

**Status of ATR-A1 Irradiation Experiment on Vanadium Alloys and Low-Activation Steels\*** H. Tsai, R. V. Strain, I. Gomes and D. L. Smith (Argonne National Laboratory), L. R. Greenwood (Pacific Northwest National Laboratory), H. Matsui (Tohoku University, Japan)

## Summary

The ATR-A1 irradiation experiment in the Advanced Test Reactor (ATR) was a collaborative U.S./Japan effort to study the effects of neutron damage on vanadium alloys at low temperature. The experiment also contained a limited quantity of low-activation ferritic steel specimens from Japan as part of the collaboration agreement. Irradiation was completed in 1996 after attaining the target exposure of  $\approx 4.7$  dpa in vanadium. The irradiated capsule was disassembled in this reporting period, and all specimens and monitors were successfully retrieved.

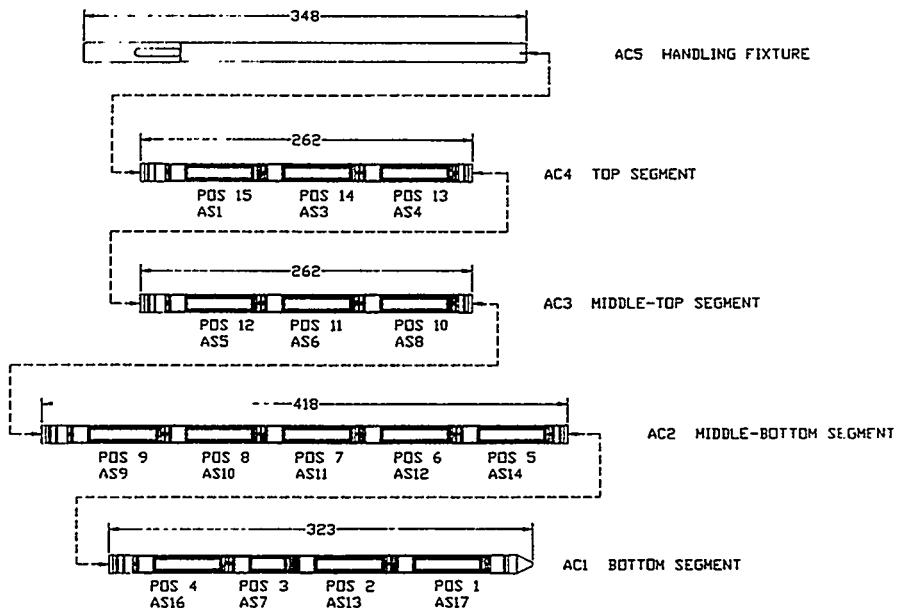
## Objective

The main objective of the experiment was to obtain mechanical property data, including in-reactor creep, on vanadium alloys irradiated at two low temperatures ( $\approx 200$  and  $300^\circ\text{C}$ ). The objective of the present task is to receive the irradiated capsule from ATR and to complete the capsule disassembly and specimen retrieval at ANL.

## Summary Description of Experiment

The irradiation vehicle was a drop-in capsule consisting of 15 lithium-filled subcapsules in 4 gas-bonded segments, as shown in Fig. 1. The blend of the gas in the gas bond and the width of the bond determined the temperature of the specimens in the subcapsules. The materials for both the capsule and subcapsule components were Type 304 stainless steel. A gadolinium filter set consisting of a tube, a top end disk, and a bottom end disk, was incorporated inside each subcapsule to mitigate transmutations from the thermal neutron flux.

Fig. 1. Schematic Drawing of ATR-A1 Capsule Showing Capsule Segments and Subcapsule Locations



\* Work supported by Office of Fusion Energy, U.S. Department of Energy, under Contract W-31-109-Eng-38.

The specimens included in the experiment are tensile, Charpy, compact tension, transmission electron microscopy disks, and creep (pressurized tubes). The configurations of the specimens are shown in Table 1. Flux dosimeters and melt-wire temperature monitors were incorporated in selected subcapsules, and their descriptions are shown in Tables 2 and 3, respectively. The loading of specimens in the subcapsules is summarized in Table 4 and the detailed listing of the specimens is shown in Appendix 1.

Table 1. Complement of Specimens in the ATR-A1 Experiment

| Type         | Material | Origin | Nominal Dimensions (mm)    | Approx. Wt. (g) |      |
|--------------|----------|--------|----------------------------|-----------------|------|
|              |          |        |                            | V               | Fe   |
| SS-3 Tensile | V        | US     | 25.4 l x 4.95 w x 0.76 t   | 0.33            | -    |
| MT Tensile   | V, Fe    | JP, US | 16.0 l x 4.0 w x 0.25 t    | 0.06            | 0.09 |
| 1/3 CVN      | V        | US     | 25.4 l x 3.33 w x 3.33 t   | 1.7             | -    |
| 1.5 CVN      | V, Fe    | JP, US | 20.0 l x 1.5 w x 1.5 t     | 0.26            | 0.35 |
| DCT-A        | V        | US, JP | 9.60 d x 3.56 t            | 1.3             | -    |
| Creep        | V        | US, JP | 25.4 l x 4.57 OD x 4.06 ID | 0.65            | -    |
| TEM          | V, Fe    | US, JP | 3.0d x 0.25 t              | 0.01            | 0.01 |

Table 2. Description of Flux Dosimeters

| Material                          | Reactions                                | Half-life | Energy Range (MeV)          |
|-----------------------------------|--|-----------|-----------------------------|
| <u>Spectral Set (6 Materials)</u> |  |           |                             |
| Fe                                | $^{58}\text{Fe}$ (n,γ) $^{59}\text{Fe}$  | 45 d      | $3.6 \times 10^{-4} - 0.5$  |
|                                   | $^{54}\text{Fe}$ (n,p) $^{54}\text{Mn}$  | 312 d     | 2.3 – 6.7                   |
| Ti                                | $^{46}\text{Ti}$ (n,p) $^{46}\text{Sc}$  | 84 d      | 3.7 – 9.0                   |
| Nb                                | $^{93}\text{Nb}$ (n,γ) $^{94}\text{Nb}$  | 20,300 y  | $4.0 \times 10^{-4} - 0.4$  |
|                                   | $^{93}\text{Nb}$ (n,n) $^{93}\text{Nb}$  | 16 y      | 0.55 – 4.5                  |
| Cu                                | $^{63}\text{Cu}$ (n,α) $^{60}\text{Co}$  | 5.3 y     | 5.0 – 10.0                  |
| Mn-20%Cu                          | $^{55}\text{Mn}$ (n,2n) $^{54}\text{Mn}$ | 312 d     | 12.0 – 15.0                 |
| 0.1%Co-Al                         | $^{59}\text{Co}$ (n,γ) $^{60}\text{Co}$  | 5.3 y     | $1.4 \times 10^{-6} - 0.19$ |
| <u>Gradient Set (2 Materials)</u> |  |           |                             |
| Fe                                | $^{58}\text{Fe}$ (n,γ) $^{59}\text{Fe}$  | 45 d      | $3.6 \times 10^{-4} - 0.5$  |
|                                   | $^{54}\text{Fe}$ (n,p) $^{54}\text{Mn}$  | 312 d     | 2.3 – 6.7                   |
| 0.1%Co-Al                         | $^{59}\text{Co}$ (n,γ) $^{60}\text{Co}$  | 5.3 y     | $1.4 \times 10^{-6} - 0.19$ |

Table 3. Description of Temperature (Melt-Wire) Monitors

| Monitors | Melt Materials | Melting Temp. (°C) |
|----------|----------------|--------------------|
| MW01     | 63Sn/37Pb      | 183                |
| MW02     | Se             | 221                |
| MW04     | Sn             | 232                |
|          | Bi             | 271                |
| <hr/>    |                |                    |
| MW08     | Sn             | 232                |
| MW09     | Bi             | 271                |
| MW10     | Pb             | 327                |
|          | Zn             | 420                |

### Status of Specimen Retrieval

#### Shipment of Irradiated Capsule to ANL

A dry cask from ANL was used to ship the capsule from the ATR complex to ANL-E for disassembly. Loading of the capsule into the cask required the capsule to be out of the ATR water pool, i.e., without shielding, for  $\approx 1$  min while being inserted into the cask. Because of the high radioactivity of the capsule,  $\approx 80$  R/h at 1 m in air, extensive preparation was required. Thorough planning allowed this task to be accomplished at ATR without significant difficulties. The loaded cask was immediately shipped to ANL-E and was received in January 1997.

#### Disassembly of Capsule Segments

The capsule segments were disassembled in an alpha-free cell at ANL-E. To minimize the spread of loose contamination, a tubing cutter, instead of a saw, was used to remove the top and bottom end caps of the four capsule segments. After the cutting, a small hydraulic ram mounted on a platform (Fig. 2) was used to push the subcapsules out of the opened capsule tubes. (The ram provided the necessary force to overcome the resistance from the cutting burr and the tight fit between the subcapsule spacer pads and the capsule tube.) In this manner, all subcapsules from the four segments were successfully retrieved.

The subcapsules were individually surveyed for their gamma activity after retrieval. The peak readings were substantial,  $\approx 50$ -60 R/h at a distance of  $\approx 35$  cm for the midplane subcapsules. The distribution profile among the subcapsules appeared to follow approximately the reactor axial power profile, i.e., immaterial of the specimen loading inside. This result suggested that the bulk of the induced activity was due to the activation of the subcapsule hardware and the Gd filter.

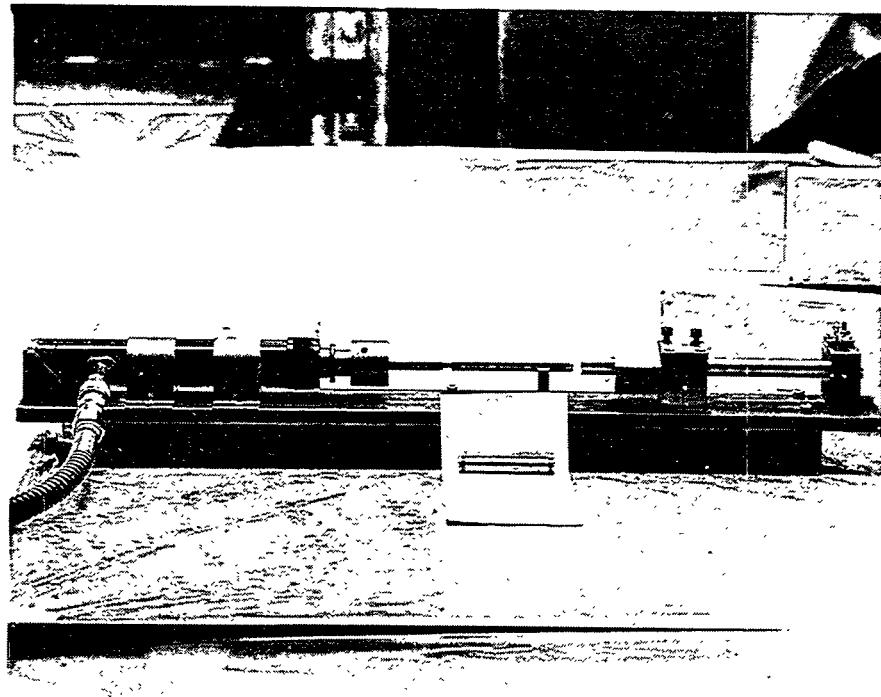
#### Disassembly of Subcapsules

The subcapsules were disassembled in the same alpha-free cell. The task consisted of removal of the top and bottom end caps, dissolving the bond lithium with ammonia, and cleaning the specimens with alcohol.

pressurization, a rupture of the creep specimen would result in an increase in the subcapsule plenum pressure from the nominal  $\approx 1$  atm to  $\approx 5\text{-}10$  atm.) The results showed all punctured subcapsules to have the normal plenum pressure, thus confirming all of the pressurized creep specimens were intact.

As in the case of the capsule segments, the top and bottom end plugs of the subcapsules were removed with a tubing cutter, with the assistance of a hydraulic ram in a setup similar to that shown in Fig. 2.

Fig. 2. Capsule Disassembly Fixture and A Retrieved Subcapsule



Dissolution of lithium with ammonia and cleaning of the retrieved specimens with alcohol was performed according to established procedures and no significant difficulties were encountered. The possibly fragile creep specimens were the first to be retrieved and were immediately put away to prevent possible damage from contact with the other specimens.

