Robatel Technologies, LLC RT-100 Application for Contents Modification April 1, 2014

Docket No. 71-9365

AGENDA

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Meeting between Robatel Technologies, LLC (Robatel) and the Nuclear Regulatory Commission
April 1, 2014
1:00 p.m. – 2:30 p.m.
3WFN 13-A-28

1. Introduction.
2. Characterization of Activated Metal Contents for the Model No. RT-100 Package.
3. Shielding Evaluation Results.
4. Timeframe for Submittal of an Amendment Request.
5. Opportunity for Public Comments.
6. Conclusion.

Introduction

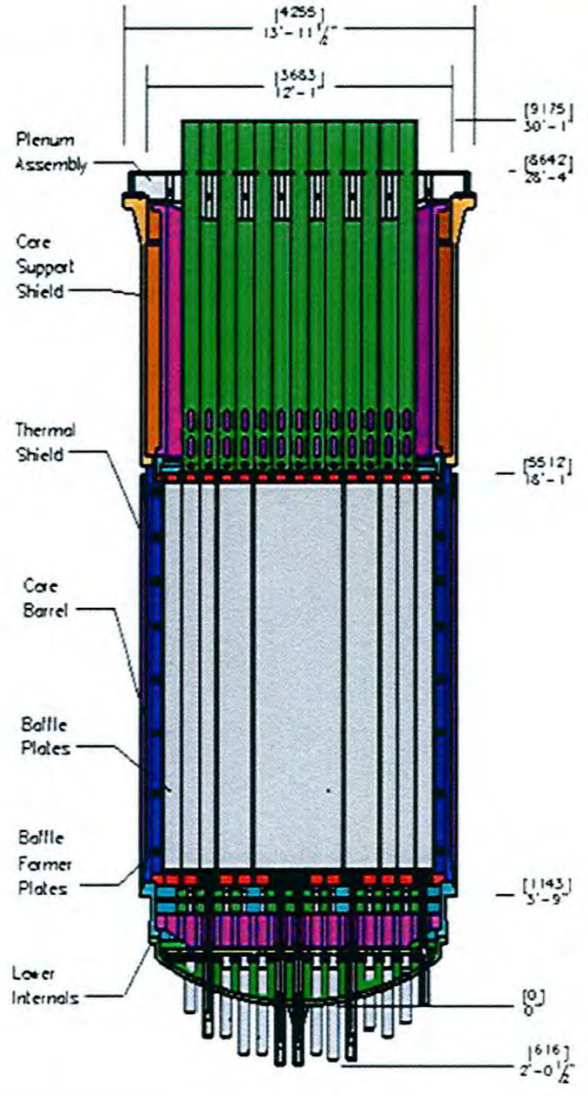
The Sacramento Municipal Utility District (SMUD), operator of the Rancho Seco reactor site, has secured funding to ship a total of 23 liners of Class B and C waste in calendar year 2014. SMUD has contracted for disposal of all 23 B&C liners at WCS in 2014, with the only contract contingency being the availability of a suitable transportation cask. The current estimate of the number of liners that will need a Type B cask is a minimum of 8, and a maximum of 14. This estimate is based on calculation from surveys performed before the wastes were placed in shielded storage (circa 2006). Some of the liners will be suitable for shipment in a Type A cask; this determination depending on updated dose surveys that will be performed when the liners are removed from shielded storage in preparation for disposal.

SMUD has committed to the NRC and SMUD stakeholders to remove Class B and C wastes from the IOSB as soon as a disposal option becomes available. Authorization of a cask to transport the waste will support those commitments, and provide corresponding benefits in risk and dose reduction at the site. Removal of the Class B and C wastes stored there will remove a final barrier to completion of Part 50 license decommissioning activities that began in 1989.

