Jib Cranes.

65. **Units 2/3** - AR 041101789-5, (Rev. 13) Update procedure with additional Safe Load Path information.

66. **Units 2/3** - AR 040900145-3, (Rev. 14) Update procedure with additional Table 3 at step 6.4.4 showing NUREG 0612 Cranes Maximum Hook Height.

67. **Units 2/3** - AR 070300710-3, (Rev. 15) Revise SO123-I-1.13, and remove Safe Load Path drawings from procedure.

68. **Units 2/3** - Supplement 1 to Regulatory Issue Summary (RIS) 2005-25, "Clarification of NRC Guidelines for Control of Heavy Loads," issued October 31, 2005.

69. **Units 2/3** - AR 070700110-6, (Rev. 16) The NRC Regulatory Issue Summary (RIS) 2005-25, requirement that slings should be metallic material such as chain or wire rope) is not requiring compliance, I think we need to specify "steel slings" are to be used for NUREG 0612 lifts using the Cask Handling (Single Failure Proof) Cranes. Slings should satisfy the criteria of ASME B30.9-2003, Slings. Lifts such as those made over the top of a loaded transfer cask (Shield Plug) and lifts of the Cask pool weir gate. Additionally, change the procedure step for the irradiated fuel cask lifting device as specified by ANSI N14.6-1993, Radioactive Materials, Special Lifting Devices. Mike Orewyler

DEVELOPMENTAL RESOURCES (Continued)

A. Actions (Continued)

70. **Units 2/3** - Order 800256735-50, (Rev 17) Evaluation of polar crane lifts and safe load paths. See Operation 10 under this order for detailed engineering summary of polar crane rigging activities evaluation and NUREG 0612 as it pertains to load path requirements.

71. **Units 2/3** - NN 200378090-06, (Rev 18) Incorporate drawing 716037/ECN D0014055 for Penetration Bldg Roof Jib Crane.

72. NN 200397411, (Rev 19) Heavy loads near containment equipment hatch.

73. NN 200641214, (Rev 19) Clarify rigging requirements.

74. NN 201535754, (Rev 20) Incorporate Unit 2 Simplified Reactor Head Assembly upgrades.

75. NN 201620131, (Rev 20) Incorporate Unit 2 reactor head lift rig tripod 6% dynamic loading factor.

76. NN 201770222, (Rev 20) Authorize use of Polar Crane jib hoist to move loads in containment.

77. NN 201620205, (Rev 21) Clarify cranes that are treated as NUREG 0612.

SUMMARY OF CHANGES

Procedure No. SO123-I-1.13 **Rev.** 27

Author (b)(7)(C) 89408

AR, Order, or Other Action	Description of Change	50.59	REVIEWER	Step(s), Section(s) or Page Number
ADMIN	Added note regarding crane load testing. Same note was added to Holtec procedure HPP-2464-007. Replaced “Notification” with “Action Request”.	A	See below	12 7, 11

Document Reviewers:	Name:
Owner/Maintenance	(b)(7)(C)
Approvers:	
Nuclear Oversight Final Approval:	N/A
CFDM Final Approval:	(b)(7)(C)