Additional gamma surveys were performed on the disassembled subcapsule components, and the results confirmed that much of the high activities noted before were due to the subcapsule hardware and the Gd filter. Gamma scans of the subcapsule hardware revealed the expected peaks of  $^{60}\text{Co}$ ,  $^{54}\text{Mn}$  from activation of the stainless steels and  $^{160}\text{Tb}$ ,  $^{153}\text{Gd}$ , and  $^{154}\text{Eu}$  from the activation of the Gd. The scans also revealed the presence of  $^{82}\text{Ta}$ , probably from the Ta impurity ( $\leq 60$  wppm) in the gadolinium filter. ( $^{82}\text{Ta}$  produces energetic gammas and can be a significant dose contributor within few years after the irradiation, as in the case of ATR-A1.) Gamma scanning of the specimens was limited to only one compact tension specimen (BL-47 material), due to the concern over alpha contamination. (The scanner is located in the alpha-side of the hot cell.) In that scan, gamma peaks suggesting  $^{91}\text{Nb}$ ,  $^{54}\text{Mn}$ , and  $^{182}\text{Ta}$  were detected. (This specimen was subsequently retrieved from the alpha-cell contamination-free.)

Status of Retrieved Specimens

The retrieved specimens and monitors were transferred from the high-background disassembly cell to a low-background  $\beta$ - $\gamma$  cell and the inventory of the specimens has been completed.

All mechanical testing specimens and monitors were accounted for. Except for a slight bend in a tensile specimen, all appear to be in good condition. The counts of the TEM disks were in good agreement with the loading data, except possibly for a few missing disks from subcapsule AS10.

A thorough and accurate radiation survey of the separated specimens has been conducted. The results, summarized in Table 5, indicate greater activation of the steel specimens (subcapsules AS3 and AS16) than the vanadium alloys. This was probably due to the inclusion of austenitic stainless steel specimens and the substantial contents of Ta and Nb in some of the ferritic alloys. For the vanadium alloys, the survey results show that as a whole, the Monbusho vanadium alloys seem to have greater activation than the U.S. vanadium alloys.

**Future Activities**

Disposition of the specimens will be determined. The specimens will be packaged and shipped to the collaborating laboratories. The flux dosimeters will be counted and calculations will be performed to determine the displacement damage in the specimens. The temperature monitors (melt wires) will be examined by radiography and possibly metallography.

Table 4. ATR-A1 Specimen and Monitor Loading Diagram

| Subcap.<br>No. | Test<br>Temp. | Mat'l | Tier | US  |         |         |       |       |     |       |       | JP     |         |       |     |       |     |   |  |  |
|----------------|---------------|-------|------|-----|---------|---------|-------|-------|-----|-------|-------|--------|---------|-------|-----|-------|-----|---|--|--|
|                |               |       |      | DCT | 1/3 CVN | SS-3 TS | MT TS | Creep | TEM | T.Mtr | F.Mtr | DCT    | 1.5 CVN | MT TS | TEM | Creep |     |   |  |  |
| AS1            | Low           | V     | Top  | -   | -       | 2       | -     | A5    | -   | -     | -     | Gr.(2) | -       | 4     | 4   | -     | -   |   |  |  |
|                |               |       | Bot  | -   | 3       | 1       | -     | -     | -   | -     | -     | -      | -       | 2     | 4   | -     | -   |   |  |  |
| AS3            | Low           | V     | -    | 9   | -       | -       | -     | -     | -   | -     | -     | MW01   | -       | 3     | -   | -     | -   |   |  |  |
| AS4            | Low           | Fe    | Top  | -   | -       | -       | -     | -     | -   | -     | -     | MW02   | -       | -     | 12  | 12    | -   |   |  |  |
|                |               |       | Bot  | -   | -       | -       | -     | -     | -   | -     | -     | -      | -       | 12    | 15  | 126   | -   |   |  |  |
| AS5            | Low           | V     | Top  | -   | -       | 2       | -     | -     | -   | -     | -     | -      | -       | 4     | 4   | -     | J3  |   |  |  |
|                |               |       | Bot  | -   | 3       | 1       | 2     | -     | 65  | -     | -     | -      | -       | 2     | 2   | -     | -   |   |  |  |
| AS6            | Low           | V     | Top  | -   | -       | 2       | -     | A2    | -   | -     | -     | -      | -       | 4     | 4   | -     | -   |   |  |  |
|                |               |       | Bot  | -   | 3       | 1       | 4     | -     | 50  | -     | -     | -      | -       | 2     | -   | -     | -   |   |  |  |
| AS8            | Low           | V     | Top  | -   | -       | 2       | -     | A3    | -   | -     | -     | MW04   | -       | -     | 4   | 4     | -   |   |  |  |
|                |               |       | Bot  | -   | 3       | 1       | -     | -     | -   | -     | -     | -      | -       | 2     | 4   | 64    | -   |   |  |  |
| AS9            | High          | V     | Top  | -   | -       | 2       | -     | A1    | -   | -     | -     | -      | -       | 4     | 4   | -     | -   |   |  |  |
|                |               |       | Bot  | -   | 2+4*    | 1       | -     | -     | 41  | -     | -     | -      | -       | 2     | 4   | -     | -   |   |  |  |
| AS10           | High          | V     | Top  | -   | -       | 2       | -     | A10   | -   | -     | -     | Sp.(6) | -       | 4     | 4   | -     | -   |   |  |  |
|                |               |       | Bot  | -   | 3       | 1       | -     | -     | 50  | -     | -     | -      | -       | 2     | 4   | -     | -   |   |  |  |
| AS11           | High          | V     | Top  | -   | -       | 2       | -     | A7    | -   | -     | -     | MW08   | -       | -     | 4   | 4     | -   |   |  |  |
|                |               |       | Bot  | -   | 3       | 1       | 4     | -     | 24  | -     | -     | -      | -       | 2     | -   | -     | -   |   |  |  |
| AS12           | High          | V     | Top  | -   | -       | 2       | -     | A11   | -   | -     | -     | Gr.(2) | -       | -     | 4   | 4     | -   |   |  |  |
|                |               |       | Bot  | -   | 3       | 1       | -     | -     | -   | -     | -     | -      | -       | 2     | 4   | 41    | -   |   |  |  |
| AS14           | High          | V     | Top  | -   | -       | 2       | -     | -     | -   | -     | -     | MW09   | -       | -     | 4   | 4     | -   |   |  |  |
|                |               |       | Bot  | -   | 3       | 1       | -     | -     | -   | -     | -     | -      | -       | 2     | 3   | 23    | -   |   |  |  |
| AS16           | High          | Fe    | Top  | -   | -       | -       | -     | -     | -   | -     | -     | Gr.(2) | -       | -     | 12  | 12    | -   |   |  |  |
|                |               |       | Bot  | -   | -       | -       | -     | -     | -   | -     | -     | -      | -       | -     | 12  | 15    | 126 |   |  |  |
| AS7            | High          | V     | Bot  | -   | 3       | 1       | 2     | -     | -   | -     | -     | -      | -       | -     | -   | -     | -   |   |  |  |
| AS13           | High          | V     | -    | 10  | -       | -       | -     | -     | -   | -     | -     | MW10   | -       | 3     | -   | -     | -   |   |  |  |
| AS17           | Low           | V     | Top  | -   | -       | 2       | -     | A4    | -   | -     | -     | Sp.(6) | -       | 4     | 4   | -     | -   |   |  |  |
|                |               |       | Bot  | -   | 3       | 1       | -     | -     | -   | -     | -     | -      | -       | 2     | 4   | -     | -   |   |  |  |
| Total          |               |       |      |     |         |         |       |       |     |       |       |        |         |       |     |       |     |   |  |  |
| Low Temp., V   |               |       |      | 9   | 15      | 15      | 6     | 4     | 115 |       |       |        |         | 3     | 30  | 34    | 64  | 1 |  |  |
| High Temp., V  |               |       |      | 10  | 21      | 16      | 6     | 4     | 115 |       |       |        |         | 3     | 30  | 35    | 64  | 1 |  |  |
| Low Temp., Fe  |               |       |      | 0   | 0       | 0       | 0     | 0     | 0   |       |       |        |         | 0     | 24  | 27    | 126 | 0 |  |  |
| High Temp., Fe |               |       |      | 0   | 0       | 0       | 0     | 0     | 0   |       |       |        |         | 0     | 24  | 27    | 126 | 0 |  |  |

| Creep Specimen Hoop Stress Loading |         |    |         |        |  |  |  |
|------------------------------------|---------|----|---------|--------|--|--|--|
| High T.                            |         |    |         | Low T. |  |  |  |
| A1                                 | 0 MPa   | A5 | 0 MPa   |        |  |  |  |
| A10                                | 100 MPa | A4 | 100 MPa |        |  |  |  |
| A7                                 | 150 Mpa | A2 | 150 Mpa |        |  |  |  |
| A11                                | 200 MPa | A3 | 200 MPa |        |  |  |  |
| J2                                 | 200 MPa | J3 | 200 MPa |        |  |  |  |

Table 5. Summary of Radiation Survey of ATR-A1 Specimens  
(Full Scale Reading 2000 mR/h)

| Sub-cap | Content   | Gamma Activity<br>(mR/h)        |                              | Sub-cap | Content   | Gamma Activity<br>(mR/h)           |                              |
|---------|---|---------------------------------|------------------------------|---------|---|------------------------------------|------------------------------|
|         |   | @ Contact                       | @ ~ 10 cm                    |         |   | @ Contact                          | @ ~ 10 cm                    |
| AS1     | 3 CVN + 3 TS (US)<br>6 CVN + 8 TS (JP)<br>Creep A5 (US)<br>2 Flux Monitors              | 78<br>585<br>14<br>52           | 16<br>75<br>7<br>12          | AS11    | 3 CVN + 7 TS (US)<br>6 CVN + 4 TS (JP)<br>Creep A7 (US)<br>TEM (US)<br>Temp. Monitors   | 410<br>1510<br>45<br>80<br>22      | 60<br>210<br>11<br>15<br>9   |
| AS3     | 9 DCT (US)<br>3 DCT (JP)<br>Temp. Monitors  | 210<br>>2000<br>150             | 40<br>290<br>28              | AS12    | 3 CVN + 3 TS (US)<br>6 CVN + 8 TS (JP)<br>Creep A11 (US)<br>TEM (JP)<br>2 Flux Monitors | 360<br>900<br>54<br>410<br>185     | 55<br>120<br>16<br>48<br>28  |
| AS4     | Ferritic (all, JP)*<br>Temp. Monitors   | >>2000<br>275                   | >>2000<br>35                 | AS14    | 3 CVN + 3 TS (US)<br>6 CVN + 7 TS (JP)<br>Creep J2 (JP)<br>TEM (JP)<br>Temp. Monitors   | 300<br>>2000<br>>2000<br>425<br>80 | 50<br>360<br>380<br>53<br>15 |
| AS5     | 3 CVN + 5 TS (US)<br>6 CVN + 6 TS (JP)<br>Creep J3 (JP)<br>TEM (US)                     | 270<br>>2000<br>>2000<br>55     | 42<br>283<br>300<br>16       | AS16    | Ferritic (all, JP)*<br>2 Flux Monitors  | >>2000<br>190                      | >>2000<br>24                 |
| AS6     | 3 CVN + 7 TS (US)<br>6 CVN + 4 TS (JP)<br>Creep A2 (US)<br>TEM (US)                     | 350<br>1140<br>40<br>48         | 52<br>160<br>10<br>11        | AS7     | 3 CVN + 3 TS (US)   | 165                                | 35                           |
| AS8     | 3 CVN + 3 TS (US)<br>6 CVN + 8 TS (JP)<br>Creep A3 (US)<br>TEM (JP)<br>Temp. Monitors   | 260<br>1480<br>46<br>720<br>280 | 60<br>210<br>14<br>100<br>45 | AS13    | 10 DCT (US)<br>3 DCT (JP)<br>Temp. Monitors   | 1760<br>>>2000<br>385              | 269<br>590<br>56             |
| AS9     | 6 CVN + 3 TS (US)<br>6 CVN + 8 TS (JP)<br>Creep A1 (US)<br>TEM (US)                     | 520<br>1410<br>60<br>91         | 75<br>190<br>12<br>17        | AS17    | 3 CVN + 3 TS (US)<br>6 CVN + 8 TS (JP)<br>Creep A4 (US)<br>6 Flux Monitors              | 152<br>575<br>22<br>95             | 25<br>70<br>8<br>17          |
| AS10    | 3 CVN + 3 TS (US)<br>6 CVN + 8 TS (JP)<br>Creep A10 (US)<br>TEM (US)<br>6 Flux Monitors | 295<br>1910<br>60<br>113<br>235 | 51<br>268<br>15<br>24<br>36  |         |   |                                    |                              |

\*Reading ≈ 2000 mR/h at 45 cm.