Reference: Rancho Seco Nuclear Generating Station Proposed Decommissioning Plan, May 20, 1991, (Amendment 4 July 2003)

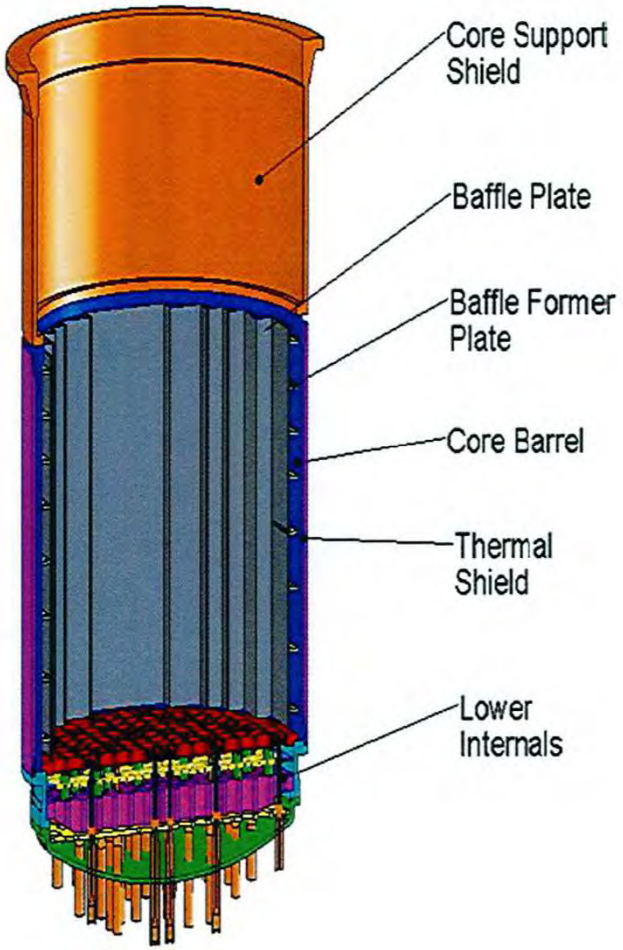
Rancho Seco Reactor Vessel Internals (RVI)

- 2,772 MWt Babcock & Wilcox PWR
- 343,000 pounds (156 Mg) stainless steel
  - 48% Class A Waste
  - 42% Class B/C Waste
  - 10% Greater than Class C (GTCC)
- 99,500 Curies (3.7E15 Bq)
  - 79% GTCC Waste
  - 21% Class B/C Waste
  - <1% Class A Waste



Core Support Assembly

- 246,300 pounds
- 99,223 Curies
  - Baffle Assembly
    - Baffle Plates
    - Baffle Former Plates
  - Core Support Shield
  - Core Barrel
  - Thermal Shield
  - Lower Internals



Characterization of Contents

Upper Grid (UG): Core Plate Items consisting of Type 304 stainless steel tube stubs attached to a plate, loose tubes, and are approximately 10-12" long

Core Barrel (ACB): Sections consisting of curved plate sections made of Type 304 stainless steel, approximately 2" thick by 50" high, with a chord length of approximately 51"

Thermal Shield (ATS): Thermal Shield Sections consisting of curved plate sections of Type 304 stainless steel, approximately 2" thick by 50" high, with a chord length of approximately 51"

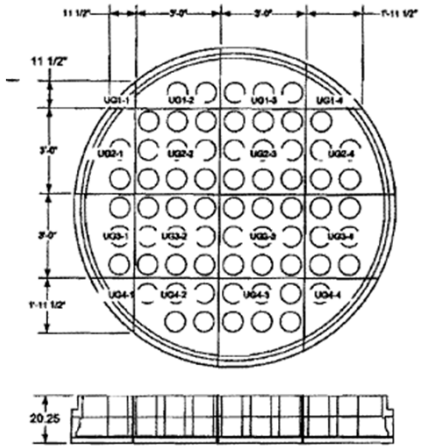
Lower Internal Grid Support (ALIGS): Sections consisting of Type 304 stainless steel, some sections with thermal shield sections attached

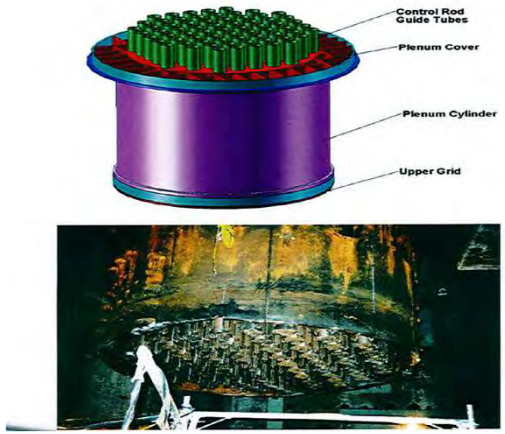
Chips: Cutting chips from sectioning of the reactor internals

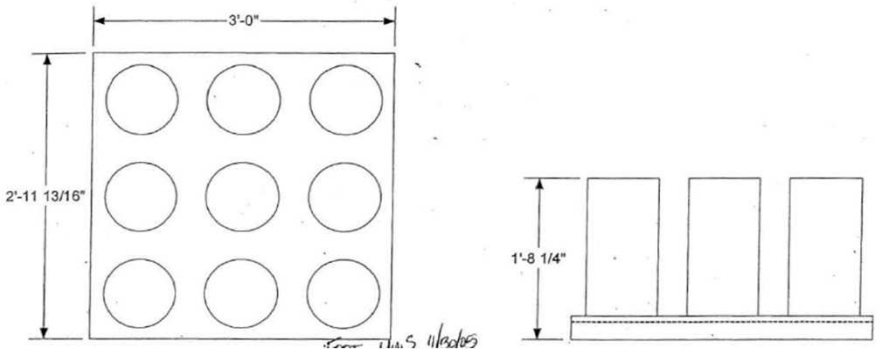
CRUD: Removable contamination on reactor internals in limited quantity

Observation: The liner contents described are not cribbed within the liner and are free to move in the liner during transportation (NCT and HAC)

Upper Grid (UG)
RVI-008

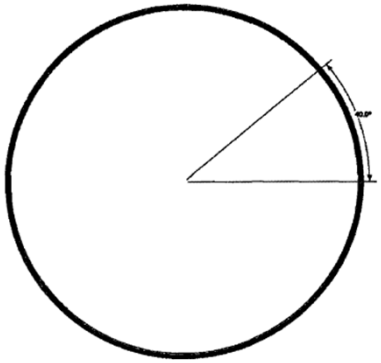


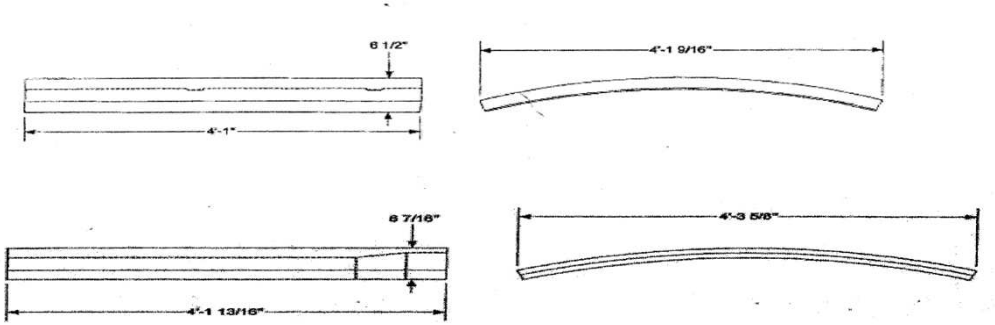


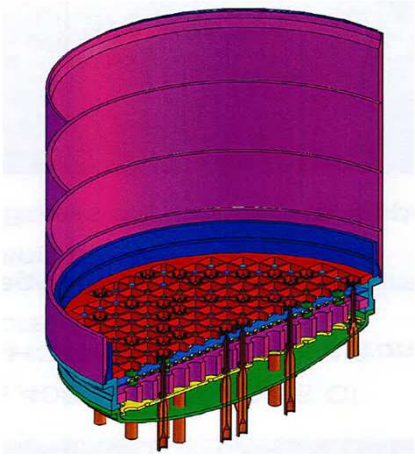


- Upper Guide Plates
- Core Barrel Pieces
- Thermal Shield Pieces
- Control Rod Guide Tube Pieces
- Chips