## Appendix 1 Listing of Specimens in the ATR-A1 Experiment

| Specimen<br>ID No. | Lab.     | Specimen<br>Type | Mat'l/Heat       | Mass<br>(g) | Subcap. |
|--------------------|----------|------------------|------------------|-------------|---------|
| Subcapsule AS1     |          |                  |                  |             |         |
| A5                 | ANL      | Creep            | 832665           | 0.650       | AS1     |
| AJX0               | Abe      | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.265       | AS1     |
| AJX1               | Abe      | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.265       | AS1     |
| AJX2               | Abe      | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.265       | AS1     |
| AJX3               | Abe      | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.265       | AS1     |
| AJX4               | Abe      | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.265       | AS1     |
| AJZ0               | Abe      | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.265       | AS1     |
| QC08               | ORNL     | CVNM             | 832665           | 1.660       | AS1     |
| 71                 | ANL      | CVNM30           | 832665           | 1.662       | AS1     |
| 47                 | ANL      | CVNM45           | BL-47            | 1.680       | AS1     |
| 47                 | ANL      | SS-3 TS          | BL-47            | 0.318       | AS1     |
| 71                 | ANL      | SS-3 TS          | 832665           | 0.318       | AS1     |
| 72                 | ANL      | SS-3 TS          | T87              | 0.318       | AS1     |
| AJA0               | Abe      | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS1     |
| AJA1               | Abe      | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS1     |
| AJA2               | Abe      | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS1     |
| AJA3               | Abe      | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS1     |
| AJB0               | Abe      | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS1     |
| AJB1               | Abe      | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS1     |
| AJB2               | Abe      | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS1     |
| AJB3               | Abe      | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS1     |
| Subcapsule AS3     |          |                  |                  |             |         |
| --                 | Matsui   | DCT-A            | V-3Fe-4Ti        | 1.253       | AS3     |
| 47                 | ANL      | DCT-A            | BL-47            | 1.255       | AS3     |
| 47                 | ANL      | DCT-A            | BL-47            | 1.255       | AS3     |
| 71                 | ANL      | DCT-A            | 832665           | 1.223       | AS3     |
| 71                 | ANL      | DCT-A            | 832665           | 1.223       | AS3     |
| 71                 | ANL      | DCT-A            | 832665           | 1.223       | AS3     |
| 72                 | ANL      | DCT-A            | T87              | 1.245       | AS3     |
| 72                 | ANL      | DCT-A            | T87              | 1.245       | AS3     |
| M                  | Matsui   | DCT-A            | V-3Fe-4Ti        | 1.253       | AS3     |
| M                  | Matsui   | DCT-A            | V-3Fe-4Ti        | 1.253       | AS3     |
| QA05               | ORNL     | DCT-A            | 832665           | 1.375       | AS3     |
| QA06               | ORNL     | DCT-A            | 832665           | 1.375       | AS3     |
| Subcapsule AS4     |          |                  |                  |             |         |
| G2F1               | A.Kimura | 1.5CVN           | NLM-E            | 0.334       | AS4     |
| G2F2               | A.Kimura | 1.5CVN           | NLM-E            | 0.334       | AS4     |
| G2F3               | A.Kimura | 1.5CVN           | NLM-E            | 0.334       | AS4     |
| G2F4               | A.Kimura | 1.5CVN           | NLM-E            | 0.334       | AS4     |
| G2F5               | A.Kimura | 1.5CVN           | NLM-E            | 0.334       | AS4     |
| G2F6               | A.Kimura | 1.5CVN           | NLM-E            | 0.334       | AS4     |
| G2F7               | A.Kimura | 1.5CVN           | NLM-E            | 0.334       | AS4     |
| G2F8               | A.Kimura | 1.5CVN           | NLM-E            | 0.334       | AS4     |
| LF01               | Kohno    | 1.5CVN           | JLF1             | 0.353       | AS4     |
| LF02               | Kohno    | 1.5CVN           | JLF1             | 0.353       | AS4     |
| LF03               | Kohno    | 1.5CVN           | JLF1             | 0.353       | AS4     |
| LF04               | Kohno    | 1.5CVN           | JLF1             | 0.353       | AS4     |
| LF05               | Kohno    | 1.5CVN           | JLF1             | 0.353       | AS4     |
| LF06               | Kohno    | 1.5CVN           | JLF1             | 0.353       | AS4     |
| LF07               | Kohno    | 1.5CVN           | JLF1             | 0.353       | AS4     |
| LF08               | Kohno    | 1.5CVN           | JLF1             | 0.353       | AS4     |
| LH01               | Kohno    | 1.5CVN           | F82H             | 0.335       | AS4     |
| LH02               | Kohno    | 1.5CVN           | F82H             | 0.335       | AS4     |

| Specimen ID No. | Lab.     | Specimen Type | Mat'l/Heat | Mass (g) | Subcap. |
|-----------------|----------|---------------|------------|----------|---------|
| LH03            | Kohno    | 1.5CVN        | F82H       | 0.335    | AS4     |
| LH04            | Kohno    | 1.5CVN        | F82H       | 0.335    | AS4     |
| LH05            | Kohno    | 1.5CVN        | F82H       | 0.335    | AS4     |
| LH06            | Kohno    | 1.5CVN        | F82H       | 0.335    | AS4     |
| LH07            | Kohno    | 1.5CVN        | F82H       | 0.335    | AS4     |
| LH08            | Kohno    | 1.5CVN        | F82H       | 0.335    | AS4     |
| G211            | A.Kimura | MT TS         | JLM-1      | 0.092    | AS4     |
| G212            | A.Kimura | MT TS         | JLM-1      | 0.092    | AS4     |
| G213            | A.Kimura | MT TS         | JLM-1      | 0.092    | AS4     |
| G214            | A.Kimura | MT TS         | JLM-1      | 0.092    | AS4     |
| G2D1            | A.Kimura | MT TS         | NLM-D      | 0.092    | AS4     |
| G2D2            | A.Kimura | MT TS         | NLM-D      | 0.092    | AS4     |
| G2D3            | A.Kimura | MT TS         | NLM-D      | 0.092    | AS4     |
| G2D4            | A.Kimura | MT TS         | NLM-D      | 0.092    | AS4     |
| G2F1            | A.Kimura | MT TS         | NLM-E      | 0.092    | AS4     |
| G2F2            | A.Kimura | MT TS         | NLM-E      | 0.092    | AS4     |
| G2F3            | A.Kimura | MT TS         | NLM-E      | 0.092    | AS4     |
| G2F4            | A.Kimura | MT TS         | NLM-E      | 0.092    | AS4     |
| LB01            | Kohno    | MT TS         | JLF1B      | 0.031    | AS4     |
| LB02            | Kohno    | MT TS         | JLF1B      | 0.031    | AS4     |
| LB03            | Kohno    | MT TS         | JLF1B      | 0.031    | AS4     |
| LF01            | Kohno    | MT TS         | JLF1       | 0.031    | AS4     |
| LF02            | Kohno    | MT TS         | JLF1       | 0.031    | AS4     |
| LF03            | Kohno    | MT TS         | JLF1       | 0.031    | AS4     |
| LF04            | Kohno    | MT TS         | JLF1       | 0.031    | AS4     |
| LH01            | Kohno    | MT TS         | F82H       | 0.031    | AS4     |
| LH02            | Kohno    | MT TS         | F82H       | 0.031    | AS4     |
| LH03            | Kohno    | MT TS         | F82H       | 0.031    | AS4     |
| LH04            | Kohno    | MT TS         | F82H       | 0.031    | AS4     |
| LM10            | Kohno    | MT TS         | JLF1Mn1    | 0.031    | AS4     |
| LM11            | Kohno    | MT TS         | JLF1Mn1    | 0.031    | AS4     |
| LM20            | Kohno    | MT TS         | JLFMn2     | 0.031    | AS4     |
| LM21            | Kohno    | MT TS         | JLFMn2     | 0.031    | AS4     |
| G211            | A.Kimura | TEM           | JLM-1      | 0.008    | AS4     |
| G212            | A.Kimura | TEM           | JLM-1      | 0.008    | AS4     |
| G213            | A.Kimura | TEM           | JLM-1      | 0.008    | AS4     |
| G214            | A.Kimura | TEM           | JLM-1      | 0.008    | AS4     |
| G241            | A.Kimura | TEM           | NLM-D      | 0.008    | AS4     |
| G242            | A.Kimura | TEM           | NLM-D      | 0.008    | AS4     |
| G243            | A.Kimura | TEM           | NLM-D      | 0.008    | AS4     |
| G244            | A.Kimura | TEM           | NLM-D      | 0.008    | AS4     |
| G271            | A.Kimura | TEM           | NLM-E      | 0.008    | AS4     |
| G272            | A.Kimura | TEM           | NLM-E      | 0.008    | AS4     |
| G273            | A.Kimura | TEM           | NLM-E      | 0.008    | AS4     |
| G274            | A.Kimura | TEM           | NLM-E      | 0.008    | AS4     |
| LB01            | Kohno    | TEM           | JLF1B      | 0.010    | AS4     |
| LB02            | Kohno    | TEM           | JLF1B      | 0.010    | AS4     |
| LB03            | Kohno    | TEM           | JLF1B      | 0.010    | AS4     |
| LB04            | Kohno    | TEM           | JLF1B      | 0.010    | AS4     |
| LB05            | Kohno    | TEM           | JLF1B      | 0.010    | AS4     |
| LB06            | Kohno    | TEM           | JLF1B      | 0.010    | AS4     |
| LB07            | Kohno    | TEM           | JLF1B      | 0.010    | AS4     |
| LB08            | Kohno    | TEM           | JLF1B      | 0.010    | AS4     |
| LF01            | Kohno    | TEM           | JLF1       | 0.010    | AS4     |
| LF02            | Kohno    | TEM           | JLF1       | 0.010    | AS4     |
| LF03            | Kohno    | TEM           | JLF1       | 0.010    | AS4     |
| LF04            | Kohno    | TEM           | JLF1       | 0.010    | AS4     |
| LF05            | Kohno    | TEM           | JLF1       | 0.010    | AS4     |
| LF06            | Kohno    | TEM           | JLF1       | 0.010    | AS4     |
| LF07            | Kohno    | TEM           | JLF1       | 0.010    | AS4     |
| LF08            | Kohno    | TEM           | JLF1       | 0.010    | AS4     |
| LH01            | Kohno    | TEM           | F82H       | 0.010    | AS4     |