Core Barrel (ACB)/Thermal Shield (ATS)
RVI-016, 017, 018, 019, 033, 034, 035

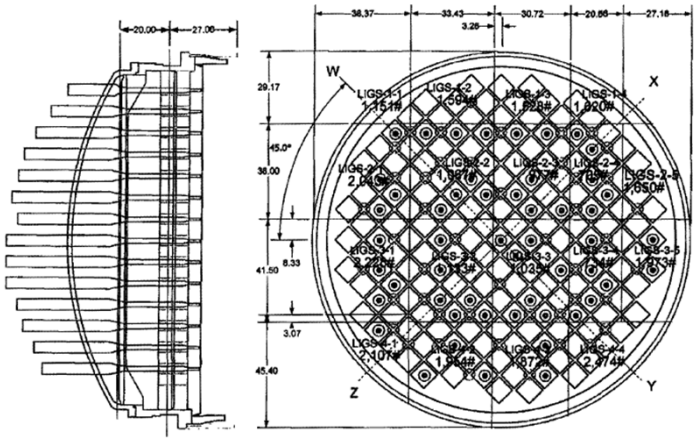


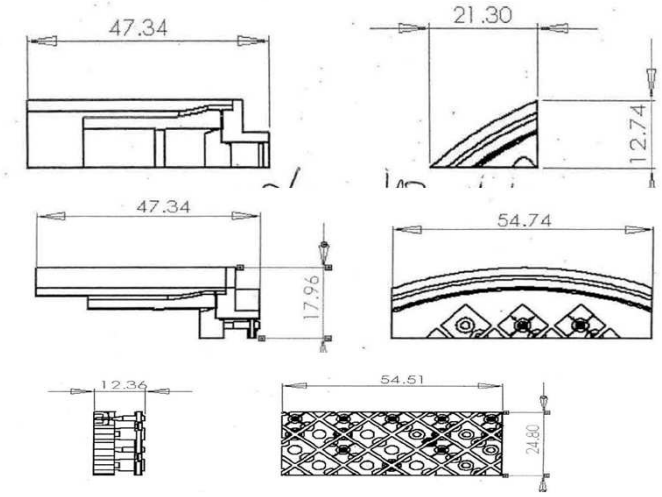


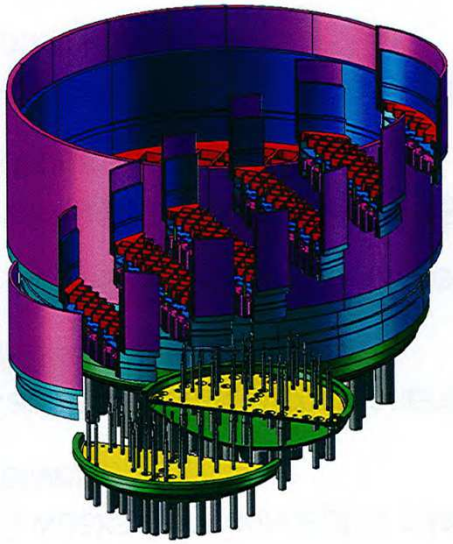


- Concentric 2-inch thick cylinders
- Cut into 40 deg. Segments
- All segments packaged in 7 liners
- Loading based on weight capacity for liner

Lower Internal Grid Support (ALIGS)
RVI-021, 022, 026, 027, 029, 037







- Lower Internal Grid Support
- Chips

RVI-018 Characterization

Co-60 ~40-50% of total activity, but >95% of the gamma source activity

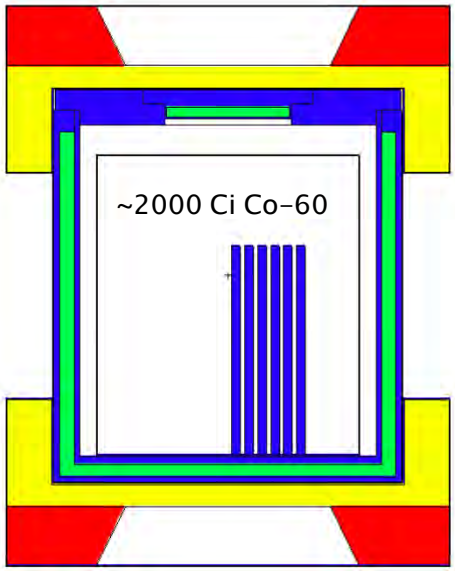
CHIPS are ~10 % of total activity

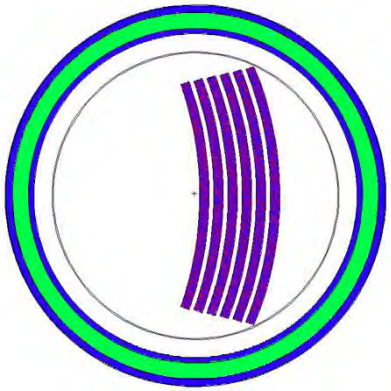
Ni-63 beta emitter

Component	Weight (lbs)	Activity (Ci)
A018chips	828	280
ACB1-7	1520	419
ACB1-8	1520	419
ACB1-9	1520	419
ACB2-7	1240	342
ACB2-8	1240	342
ACB2-9	1240	342
TOTAL	9108	2563

Nuclide	Initial Activity (2005)	Decayed Activity (2014)
Ni-63	1.03E+03	9.95E+02
Co-60	1.39E+03	7.20E+02
Fe-55	2.17E+02	6.09E+01
Ni-59	1.06E+01	1.06E+01
C-14	1.52E+00	1.52E+00
Nb-94	2.95E-02	2.95E-02
Pu-241	8.85E-03	6.96E-03
Am-241	1.68E-03	1.67E-03
Sr-90	1.26E-03	1.12E-03
Pu-238	3.19E-04	3.07E-04
Cs-137	3.19E-04	2.84E-04
Pu-239	2.78E-04	2.78E-04
Cm-244	2.07E-04	1.71E-04
Mn-54	2.87E-03	5.00E-05
Tc-99	5.75E-06	5.75E-06
Zn-65	1.72E-06	9.66E-09
Cm-242	1.99E-07	8.49E-11
H-3	0.00E+00	0.00E+00
Cs-134	0.00E+00	0.00E+00
Total	2.65E+03	1.79E+03

Routine and NCT – Realistic Contents Geometry



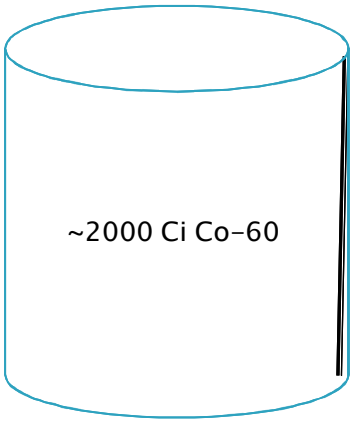


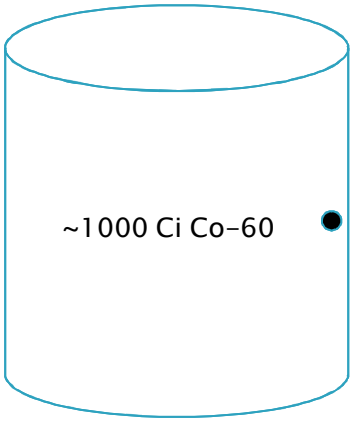
Surface < 200 mr/hr

2m from vertical plane of vehicle <10 mr/hr

Occupied space < 2mr/hr

Hypothetical Accident Condition
Point or Line Source at Edge





1 m from surface of cask < 1000 mrem/hr

MCNP Hybrid Transport Method

Hybrid transport methods for fixed-source problems typically consist of

- A deterministic adjoint calculation
- A method of converting the adjoint flux into a biasing function (cell importance, weight window parameters, etc.)
- A Monte Carlo calculation using the biasing function

The primary advantage of hybrid techniques is the speed at which the biasing function can be estimated.

Integrating with PARTISN to generate importance functions to be used in deterministically generating weight windows.