| Specimen<br>ID No. | Lab.    | Specimen<br>Type | Mat'l/Heat   | Mass<br>(g) | Subcap. |
|--------------------|---------|------------------|--------------|-------------|---------|
| LH02               | Kohno   | TEM              | F82H         | 0.010       | AS4     |
| LH03               | Kohno   | TEM              | F82H         | 0.010       | AS4     |
| LH04               | Kohno   | TEM              | F82H         | 0.010       | AS4     |
| LH05               | Kohno   | TEM              | F82H         | 0.010       | AS4     |
| LH06               | Kohno   | TEM              | F82H         | 0.010       | AS4     |
| LH07               | Kohno   | TEM              | F82H         | 0.010       | AS4     |
| LH08               | Kohno   | TEM              | F82H         | 0.010       | AS4     |
| LM11               | Kohno   | TEM              | JLF1Mn1      | 0.010       | AS4     |
| LM12               | Kohno   | TEM              | JLF1Mn1      | 0.010       | AS4     |
| LM13               | Kohno   | TEM              | JLF1Mn1      | 0.010       | AS4     |
| LM14               | Kohno   | TEM              | JLF1Mn1      | 0.010       | AS4     |
| LM15               | Kohno   | TEM              | JLF1Mn1      | 0.010       | AS4     |
| LM16               | Kohno   | TEM              | JLF1Mn1      | 0.010       | AS4     |
| LM17               | Kohno   | TEM              | JLFMn1       | 0.010       | AS4     |
| LM18               | Kohno   | TEM              | JLFMn1       | 0.010       | AS4     |
| LM21               | Kohno   | TEM              | JLFMn2       | 0.010       | AS4     |
| LM22               | Kohno   | TEM              | JLFMn2       | 0.010       | AS4     |
| LM23               | Kohno   | TEM              | JLFMn2       | 0.010       | AS4     |
| LM24               | Kohno   | TEM              | JLFMn2       | 0.010       | AS4     |
| LM25               | Kohno   | TEM              | JLFMn2       | 0.010       | AS4     |
| LM26               | Kohno   | TEM              | JLFMn2       | 0.010       | AS4     |
| LM27               | Kohno   | TEM              | JLFMn2       | 0.010       | AS4     |
| LM28               | Kohno   | TEM              | JLFMn2       | 0.010       | AS4     |
| TR17               | Ohnuki  | TEM              | 316L         | 0.011       | AS4     |
| TR18               | Ohnuki  | TEM              | 316L         | 0.011       | AS4     |
| TR19               | Ohnuki  | TEM              | 316-0.3Ti    | 0.011       | AS4     |
| TR20               | Ohnuki  | TEM              | 316-0.3Ti    | 0.011       | AS4     |
| TR21               | Ohnuki  | TEM              | 316-0.3Zr    | 0.011       | AS4     |
| TR22               | Ohnuki  | TEM              | 316-0.3Zr    | 0.011       | AS4     |
| TR23               | Ohnuki  | TEM              | 316-0.3Hf    | 0.011       | AS4     |
| TR24               | Ohnuki  | TEM              | 316-0.3Hf    | 0.011       | AS4     |
| TR25               | Ohnuki  | TEM              | 316-0.3Nb    | 0.011       | AS4     |
| TR26               | Ohnuki  | TEM              | 316-0.3Nb    | 0.011       | AS4     |
| TR27               | Ohnuki  | TEM              | 316L/CW      | 0.011       | AS4     |
| TR28               | Ohnuki  | TEM              | 316L/CW      | 0.011       | AS4     |
| TR29               | Ohnuki  | TEM              | 316L/CW      | 0.011       | AS4     |
| TR30               | Ohnuki  | TEM              | 316-0.3Ti/CW | 0.011       | AS4     |
| TR31               | Ohnuki  | TEM              | 316-0.3Ti/CW | 0.011       | AS4     |
| TR32               | Ohnuki  | TEM              | 316-0.3Ti/CW | 0.011       | AS4     |
| TR33               | Ohnuki  | TEM              | 316-0.3Zr/CW | 0.011       | AS4     |
| TR34               | Ohnuki  | TEM              | 316-0.3Zr/CW | 0.011       | AS4     |
| TR35               | Ohnuki  | TEM              | 316-0.3Zr/CW | 0.011       | AS4     |
| YA01               | Yoshida | TEM              | FeCrNi(1)    | 0.010       | AS4     |
| YA02               | Yoshida | TEM              | FeCrNi(1)    | 0.010       | AS4     |
| YA03               | Yoshida | TEM              | FeCrNi(2)    | 0.010       | AS4     |
| YA04               | Yoshida | TEM              | FeCrNi(2)    | 0.010       | AS4     |
| YA05               | Yoshida | TEM              | FeCrNi(3)    | 0.010       | AS4     |
| YA06               | Yoshida | TEM              | FeCrNi(3)    | 0.010       | AS4     |
| YA07               | Yoshida | TEM              | FeCrNi(4)    | 0.010       | AS4     |
| YA08               | Yoshida | TEM              | FeCrNi(4)    | 0.010       | AS4     |
| YA09               | Yoshida | TEM              | FeCrNi(5)    | 0.010       | AS4     |
| YA10               | Yoshida | TEM              | FeCrNi(5)    | 0.010       | AS4     |
| YA11               | Yoshida | TEM              | FeCrNi(6)    | 0.010       | AS4     |
| YA12               | Yoshida | TEM              | FeCrNi(6)    | 0.010       | AS4     |
| YA13               | Yoshida | TEM              | FeCrNi(7)    | 0.010       | AS4     |
| YA14               | Yoshida | TEM              | FeCrNi(7)    | 0.010       | AS4     |
| YA15               | Yoshida | TEM              | FeCrNi(8)    | 0.010       | AS4     |
| YA16               | Yoshida | TEM              | FeCrNi(8)    | 0.010       | AS4     |
| YA17               | Yoshida | TEM              | FeCrNi(9)    | 0.010       | AS4     |
| YA18               | Yoshida | TEM              | FeCrNi(9)    | 0.010       | AS4     |
| YA19               | Yoshida | TEM              | FeCrNi(10)   | 0.010       | AS4     |
| YA20               | Yoshida | TEM              | FeCrNi(10)   | 0.010       | AS4     |

| Specimen ID No. | Lab.     | Specimen Type | Mat'l/Heat | Mass (g) | Subcap. |
|-----------------|----------|---------------|------------|----------|---------|
| YA21            | Yoshida  | TEM           | FeCrNi(11) | 0.010    | AS4     |
| YA22            | Yoshida  | TEM           | FeCrNi(11) | 0.010    | AS4     |
| G215            | A.Kimura | TEM           | JLM-1      | 0.010    | AS4     |
| G216            | A.Kimura | TEM           | JLM-1      | 0.010    | AS4     |
| G217            | A.Kimura | TEM           | JLM-1      | 0.010    | AS4     |
| G218            | A.Kimura | TEM           | JLM-1      | 0.010    | AS4     |
| G219            | A.Kimura | TEM           | JLM-1      | 0.010    | AS4     |
| G220            | A.Kimura | TEM           | JLM-1      | 0.010    | AS4     |
| G221            | A.Kimura | TEM           | JLM-1      | 0.010    | AS4     |
| G222            | A.Kimura | TEM           | JLM-1      | 0.010    | AS4     |
| G223            | A.Kimura | TEM           | JLM-1      | 0.010    | AS4     |
| G224            | A.Kimura | TEM           | JLM-1      | 0.010    | AS4     |
| G225            | A.Kimura | TEM           | JLM-1      | 0.010    | AS4     |
| G245            | A.Kimura | TEM           | NLM-D      | 0.010    | AS4     |
| G246            | A.Kimura | TEM           | NLM-D      | 0.010    | AS4     |
| G247            | A.Kimura | TEM           | NLM-D      | 0.010    | AS4     |
| G248            | A.Kimura | TEM           | NLM-D      | 0.010    | AS4     |
| G249            | A.Kimura | TEM           | NLM-D      | 0.010    | AS4     |
| G250            | A.Kimura | TEM           | NLM-D      | 0.010    | AS4     |
| G251            | A.Kimura | TEM           | NLM-D      | 0.010    | AS4     |
| G252            | A.Kimura | TEM           | NLM-D      | 0.010    | AS4     |
| G253            | A.Kimura | TEM           | NLM-D      | 0.010    | AS4     |
| G254            | A.Kimura | TEM           | NLM-D      | 0.010    | AS4     |
| G255            | A.Kimura | TEM           | NLM-D      | 0.010    | AS4     |
| G275            | A.Kimura | TEM           | NLM-E      | 0.010    | AS4     |
| G276            | A.Kimura | TEM           | NLM-E      | 0.010    | AS4     |
| G277            | A.Kimura | TEM           | NLM-E      | 0.010    | AS4     |
| G278            | A.Kimura | TEM           | NLM-E      | 0.010    | AS4     |
| G279            | A.Kimura | TEM           | NLM-E      | 0.010    | AS4     |
| G280            | A.Kimura | TEM           | NLM-E      | 0.010    | AS4     |
| G281            | A.Kimura | TEM           | NLM-E      | 0.010    | AS4     |
| G282            | A.Kimura | TEM           | NLM-E      | 0.010    | AS4     |
| G283            | A.Kimura | TEM           | NLM-E      | 0.010    | AS4     |
| G284            | A.Kimura | TEM           | NLM-E      | 0.010    | AS4     |
| G285            | A.Kimura | TEM           | NLM-E      | 0.010    | AS4     |

Subcapsule AS5

|        |          |                 |                  |       |     |
|--------|----------|-----------------|------------------|-------|-----|
| J3     | Monbusho | Creep           | V-3Fe-4Ti-0.1Si  | 0.650 | AS5 |
| 1XR5   | Matsui   | 1.5CVN          | V-4Cr-4Ti-0.1Si  | 0.264 | AS5 |
| 95F1   | Matsui   | 1.5CVN          | V-3Fe-4Ti-0.1Si  | 0.264 | AS5 |
| 95F2   | Matsui   | 1.5CVN          | V-3Fe-4Ti-0.1Si  | 0.264 | AS5 |
| 95F3   | Matsui   | 1.5CVN          | V-3Fe-4Ti-0.1Si  | 0.264 | AS5 |
| 95F4   | Matsui   | 1.5CVN          | V-3Fe-4Ti-0.1Si  | 0.264 | AS5 |
| 95F5   | Matsui   | 1.5CVN          | V-3Fe-4Ti-0.1Si  | 0.264 | AS5 |
| 71     | ANL      | CVNM30          | 832665           | 1.662 | AS5 |
| 71E    | ANL      | CVNM-Weld       | 832665           | 1.660 | AS5 |
| 71E    | ANL      | CVNM-Weld       | 832665           | 1.660 | AS5 |
| XC08   | ORNL     | SS-3 TS         | T91              | 0.340 | AS5 |
| XC09   | ORNL     | SS-3 TS         | T91              | 0.340 | AS5 |
| ZC09   | ORNL     | SS-3 TS         | T92              | 0.345 | AS5 |
| AJD8   | Abe      | MT TS           | V-5Cr-5Ti-1SiAlY | 0.059 | AS5 |
| P140   | PNL      | MT TS           | T91              | 0.075 | AS5 |
| P141   | PNL      | MT TS           | T91              | 0.075 | AS5 |
| Matsui | MT TS    | V-3Fe-4Ti-0.1Si | 0.051            | AS5   |     |
| XF22   | Matsui   | MT TS           | V-3Fe-4Ti-0.1Si  | 0.051 | AS5 |
| XF23   | Matsui   | MT TS           | V-3Fe-4Ti-0.1Si  | 0.051 | AS5 |
| XF24   | Matsui   | MT TS           | V-3Fe-4Ti-0.1Si  | 0.051 | AS5 |
| XRX5   | Matsui   | MT TS           | V-4Cr-4Ti-0.1Si  | 0.051 | AS5 |
| 47     | ANL      | TEM             | BL-47            | 0.012 | AS5 |
| 47     | ANL      | TEM             | BL-47            | 0.012 | AS5 |
| 47     | ANL      | TEM             | BL-47            | 0.012 | AS5 |

| Specimen ID No. | Lab. | Specimen Type | Mat'l/Heat | Mass (g) | Subcap. |
|-----------------|------|---------------|------------|----------|---------|
| 47              | ANL  | TEM           | BL-47      | 0.012    | AS5     |
| 47              | ANL  | TEM           | BL-47      | 0.012    | AS5     |
| 47              | ANL  | TEM           | BL-47      | 0.012    | AS5     |
| 47              | ANL  | TEM           | BL-47      | 0.012    | AS5     |
| 47              | ANL  | TEM           | BL-47      | 0.012    | AS5     |
| 47              | ANL  | TEM           | BL-47      | 0.012    | AS5     |
| 47              | ANL  | TEM           | BL-47      | 0.012    | AS5     |
| 47              | ANL  | TEM           | BL-47      | 0.012    | AS5     |
| 70              | ANL  | TEM           | BL-70      | 0.012    | AS5     |
| 70              | ANL  | TEM           | BL-70      | 0.012    | AS5     |
| 70              | ANL  | TEM           | BL-70      | 0.012    | AS5     |
| 70              | ANL  | TEM           | BL-70      | 0.012    | AS5     |
| 70              | ANL  | TEM           | BL-70      | 0.012    | AS5     |
| 70              | ANL  | TEM           | BL-70      | 0.012    | AS5     |
| 70              | ANL  | TEM           | BL-70      | 0.012    | AS5     |
| 70              | ANL  | TEM           | BL-70      | 0.012    | AS5     |
| 70              | ANL  | TEM           | BL-70      | 0.012    | AS5     |
| 70              | ANL  | TEM           | BL-70      | 0.012    | AS5     |
| 71              | ANL  | TEM           | 832665     | 0.012    | AS5     |
| 71              | ANL  | TEM           | 832665     | 0.012    | AS5     |
| 71              | ANL  | TEM           | 832665     | 0.012    | AS5     |
| 71              | ANL  | TEM           | 832665     | 0.012    | AS5     |
| 71              | ANL  | TEM           | 832665     | 0.012    | AS5     |
| 71              | ANL  | TEM           | 832665     | 0.012    | AS5     |
| 71              | ANL  | TEM           | 832665     | 0.012    | AS5     |
| 71              | ANL  | TEM           | 832665     | 0.012    | AS5     |
| 71              | ANL  | TEM           | 832665     | 0.012    | AS5     |
| 72              | ANL  | TEM           | T87        | 0.012    | AS5     |
| 72              | ANL  | TEM           | T87        | 0.012    | AS5     |
| 72              | ANL  | TEM           | T87        | 0.012    | AS5     |
| 72              | ANL  | TEM           | T87        | 0.012    | AS5     |
| 72              | ANL  | TEM           | T87        | 0.012    | AS5     |
| 72              | ANL  | TEM           | T87        | 0.012    | AS5     |
| 72              | ANL  | TEM           | T87        | 0.012    | AS5     |
| 72              | ANL  | TEM           | T87        | 0.012    | AS5     |
| 72              | ANL  | TEM           | T87        | 0.012    | AS5     |
| P109            | PNL  | TEM           | T91        | 0.013    | AS5     |
| P112            | PNL  | TEM           | T91        | 0.013    | AS5     |
| P113            | PNL  | TEM           | T91        | 0.013    | AS5     |
| P116            | PNL  | TEM           | T91        | 0.013    | AS5     |
| P117            | PNL  | TEM           | T91        | 0.013    | AS5     |
| P125            | PNL  | TEM           | T91        | 0.013    | AS5     |
| P203            | PNL  | TEM           | T92        | 0.013    | AS5     |
| P218            | PNL  | TEM           | T92        | 0.013    | AS5     |
| P224            | PNL  | TEM           | T92        | 0.013    | AS5     |
| P225            | PNL  | TEM           | T92        | 0.013    | AS5     |
| P226            | PNL  | TEM           | T92        | 0.013    | AS5     |
| P228            | PNL  | TEM           | T92        | 0.013    | AS5     |
| P702            | PNL  | TEM           | T87        | 0.013    | AS5     |
| P703            | PNL  | TEM           | T87        | 0.013    | AS5     |
| P706            | PNL  | TEM           | T87        | 0.013    | AS5     |
| P723            | PNL  | TEM           | T87        | 0.013    | AS5     |
| P728            | PNL  | TEM           | T87        | 0.013    | AS5     |
| P732            | PNL  | TEM           | T87        | 0.013    | AS5     |
| P803            | PNL  | TEM           | 832665     | 0.013    | AS5     |
| P804            | PNL  | TEM           | 832665     | 0.013    | AS5     |
| P816            | PNL  | TEM           | 832665     | 0.013    | AS5     |
| P827            | PNL  | TEM           | 832665     | 0.013    | AS5     |
| P834            | PNL  | TEM           | 832665     | 0.013    | AS5     |
| P837            | PNL  | TEM           | 832665     | 0.013    | AS5     |
| LZ              | ANL  | TEM-LZ        | 832665     | 0.012    | AS5     |

| Specimen<br>ID No.    | Lab.   | Specimen<br>Type | Mat'l/Heat      | Mass<br>(g) | Subcap. |
|-----------------------|--------|------------------|-----------------|-------------|---------|
| <b>Subcapsule AS6</b> |        |                  |                 |             |         |
| A2                    | ANL    | Creep            | 832665          | 0.650       | AS6     |
| 1XR1                  | Matsui | 1.5CVN           | V-4Cr-4Ti-0.1Si | 0.264       | AS6     |
| 1XR2                  | Matsui | 1.5CVN           | V-4Cr-4Ti-0.1Si | 0.264       | AS6     |
| 1XR3                  | Matsui | 1.5CVN           | V-4Cr-4Ti-0.1Si | 0.264       | AS6     |
| 1XR4                  | Matsui | 1.5CVN           | V-4Cr-4Ti-0.1Si | 0.264       | AS6     |
| 95R5                  | Matsui | 1.5CVN           | V-4Cr-4Ti-0.1Si | 0.264       | AS6     |
| AN12                  | Matsui | 1.5CVN           | V-4Cr4Ti/832665 | 0.264       | AS6     |
| 71                    | ANL    | CVNM30           | 832665          | 1.662       | AS6     |
| BL71W-39              | ANL    | CVNM30           | 832665          | 1.662       | AS6     |
| BL71W-54              | ANL    | CVNM30           | 832665          | 1.662       | AS6     |
| UC08                  | ORNL   | SS-3 TS          | T90             | 0.345       | AS6     |
| UC09                  | ORNL   | SS-3 TS          | T90             | 0.345       | AS6     |
| ZC08                  | ORNL   | SS-3 TS          | T92             | 0.345       | AS6     |
| P747                  | PNL    | MT TS            | T87             | 0.075       | AS6     |
| P753                  | PNL    | MT TS            | T87             | 0.075       | AS6     |
| P845                  | PNL    | MT TS            | 832665          | 0.075       | AS6     |
| P853                  | PNL    | MT TS            | 832665          | 0.075       | AS6     |
| XFX1                  | Matsui | MT TS            | V-3Fe-4Ti-0.1Si | 0.051       | AS6     |
| XFX2                  | Matsui | MT TS            | V-3Fe-4Ti-0.1Si | 0.051       | AS6     |
| XFX3                  | Matsui | MT TS            | V-3Fe-4Ti-0.1Si | 0.051       | AS6     |
| XFX4                  | Matsui | MT TS            | V-3Fe-4Ti-0.1Si | 0.051       | AS6     |
| ET11                  | ORNL   | TEM              | T89             | 0.010       | AS6     |
| ET12                  | ORNL   | TEM              | T89             | 0.010       | AS6     |
| ET13                  | ORNL   | TEM              | T89             | 0.010       | AS6     |
| ET14                  | ORNL   | TEM              | T89             | 0.010       | AS6     |
| ET15                  | ORNL   | TEM              | T89             | 0.010       | AS6     |
| ET16                  | ORNL   | TEM              | T89             | 0.010       | AS6     |
| ET17                  | ORNL   | TEM              | T89             | 0.010       | AS6     |
| ET18                  | ORNL   | TEM              | T89             | 0.010       | AS6     |
| ET19                  | ORNL   | TEM              | T89             | 0.010       | AS6     |
| ET20                  | ORNL   | TEM              | T90             | 0.010       | AS6     |
| FT11                  | ORNL   | TEM              | T90             | 0.010       | AS6     |
| FT12                  | ORNL   | TEM              | T90             | 0.010       | AS6     |
| FT13                  | ORNL   | TEM              | T90             | 0.010       | AS6     |
| FT14                  | ORNL   | TEM              | T90             | 0.010       | AS6     |
| FT15                  | ORNL   | TEM              | T90             | 0.010       | AS6     |
| FT16                  | ORNL   | TEM              | T90             | 0.010       | AS6     |
| FT17                  | ORNL   | TEM              | T90             | 0.010       | AS6     |
| FT18                  | ORNL   | TEM              | T90             | 0.010       | AS6     |
| FT19                  | ORNL   | TEM              | T90             | 0.010       | AS6     |
| FT20                  | ORNL   | TEM              | T90             | 0.010       | AS6     |
| GT11                  | ORNL   | TEM              | T91             | 0.011       | AS6     |
| GT12                  | ORNL   | TEM              | T91             | 0.011       | AS6     |
| GT13                  | ORNL   | TEM              | T91             | 0.011       | AS6     |
| GT14                  | ORNL   | TEM              | T91             | 0.011       | AS6     |
| GT15                  | ORNL   | TEM              | T91             | 0.011       | AS6     |
| GT16                  | ORNL   | TEM              | T91             | 0.011       | AS6     |
| GT17                  | ORNL   | TEM              | T91             | 0.011       | AS6     |
| GT18                  | ORNL   | TEM              | T91             | 0.011       | AS6     |
| GT19                  | ORNL   | TEM              | T91             | 0.011       | AS6     |
| GT20                  | ORNL   | TEM              | T91             | 0.011       | AS6     |
| HT11                  | ORNL   | TEM              | T92             | 0.011       | AS6     |
| HT12                  | ORNL   | TEM              | T92             | 0.011       | AS6     |
| HT13                  | ORNL   | TEM              | T92             | 0.011       | AS6     |
| HT14                  | ORNL   | TEM              | T92             | 0.011       | AS6     |
| HT15                  | ORNL   | TEM              | T92             | 0.011       | AS6     |
| HT16                  | ORNL   | TEM              | T92             | 0.011       | AS6     |
| HT17                  | ORNL   | TEM              | T92             | 0.011       | AS6     |
| HT18                  | ORNL   | TEM              | T92             | 0.011       | AS6     |

| Specimen<br>ID No.    | Lab.   | Specimen<br>Type | Mat'l/Heat       | Mass<br>(g) | Subcap. |
|-----------------------|--------|------------------|------------------|-------------|---------|
| HT19                  | ORNL   | TEM              | T92              | 0.011       | AS6     |
| HT20                  | ORNL   | TEM              | T92              | 0.011       | AS6     |
| NT11                  | ORNL   | TEM              | 832665           | 0.010       | AS6     |
| NT12                  | ORNL   | TEM              | 832665           | 0.010       | AS6     |
| NT13                  | ORNL   | TEM              | 832665           | 0.010       | AS6     |
| NT14                  | ORNL   | TEM              | 832665           | 0.010       | AS6     |
| NT15                  | ORNL   | TEM              | 832665           | 0.010       | AS6     |
| NT16                  | ORNL   | TEM              | 832665           | 0.010       | AS6     |
| NT17                  | ORNL   | TEM              | 832665           | 0.010       | AS6     |
| NT18                  | ORNL   | TEM              | 832665           | 0.010       | AS6     |
| NT19                  | ORNL   | TEM              | 832665           | 0.010       | AS6     |
| NT20                  | ORNL   | TEM              | 832665           | 0.010       | AS6     |
| <u>Subcapsule AS7</u> |        |                  |                  |             |         |
| QC02                  | ORNL   | CVNM             | 832665           | 1.662       | AS7     |
| 71E                   | ANL    | CVNM-Weld        | 832665           | 1.650       | AS7     |
| 71E                   | ANL    | CVNM-Weld        | 832665           | 1.650       | AS7     |
| WF22                  | ORNL   | SS-3-EB          | 832665           | 0.340       | AS7     |
| P143                  | PNL    | MT TS            | T91              | 0.072       | AS7     |
| P144                  | PNL    | MT TS            | T91              | 0.072       | AS7     |
| <u>Subcapsule AS8</u> |        |                  |                  |             |         |
| A3                    | ANL    | Creep            | 832665           | 0.650       | AS8     |
| 95R1                  | Matsui | 1.5CVN           | V-4Cr-4Ti-0.1Si  | 0.264       | AS8     |
| 95R2                  | Matsui | 1.5CVN           | V-4Cr-4Ti-0.1Si  | 0.264       | AS8     |
| 95R3                  | Matsui | 1.5CVN           | V-4Cr-4Ti-0.1Si  | 0.264       | AS8     |
| 95R4                  | Matsui | 1.5CVN           | V-4Cr-4Ti-0.1Si  | 0.264       | AS8     |
| AJZ1                  | Abe    | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.265       | AS8     |
| AJZ2                  | Abe    | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.265       | AS8     |
| QC07                  | ORNL   | CVNM             | 832665           | 1.660       | AS8     |
| QC09                  | ORNL   | CVNM             | 832665           | 1.660       | AS8     |
| QC10                  | ORNL   | CVNM             | 832665           | 1.660       | AS8     |
| 71                    | ANL    | SS-3 TS          | 832665           | 0.318       | AS8     |
| 71                    | ANL    | SS-3 TS          | 832665           | 0.318       | AS8     |
| 71-LZ                 | ANL    | SS-3-LZ          | 832665           | 0.318       | AS8     |
| XR21                  | Matsui | MT TS            | V-4Cr-4Ti-0.1Si  | 0.051       | AS8     |
| XR22                  | Matsui | MT TS            | V-4Cr-4Ti-0.1Si  | 0.051       | AS8     |
| XR23                  | Matsui | MT TS            | V-4Cr-4Ti-0.1Si  | 0.051       | AS8     |
| XR24                  | Matsui | MT TS            | V-4Cr-4Ti-0.1Si  | 0.051       | AS8     |
| XRX1                  | Matsui | MT TS            | V-4Cr-4Ti-0.1Si  | 0.051       | AS8     |
| XRX2                  | Matsui | MT TS            | V-4Cr-4Ti-0.1Si  | 0.051       | AS8     |
| XRX3                  | Matsui | MT TS            | V-4Cr-4Ti-0.1Si  | 0.051       | AS8     |
| XRX4                  | Matsui | MT TS            | V-4Cr-4Ti-0.1Si  | 0.051       | AS8     |
| 1RX1                  | Matsui | TEM              | V-4Cr-4Ti-0.1Si  | 0.011       | AS8     |
| 1RX2                  | Matsui | TEM              | V-4Cr-4Ti-0.1Si  | 0.011       | AS8     |
| 1RX3                  | Matsui | TEM              | V-4Cr-4Ti-0.1Si  | 0.011       | AS8     |
| 1SX1                  | Matsui | TEM              | V-1Si            | 0.011       | AS8     |
| 5CX1                  | Matsui | TEM              | V-5Cr            | 0.011       | AS8     |
| 5FX1                  | Matsui | TEM              | V-5Fe            | 0.011       | AS8     |
| 5MX1                  | Matsui | TEM              | V-5Mo            | 0.011       | AS8     |
| 5NX1                  | Matsui | TEM              | V-5Nb            | 0.011       | AS8     |
| 5TX1                  | Matsui | TEM              | V-5Ti            | 0.011       | AS8     |
| 9RX1                  | Matsui | TEM              | V-4Cr-4Ti-0.1Si  | 0.011       | AS8     |
| 9RX2                  | Matsui | TEM              | V-4Cr-4Ti-0.1Si  | 0.011       | AS8     |
| 9RX3                  | Matsui | TEM              | V-4Cr-4Ti-0.1Si  | 0.011       | AS8     |
| AJ11                  | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ12                  | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ13                  | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ14                  | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ20                  | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |

| Specimen<br>ID No. | Lab.   | Specimen<br>Type | Mat'l/Heat       | Mass<br>(g) | Subcap. |
|--------------------|--------|------------------|------------------|-------------|---------|
| AJ30               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ31               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ32               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ33               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ34               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ50               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ51               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ52               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ53               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ54               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ55               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ56               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ57               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ58               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ59               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ80               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ81               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ82               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ83               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| AJ84               | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS8     |
| F9X1               | Matsui | TEM              | V-3Fe-4Ti-0.1Si  | 0.011       | AS8     |
| F9X2               | Matsui | TEM              | V-3Fe-4Ti-0.1Si  | 0.011       | AS8     |
| F9X3               | Matsui | TEM              | V-3Fe-4Ti-0.1Si  | 0.011       | AS8     |
| PVX1               | Matsui | TEM              | PureV            | 0.011       | AS8     |
| TR01               | Ohnuki | TEM              | pure V           | 0.008       | AS8     |
| TR02               | Ohnuki | TEM              | pure V           | 0.008       | AS8     |
| TR03               | Ohnuki | TEM              | V-0.5Cr          | 0.008       | AS8     |
| TR04               | Ohnuki | TEM              | V-0.5Cr          | 0.008       | AS8     |
| TR05               | Ohnuki | TEM              | V-1Cr            | 0.008       | AS8     |
| TR06               | Ohnuki | TEM              | V-1Cr            | 0.008       | AS8     |
| TR07               | Ohnuki | TEM              | V-2Cr            | 0.008       | AS8     |
| TR08               | Ohnuki | TEM              | V-2Cr            | 0.008       | AS8     |
| TR09               | Ohnuki | TEM              | V-5Cr            | 0.008       | AS8     |
| TR10               | Ohnuki | TEM              | V-5Cr            | 0.008       | AS8     |
| TR11               | Ohnuki | TEM              | V-10Cr           | 0.008       | AS8     |
| TR12               | Ohnuki | TEM              | V-10Cr           | 0.008       | AS8     |
| TR13               | Ohnuki | TEM              | V-4Cr-4Ti        | 0.008       | AS8     |
| TR14               | Ohnuki | TEM              | V-4Cr-4Ti        | 0.008       | AS8     |
| TR15               | Ohnuki | TEM              | V-1Y             | 0.008       | AS8     |
| TR16               | Ohnuki | TEM              | V-1Y             | 0.008       | AS8     |
| X2X1               | Matsui | TEM              | VM9402           | 0.011       | AS8     |
| X3X1               | Matsui | TEM              | VM9403           | 0.011       | AS8     |
| X4X1               | Matsui | TEM              | VM9404           | 0.011       | AS8     |
| X5X1               | Matsui | TEM              | VM9405           | 0.011       | AS8     |
| X6X1               | Matsui | TEM              | VM9406           | 0.011       | AS8     |
| X8X1               | Matsui | TEM              | VM9408           | 0.011       | AS8     |
| X9X1               | Matsui | TEM              | VM9409           | 0.011       | AS8     |

Subcapsule AS9

|       |        |           |                 |       |     |
|-------|--------|-----------|-----------------|-------|-----|
| A1    | ANL    | Creep     | 832665          | 0.650 | AS9 |
| 1XR6  | Matsui | 1.5CVN    | V-4Cr-4Ti-0.1Si | 0.268 | AS9 |
| 1XR7  | Matsui | 1.5CVN    | V-4Cr-4Ti-0.1Si | 0.268 | AS9 |
| 95R6  | Matsui | 1.5CVN    | V-4Cr-4Ti-0.1Si | 0.268 | AS9 |
| 95R7  | Matsui | 1.5CVN    | V-4Cr-4Ti-0.1Si | 0.268 | AS9 |
| 95R8  | Matsui | 1.5CVN    | V-4Cr-4Ti-0.1Si | 0.268 | AS9 |
| 95R9  | Matsui | 1.5CVN    | V-4Cr-4Ti-0.1Si | 0.268 | AS9 |
| ---   | ANL    | 1.5CVN-IG | BL-47           | 0.264 | AS9 |
| ---   | ANL    | 1.5CVN-IG | BL-47           | 0.264 | AS9 |
| ---   | ANL    | 1.5CVN-IG | BL-47           | 0.264 | AS9 |
| ---   | ANL    | 1.5CVN-IG | BL-47           | 0.264 | AS9 |
| 47-09 | ANL    | CVNM30    | BL-47           | 1.678 | AS9 |

| Specimen<br>ID No. | Lab.   | Specimen<br>Type | Mat'l/Heat      | Mass<br>(g) | Subcap. |
|--------------------|--------|------------------|-----------------|-------------|---------|
| BL71W-20           | ANL    | CVNM30           | 832665          | 1.674       | AS9     |
| 71                 | ANL    | SS-3 TS          | 832665          | 0.320       | AS9     |
| 71                 | ANL    | SS-3 TS          | 832665          | 0.320       | AS9     |
| 71                 | ANL    | SS-3 TS          | 832665          | 0.320       | AS9     |
| XR25               | Matsui | MT TS            | V-4Cr-4Ti-0.1Si | 0.053       | AS9     |
| XR26               | Matsui | MT TS            | V-4Cr-4Ti-0.1Si | 0.053       | AS9     |
| XR27               | Matsui | MT TS            | V-4Cr-4Ti-0.1Si | 0.053       | AS9     |
| XR28               | Matsui | MT TS            | V-4Cr-4Ti-0.1Si | 0.053       | AS9     |
| XRX6               | Matsui | MT TS            | V-4Cr-4Ti-0.1Si | 0.053       | AS9     |
| XRX7               | Matsui | MT TS            | V-4Cr-4Ti-0.1Si | 0.053       | AS9     |
| XRX8               | Matsui | MT TS            | V-4Cr-4Ti-0.1Si | 0.053       | AS9     |
| XRX9               | Matsui | MT TS            | V-4Cr-4Ti-0.1Si | 0.053       | AS9     |
| 47                 | ANL    | TEM              | BL-47           | 0.012       | AS9     |
| 47                 | ANL    | TEM              | BL-47           | 0.012       | AS9     |
| 47                 | ANL    | TEM              | BL-47           | 0.012       | AS9     |
| 47                 | ANL    | TEM              | BL-47           | 0.012       | AS9     |
| 47                 | ANL    | TEM              | BL-47           | 0.012       | AS9     |
| 47                 | ANL    | TEM              | BL-47           | 0.012       | AS9     |
| 47                 | ANL    | TEM              | BL-47           | 0.012       | AS9     |
| 47                 | ANL    | TEM              | BL-47           | 0.012       | AS9     |
| 47                 | ANL    | TEM              | BL-47           | 0.012       | AS9     |
| 47                 | ANL    | TEM              | BL-47           | 0.012       | AS9     |
| 70                 | ANL    | TEM              | BL-70           | 0.012       | AS9     |
| 70                 | ANL    | TEM              | BL-70           | 0.012       | AS9     |
| 70                 | ANL    | TEM              | BL-70           | 0.012       | AS9     |
| 70                 | ANL    | TEM              | BL-70           | 0.012       | AS9     |
| 70                 | ANL    | TEM              | BL-70           | 0.012       | AS9     |
| 70                 | ANL    | TEM              | BL-70           | 0.012       | AS9     |
| 70                 | ANL    | TEM              | BL-70           | 0.012       | AS9     |
| 70                 | ANL    | TEM              | BL-70           | 0.012       | AS9     |
| 70                 | ANL    | TEM              | BL-70           | 0.012       | AS9     |
| 71                 | ANL    | TEM              | 832665          | 0.012       | AS9     |
| 71                 | ANL    | TEM              | 832665          | 0.012       | AS9     |
| 71                 | ANL    | TEM              | 832665          | 0.012       | AS9     |
| 71                 | ANL    | TEM              | 832665          | 0.012       | AS9     |
| 71                 | ANL    | TEM              | 832665          | 0.012       | AS9     |
| 71                 | ANL    | TEM              | 832665          | 0.012       | AS9     |
| 71                 | ANL    | TEM              | 832665          | 0.012       | AS9     |
| 71                 | ANL    | TEM              | 832665          | 0.012       | AS9     |
| 71                 | ANL    | TEM              | 832665          | 0.012       | AS9     |
| 71                 | ANL    | TEM              | 832665          | 0.012       | AS9     |
| 71                 | ANL    | TEM              | 832665          | 0.012       | AS9     |
| 72                 | ANL    | TEM              | T87             | 0.012       | AS9     |
| 72                 | ANL    | TEM              | T87             | 0.012       | AS9     |
| 72                 | ANL    | TEM              | T87             | 0.012       | AS9     |
| 72                 | ANL    | TEM              | T87             | 0.012       | AS9     |
| 72                 | ANL    | TEM              | T87             | 0.012       | AS9     |
| 72                 | ANL    | TEM              | T87             | 0.012       | AS9     |
| 72                 | ANL    | TEM              | T87             | 0.012       | AS9     |
| 72                 | ANL    | TEM              | T87             | 0.012       | AS9     |
| 72                 | ANL    | TEM              | T87             | 0.012       | AS9     |
| LZ                 | ANL    | TEM-LZ           | 832665          | 0.012       | AS9     |

Subcapsule AS10

|      |     |        |                  |       |      |
|------|-----|--------|------------------|-------|------|
| A10  | ANL | Creep  | 832665           | 0.650 | AS10 |
| AJT5 | Abe | 1.5CVN | V-5Cr-5Ti-1SiAlY | 0.264 | AS10 |
| AJT6 | Abe | 1.5CVN | V-5Cr-5Ti-1SiAlY | 0.264 | AS10 |
| AJZ5 | Abe | 1.5CVN | V-5Cr-5Ti-1SiAlY | 0.264 | AS10 |
| AJZ6 | Abe | 1.5CVN | V-5Cr-5Ti-1SiAlY | 0.264 | AS10 |
| AJZ7 | Abe | 1.5CVN | V-5Cr-5Ti-1SiAlY | 0.264 | AS10 |