DAWWG: Deterministic Adjoint Weight Window Generator

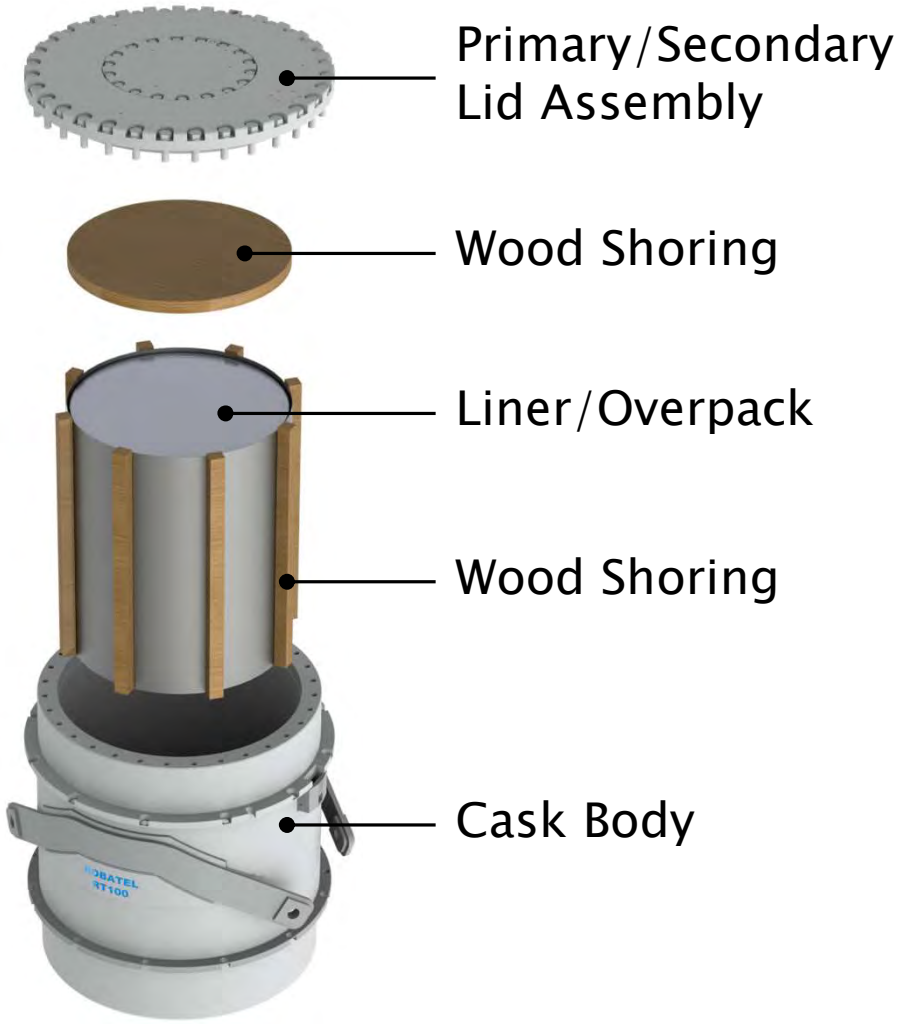
Packing Assembly

Wood Shoring is placed on top of and around the Liner.

This arrangement prevents movement of the liner during routine transport and NCT.

The liner content is made of thick stainless steel plates and welded grids. Therefore, their geometry is most unlikely to change during HAC.

The shielding evaluation assumes no safety function during HAC provided by shoring or liner.



Schedule

- Pre-application meeting April 1, 2014
- Submit complete application by June 1, 2014
- Authorization issued by August 1, 2014

Conclusions

- *Robatel Technologies* request authorization to ship a limited number of packages of Rancho Seco decommissioning waste not specified in the RT-100 Certificate of Compliance (CoC).
- Application will consist of justification for authorization to ship, characterization of contents (activated metal and loose contamination), shielding evaluation (routine, NCT, and HAC), shoring evaluation, and a plan for measuring package exterior dose rates at all locations necessary to demonstrate compliance with 10 CFR 71.47.
- The liner performs no safety function during any condition of transport (NCT or HAC).
- The shielding evaluation will consist of three content models consisting of the reactor internals (upper guide plate, core barrel and thermal shield sections, lower internals). Improvements to the existing shielding model will be made to address convergence of MCNP calculations and source term definition.
- Loose contamination (CRUD) is not a significant contributor for the subject shipments. *Robatel Technologies* will evaluate CRUD. The CRUD evaluation will limit loose CRUD to a specific Ci limit.