| Specimen ID No. | Lab. | Specimen Type | Mat'l/Heat       | Mass (g) | Subcap. |
|-----------------|------|---------------|------------------|----------|---------|
| AJZ8            | Abe  | 1.5CVN        | V-5Cr-5Ti-1SiAlY | 0.264    | AS10    |
| BL71W-21        | ANL  | CVNM30        | 832665           | 1.674    | AS10    |
| BL71W-22        | ANL  | CVNM30        | 832665           | 1.674    | AS10    |
| BL71W-30        | ANL  | CVNM30        | 832665           | 1.674    | AS10    |
| 47              | ANL  | SS-3 TS       | BL-47            | 0.320    | AS10    |
| 47              | ANL  | SS-3 TS       | BL-47            | 0.320    | AS10    |
| 71-LZ           | ANL  | SS-3-LZ       | 832665           | 0.320    | AS10    |
| AJB4            | Abe  | MT TS         | V-5Cr-5Ti-1SiAlY | 0.056    | AS10    |
| AJB5            | Abe  | MT TS         | V-5Cr-5Ti-1SiAlY | 0.056    | AS10    |
| AJB6            | Abe  | MT TS         | V-5Cr-5Ti-1SiAlY | 0.056    | AS10    |
| AJB7            | Abe  | MT TS         | V-5Cr-5Ti-1SiAlY | 0.056    | AS10    |
| AJF0            | Abe  | MT TS         | V-5Cr-5Ti-1SiAlY | 0.056    | AS10    |
| AJF1            | Abe  | MT TS         | V-5Cr-5Ti-1SiAlY | 0.056    | AS10    |
| AJF2            | Abe  | MT TS         | V-5Cr-5Ti-1SiAlY | 0.056    | AS10    |
| AJF3            | Abe  | MT TS         | V-5Cr-5Ti-1SiAlY | 0.056    | AS10    |
| ET01            | ORNL | TEM           | T89              | 0.010    | AS10    |
| ET02            | ORNL | TEM           | T89              | 0.010    | AS10    |
| ET03            | ORNL | TEM           | T89              | 0.010    | AS10    |
| ET04            | ORNL | TEM           | T89              | 0.010    | AS10    |
| ET05            | ORNL | TEM           | T89              | 0.010    | AS10    |
| ET06            | ORNL | TEM           | T89              | 0.010    | AS10    |
| ET07            | ORNL | TEM           | T89              | 0.010    | AS10    |
| ET08            | ORNL | TEM           | T89              | 0.010    | AS10    |
| ET09            | ORNL | TEM           | T89              | 0.010    | AS10    |
| ET10            | ORNL | TEM           | T89              | 0.010    | AS10    |
| FT01            | ORNL | TEM           | T90              | 0.010    | AS10    |
| FT02            | ORNL | TEM           | T90              | 0.010    | AS10    |
| FT03            | ORNL | TEM           | T90              | 0.010    | AS10    |
| FT04            | ORNL | TEM           | T90              | 0.010    | AS10    |
| FT05            | ORNL | TEM           | T90              | 0.010    | AS10    |
| FT06            | ORNL | TEM           | T90              | 0.010    | AS10    |
| FT07            | ORNL | TEM           | T90              | 0.010    | AS10    |
| FT08            | ORNL | TEM           | T90              | 0.010    | AS10    |
| FT09            | ORNL | TEM           | T90              | 0.010    | AS10    |
| FT10            | ORNL | TEM           | T90              | 0.011    | AS10    |
| GT01            | ORNL | TEM           | T91              | 0.011    | AS10    |
| GT02            | ORNL | TEM           | T91              | 0.011    | AS10    |
| GT03            | ORNL | TEM           | T91              | 0.011    | AS10    |
| GT04            | ORNL | TEM           | T91              | 0.011    | AS10    |
| GT05            | ORNL | TEM           | T91              | 0.011    | AS10    |
| GT06            | ORNL | TEM           | T91              | 0.011    | AS10    |
| GT07            | ORNL | TEM           | T91              | 0.011    | AS10    |
| GT08            | ORNL | TEM           | T91              | 0.011    | AS10    |
| GT09            | ORNL | TEM           | T91              | 0.011    | AS10    |
| GT10            | ORNL | TEM           | T91              | 0.011    | AS10    |
| HT01            | ORNL | TEM           | T92              | 0.011    | AS10    |
| HT02            | ORNL | TEM           | T92              | 0.011    | AS10    |
| HT03            | ORNL | TEM           | T92              | 0.011    | AS10    |
| HT04            | ORNL | TEM           | T92              | 0.011    | AS10    |
| HT05            | ORNL | TEM           | T92              | 0.011    | AS10    |
| HT06            | ORNL | TEM           | T92              | 0.011    | AS10    |
| HT07            | ORNL | TEM           | T92              | 0.011    | AS10    |
| HT08            | ORNL | TEM           | T92              | 0.011    | AS10    |
| HT09            | ORNL | TEM           | T92              | 0.011    | AS10    |
| HT10            | ORNL | TEM           | T92              | 0.011    | AS10    |
| NT01            | ORNL | TEM           | 832665           | 0.010    | AS10    |
| NT02            | ORNL | TEM           | 832665           | 0.010    | AS10    |
| NT03            | ORNL | TEM           | 832665           | 0.010    | AS10    |
| NT04            | ORNL | TEM           | 832665           | 0.010    | AS10    |
| NT05            | ORNL | TEM           | 832665           | 0.010    | AS10    |
| NT06            | ORNL | TEM           | 832665           | 0.010    | AS10    |
| NT07            | ORNL | TEM           | 832665           | 0.010    | AS10    |

| Specimen<br>ID No.     | Lab.   | Specimen<br>Type | Mat'l/Heat       | Mass<br>(g) | Subcap. |
|------------------------|--------|------------------|------------------|-------------|---------|
| NT08                   | ORNL   | TEM              | 832665           | 0.010       | AS10    |
| NT09                   | ORNL   | TEM              | 832665           | 0.010       | AS10    |
| NT10                   | ORNL   | TEM              | 832665           | 0.010       | AS10    |
| <u>Subcapsule AS11</u> |        |                  |                  |             |         |
| A7                     | ANL    | Creep            | 832665           | 0.650       | AS11    |
| AJX5                   | Abe    | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.264       | AS11    |
| AJX6                   | Abe    | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.264       | AS11    |
| AJX7                   | Abe    | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.264       | AS11    |
| AJX8                   | Abe    | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.264       | AS11    |
| AJX9                   | Abe    | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.264       | AS11    |
| AJZ9                   | Abe    | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.264       | AS11    |
| 47                     | ANL    | CVNM45           | BL-47            | 1.678       | AS11    |
| 47                     | ANL    | CVNM45           | BL-47            | 1.678       | AS11    |
| 47                     | ANL    | CVNM45           | BL-47            | 1.678       | AS11    |
| UC06                   | ORNL   | SS-3 TS          | T90              | 0.345       | AS11    |
| UC07                   | ORNL   | SS-3 TS          | T90              | 0.345       | AS11    |
| ZC06                   | ORNL   | SS-3 TS          | T92              | 0.340       | AS11    |
| AJA4                   | Abe    | MT TS            | V-5Cr-5Ti-1SiAlY | 0.056       | AS11    |
| AJA5                   | Abe    | MT TS            | V-5Cr-5Ti-1SiAlY | 0.056       | AS11    |
| AJA6                   | Abe    | MT TS            | V-5Cr-5Ti-1SiAlY | 0.056       | AS11    |
| AJA7                   | Abe    | MT TS            | V-5Cr-5Ti-1SiAlY | 0.056       | AS11    |
| P751                   | PNL    | MT TS            | T87              | 0.072       | AS11    |
| P752                   | PNL    | MT TS            | T87              | 0.072       | AS11    |
| P841                   | PNL    | MT TS            | 832665           | 0.072       | AS11    |
| P842                   | PNL    | MT TS            | 832665           | 0.072       | AS11    |
| P103                   | PNL    | TEM              | T91              | 0.013       | AS11    |
| P105                   | PNL    | TEM              | T91              | 0.013       | AS11    |
| P107                   | PNL    | TEM              | T91              | 0.013       | AS11    |
| P123                   | PNL    | TEM              | T91              | 0.013       | AS11    |
| P124                   | PNL    | TEM              | T91              | 0.013       | AS11    |
| P128                   | PNL    | TEM              | T91              | 0.013       | AS11    |
| P209                   | PNL    | TEM              | T92              | 0.013       | AS11    |
| P213                   | PNL    | TEM              | T92              | 0.013       | AS11    |
| P215                   | PNL    | TEM              | T92              | 0.013       | AS11    |
| P219                   | PNL    | TEM              | T92              | 0.013       | AS11    |
| P221                   | PNL    | TEM              | T92              | 0.013       | AS11    |
| P227                   | PNL    | TEM              | T92              | 0.013       | AS11    |
| P707                   | PNL    | TEM              | T87              | 0.013       | AS11    |
| P708                   | PNL    | TEM              | T87              | 0.013       | AS11    |
| P710                   | PNL    | TEM              | T87              | 0.013       | AS11    |
| P712                   | PNL    | TEM              | T87              | 0.013       | AS11    |
| P726                   | PNL    | TEM              | T87              | 0.013       | AS11    |
| P738                   | PNL    | TEM              | T87              | 0.013       | AS11    |
| P801                   | PNL    | TEM              | 832665           | 0.013       | AS11    |
| P808                   | PNL    | TEM              | 832665           | 0.013       | AS11    |
| P811                   | PNL    | TEM              | 832665           | 0.013       | AS11    |
| P825                   | PNL    | TEM              | 832665           | 0.013       | AS11    |
| P826                   | PNL    | TEM              | 832665           | 0.013       | AS11    |
| P831                   | PNL    | TEM              | 832665           | 0.013       | AS11    |
| <u>Subcapsule AS12</u> |        |                  |                  |             |         |
| A11                    | ANL    | Creep            | 832665           | 0.650       | AS12    |
| AJT7                   | Abe    | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.264       | AS12    |
| AJT8                   | Abe    | 1.5CVN           | V-5Cr-5Ti-1SiAlY | 0.264       | AS12    |
| AN13                   | Matsui | 1.5CVN           | V-4Cr4Ti/832665  | 0.268       | AS12    |
| AN14                   | Matsui | 1.5CVN           | V-4Cr4Ti/832665  | 0.268       | AS12    |
| AN15                   | Matsui | 1.5CVN           | V-4Cr4Ti/832665  | 0.268       | AS12    |
| AN16                   | Matsui | 1.5CVN           | V-4Cr4Ti/832665  | 0.268       | AS12    |
| QC03                   | ORNL   | CVNM             | 832665           | 1.662       | AS12    |

| Specimen<br>ID No.     | Lab.   | Specimen<br>Type | Mat'l/Heat       | Mass<br>(g) | Subcap. |
|------------------------|--------|------------------|------------------|-------------|---------|
| QC04                   | ORNL   | CVNM             | 832665           | 1.662       | AS12    |
| QC05                   | ORNL   | CVNM             | 832665           | 1.662       | AS12    |
| XC06                   | ORNL   | SS-3 TS          | T91              | 0.335       | AS12    |
| XC07                   | ORNL   | SS-3 TS          | T91              | 0.335       | AS12    |
| ZC07                   | ORNL   | SS-3 TS          | T92              | 0.340       | AS12    |
| AJF4                   | Abe    | MT TS            | V-5Cr-5Ti-1SiAlY | 0.056       | AS12    |
| AJF5                   | Abe    | MT TS            | V-5Cr-5Ti-1SiAlY | 0.056       | AS12    |
| AJG1                   | Abe    | MT TS            | V-5Cr-5Ti-1SiAlY | 0.056       | AS12    |
| AJG2                   | Abe    | MT TS            | V-5Cr-5Ti-1SiAlY | 0.056       | AS12    |
| AJG3                   | Abe    | MT TS            | V-5Cr-5Ti-1SiAlY | 0.056       | AS12    |
| AJG4                   | Abe    | MT TS            | V-5Cr-5Ti-1SiAlY | 0.056       | AS12    |
| XF28                   | Matsui | MT TS            | V-3Fe-4Ti-0.1Si  | 0.053       | AS12    |
| XR1X                   | Matsui | MT TS            | V-4Cr-4Ti-0.1Si  | 0.053       | AS12    |
| AJ15                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ16                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ17                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ18                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ19                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ35                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ36                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ37                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ38                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ39                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ60                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ61                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ62                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ63                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ64                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ65                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ66                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ67                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ68                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ69                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ85                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ86                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ87                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ88                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| AJ89                   | Abe    | TEM              | V-5Cr-5Ti-1SiAlY | 0.010       | AS12    |
| TR41                   | Ohnuki | TEM              | pure V           | 0.006       | AS12    |
| TR42                   | Ohnuki | TEM              | pure V           | 0.006       | AS12    |
| TR43                   | Ohnuki | TEM              | V-0.5Cr          | 0.006       | AS12    |
| TR44                   | Ohnuki | TEM              | V-0.5Cr          | 0.006       | AS12    |
| TR45                   | Ohnuki | TEM              | V-1Cr            | 0.006       | AS12    |
| TR46                   | Ohnuki | TEM              | V-1Cr            | 0.006       | AS12    |
| TR47                   | Ohnuki | TEM              | V-2Cr            | 0.006       | AS12    |
| TR48                   | Ohnuki | TEM              | V-2Cr            | 0.006       | AS12    |
| TR49                   | Ohnuki | TEM              | V-5Cr            | 0.006       | AS12    |
| TR50                   | Ohnuki | TEM              | V-5Cr            | 0.006       | AS12    |
| TR51                   | Ohnuki | TEM              | V-10Cr           | 0.006       | AS12    |
| TR52                   | Ohnuki | TEM              | V-10Cr           | 0.006       | AS12    |
| TR53                   | Ohnuki | TEM              | V-4Cr-4Ti        | 0.006       | AS12    |
| TR54                   | Ohnuki | TEM              | V-4Cr-4Ti        | 0.006       | AS12    |
| TR55                   | Ohnuki | TEM              | V-1Y             | 0.006       | AS12    |
| TR60                   | Ohnuki | TEM              | V-1Y             | 0.006       | AS12    |
| <u>Subcapsule AS13</u> |        |                  |                  |             |         |
| 47                     | ANL    | DCT-A            | BL-47            | 1.255       | AS13    |
| 47                     | ANL    | DCT-A            | BL-47            | 1.255       | AS13    |
| 71                     | ANL    | DCT-A            | 832665           | 1.220       | AS13    |
| 71                     | ANL    | DCT-A            | 832665           | 1.220       | AS13    |
| 71                     | ANL    | DCT-A            | 832665           | 1.220       | AS13    |

| Specimen<br>ID No.     | Lab.     | Specimen<br>Type | Mat'l/Heat      | Mass<br>(g) | Subcap. |
|------------------------|----------|------------------|-----------------|-------------|---------|
| 72                     | ANL      | DCT-A            | T87             | 1.240       | AS13    |
| 72                     | ANL      | DCT-A            | T87             | 1.240       | AS13    |
| M                      | Matsui   | DCT-A            | V-3Fe-4Ti       | 1.257       | AS13    |
| M                      | Matsui   | DCT-A            | V-3Fe-4Ti       | 1.257       | AS13    |
| M                      | Matsui   | DCT-A            | V-3Fe-4Ti       | 1.257       | AS13    |
| QA01                   | ORNL     | DCT-A            | 832665          | 1.377       | AS13    |
| QA02                   | ORNL     | DCT-A            | 832665          | 1.377       | AS13    |
| QA04                   | ORNL     | DCT-A            | 832665          | 1.377       | AS13    |
| <u>Subcapsule AS14</u> |          |                  |                 |             |         |
| J2                     | Monbusho | Creep            | V-3Fe-4TI-0.1Si | 0.650       | AS14    |
| 95F0                   | Matsui   | 1.5CVN           | V-3Fe-4TI-0.1Si | 0.268       | AS14    |
| 95F6                   | Matsui   | 1.5CVN           | V-3Fe-4TI-0.1Si | 0.268       | AS14    |
| 95F7                   | Matsui   | 1.5CVN           | V-3Fe-4TI-0.1Si | 0.268       | AS14    |
| 95F8                   | Matsui   | 1.5CVN           | V-3Fe-4TI-0.1Si | 0.268       | AS14    |
| 95F9                   | Matsui   | 1.5CVN           | V-3Fe-4TI-0.1Si | 0.268       | AS14    |
| 95RX                   | Matsui   | 1.5CVN           | V-4Cr-4TI-0.1Si | 0.268       | AS14    |
| BL71W-27               | ANL      | PCVN30           | 832665          | 1.667       | AS14    |
| BL71W-40               | ANL      | PCVN30           | 832665          | 1.667       | AS14    |
| BL71W-45               | ANL      | PCVN30           | 832665          | 1.667       | AS14    |
| 72                     | ANL      | SS-3 TS          | T87             | 0.320       | AS14    |
| 72                     | ANL      | SS-3 TS          | T87             | 0.320       | AS14    |
| WF21                   | ORNL     | SS-3-EB          | 832665          | 0.340       | AS14    |
| XF25                   | Matsui   | MT TS            | V-3Fe-4TI-0.1Si | 0.053       | AS14    |
| XF26                   | Matsui   | MT TS            | V-3Fe-4TI-0.1Si | 0.053       | AS14    |
| XF27                   | Matsui   | MT TS            | V-3Fe-4TI-0.1Si | 0.053       | AS14    |
| XFX5                   | Matsui   | MT TS            | V-3Fe-4TI-0.1Si | 0.053       | AS14    |
| XFX6                   | Matsui   | MT TS            | V-3Fe-4TI-0.1Si | 0.053       | AS14    |
| XFX7                   | Matsui   | MT TS            | V-3Fe-4TI-0.1Si | 0.053       | AS14    |
| XFX8                   | Matsui   | MT TS            | V-3Fe-4TI-0.1Si | 0.053       | AS14    |
| 1RX4                   | Matsui   | TEM              | V-4Cr-4TI-0.1Si | 0.010       | AS14    |
| 1RX5                   | Matsui   | TEM              | V-4Cr-4TI-0.1Si | 0.010       | AS14    |
| 1RX6                   | Matsui   | TEM              | V-4Cr-4TI-0.1Si | 0.010       | AS14    |
| 1SX2                   | Matsui   | TEM              | V-1Si           | 0.010       | AS14    |
| 5CX2                   | Matsui   | TEM              | V-5Cr           | 0.010       | AS14    |
| 5FX2                   | Matsui   | TEM              | V-5Fe           | 0.010       | AS14    |
| 5MX2                   | Matsui   | TEM              | V-5Mo           | 0.010       | AS14    |
| 5NX2                   | Matsui   | TEM              | V-5Nb           | 0.010       | AS14    |
| 5TX2                   | Matsui   | TEM              | V-5Ti           | 0.010       | AS14    |
| 9RX4                   | Matsui   | TEM              | V-4Cr-4TI-0.1Si | 0.010       | AS14    |
| 9RX5                   | Matsui   | TEM              | V-4Cr-4TI-0.1Si | 0.010       | AS14    |
| 9RX6                   | Matsui   | TEM              | V-4Cr-4TI-0.1Si | 0.010       | AS14    |
| F9X4                   | Matsui   | TEM              | V-3Fe-4TI-0.1Si | 0.010       | AS14    |
| F9X5                   | Matsui   | TEM              | V-3Fe-4TI-0.1Si | 0.010       | AS14    |
| F9X6                   | Matsui   | TEM              | V-3Fe-4TI-0.1Si | 0.010       | AS14    |
| PVX2                   | Matsui   | TEM              | PureV           | 0.010       | AS14    |
| X2X2                   | Matsui   | TEM              | VM9402          | 0.010       | AS14    |
| X3X2                   | Matsui   | TEM              | VM9403          | 0.010       | AS14    |
| X4X2                   | Matsui   | TEM              | VM9404          | 0.010       | AS14    |
| X5X2                   | Matsui   | TEM              | VM9405          | 0.010       | AS14    |
| X6X2                   | Matsui   | TEM              | VM9406          | 0.010       | AS14    |
| X8X2                   | Matsui   | TEM              | VM9408          | 0.010       | AS14    |
| X9X2                   | Matsui   | TEM              | VM9409          | 0.010       | AS14    |
| <u>Subcapsule AS16</u> |          |                  |                 |             |         |
| G3F1                   | A.Kimura | 1.5CVN           | NLM-E           | 0.341       | AS16    |
| G3F2                   | A.Kimura | 1.5CVN           | NLM-E           | 0.341       | AS16    |
| G3F3                   | A.Kimura | 1.5CVN           | NLM-E           | 0.341       | AS16    |
| G3F4                   | A.Kimura | 1.5CVN           | NLM-E           | 0.341       | AS16    |
| G3F5                   | A.Kimura | 1.5CVN           | NLM-E           | 0.341       | AS16    |

| Specimen ID No. | Lab.     | Specimen Type | Mat'l/Heat | Mass (g) | Subcap. |
|-----------------|----------|---------------|------------|----------|---------|
| G3F6            | A.Kimura | 1.5CVN        | NLM-E      | 0.341    | AS16    |
| G3F7            | A.Kimura | 1.5CVN        | NLM-E      | 0.341    | AS16    |
| G3F8            | A.Kimura | 1.5CVN        | NLM-E      | 0.341    | AS16    |
| LF09            | Kohno    | 1.5CVN        | JLF1       | 0.355    | AS16    |
| LF0A            | Kohno    | 1.5CVN        | JLF1       | 0.355    | AS16    |
| LF0B            | Kohno    | 1.5CVN        | JLF1       | 0.355    | AS16    |
| LF0D            | Kohno    | 1.5CVN        | JLF1       | 0.355    | AS16    |
| LF0F            | Kohno    | 1.5CVN        | JLF1       | 0.355    | AS16    |
| LF0G            | Kohno    | 1.5CVN        | JLF1       | 0.355    | AS16    |
| LF0H            | Kohno    | 1.5CVN        | JLF1       | 0.355    | AS16    |
| LF0K            | Kohno    | 1.5CVN        | JLF1       | 0.355    | AS16    |
| LH09            | Kohno    | 1.5CVN        | F82H       | 0.340    | AS16    |
| LH0A            | Kohno    | 1.5CVN        | F82H       | 0.340    | AS16    |
| LH0B            | Kohno    | 1.5CVN        | F82H       | 0.340    | AS16    |
| LH0D            | Kohno    | 1.5CVN        | F82H       | 0.340    | AS16    |
| LH0F            | Kohno    | 1.5CVN        | F82H       | 0.340    | AS16    |
| LH0G            | Kohno    | 1.5CVN        | F82H       | 0.340    | AS16    |
| LH0H            | Kohno    | 1.5CVN        | F82H       | 0.340    | AS16    |
| LH0K            | Kohno    | 1.5CVN        | F82H       | 0.340    | AS16    |
| G311            | A.Kimura | MT TS         | JLM-1      | 0.093    | AS16    |
| G312            | A.Kimura | MT TS         | JLM-1      | 0.093    | AS16    |
| G313            | A.Kimura | MT TS         | JLM-1      | 0.093    | AS16    |
| G314            | A.Kimura | MT TS         | JLM-1      | 0.093    | AS16    |
| G3D1            | A.Kimura | MT TS         | NLM-D      | 0.093    | AS16    |
| G3D2            | A.Kimura | MT TS         | NLM-D      | 0.093    | AS16    |
| G3D3            | A.Kimura | MT TS         | NLM-D      | 0.093    | AS16    |
| G3D4            | A.Kimura | MT TS         | NLM-D      | 0.093    | AS16    |
| G3F1            | A.Kimura | MT TS         | NLM-E      | 0.093    | AS16    |
| G3F2            | A.Kimura | MT TS         | NLM-E      | 0.093    | AS16    |
| G3F3            | A.Kimura | MT TS         | NLM-E      | 0.093    | AS16    |
| G3F4            | A.Kimura | MT TS         | NLM-E      | 0.093    | AS16    |
| LB04            | Kohno    | MT TS         | JLF1B      | 0.031    | AS16    |
| LB05            | Kohno    | MT TS         | JLF1B      | 0.031    | AS16    |
| LB06            | Kohno    | MT TS         | JLF1B      | 0.031    | AS16    |
| LF05            | Kohno    | MT TS         | JLF1       | 0.031    | AS16    |
| LF06            | Kohno    | MT TS         | JLF1       | 0.031    | AS16    |
| LF07            | Kohno    | MT TS         | JLF1       | 0.031    | AS16    |
| LF08            | Kohno    | MT TS         | JLF1       | 0.031    | AS16    |
| LH05            | Kohno    | MT TS         | F82H       | 0.031    | AS16    |
| LH06            | Kohno    | MT TS         | F82H       | 0.031    | AS16    |
| LH07            | Kohno    | MT TS         | F82H       | 0.031    | AS16    |
| LH08            | Kohno    | MT TS         | F82H       | 0.031    | AS16    |
| LM12            | Kohno    | MT TS         | JLF1Mn1    | 0.031    | AS16    |
| LM13            | Kohno    | MT TS         | JLF1Mn1    | 0.031    | AS16    |
| LM22            | Kohno    | MT TS         | JLFMn2     | 0.031    | AS16    |
| LM23            | Kohno    | MT TS         | JLFMn2     | 0.031    | AS16    |
| G311            | A.Kimura | TEM           | JLM-1      | 0.007    | AS16    |
| G312            | A.Kimura | TEM           | JLM-1      | 0.007    | AS16    |
| G313            | A.Kimura | TEM           | JLM-1      | 0.007    | AS16    |
| G314            | A.Kimura | TEM           | JLM-1      | 0.007    | AS16    |
| G341            | A.Kimura | TEM           | NLM-D      | 0.007    | AS16    |
| G342            | A.Kimura | TEM           | NLM-D      | 0.007    | AS16    |
| G343            | A.Kimura | TEM           | NLM-D      | 0.007    | AS16    |
| G344            | A.Kimura | TEM           | NLM-D      | 0.007    | AS16    |
| G371            | A.Kimura | TEM           | NLM-E      | 0.007    | AS16    |
| G372            | A.Kimura | TEM           | NLM-E      | 0.007    | AS16    |
| G373            | A.Kimura | TEM           | NLM-E      | 0.007    | AS16    |
| G374            | A.Kimura | TEM           | NLM-E      | 0.007    | AS16    |
| LB09            | Kohno    | TEM           | JLF1B      | 0.010    | AS16    |
| LB0A            | Kohno    | TEM           | JLF1B      | 0.010    | AS16    |
| LB0B            | Kohno    | TEM           | JLF1B      | 0.010    | AS16    |
| LB0D            | Kohno    | TEM           | JLF1B      | 0.010    | AS16    |

| Specimen<br>ID No. | Lab.    | Specimen<br>Type | Mat'l/Heat   | Mass<br>(g) | Subcap. |
|--------------------|---------|------------------|--------------|-------------|---------|
| LB0F               | Kohno   | TEM              | JLF1B        | 0.010       | AS16    |
| LB0G               | Kohno   | TEM              | JLF1B        | 0.010       | AS16    |
| LB0H               | Kohno   | TEM              | JLF1B        | 0.010       | AS16    |
| LB0K               | Kohno   | TEM              | JLF1B        | 0.010       | AS16    |
| LF09               | Kohno   | TEM              | JLF1         | 0.010       | AS16    |
| LF0A               | Kohno   | TEM              | JLF1         | 0.010       | AS16    |
| LF0B               | Kohno   | TEM              | JLF1         | 0.010       | AS16    |
| LF0D               | Kohno   | TEM              | JLF1         | 0.010       | AS16    |
| LF0F               | Kohno   | TEM              | JLF1         | 0.010       | AS16    |
| LF0G               | Kohno   | TEM              | JLF1         | 0.010       | AS16    |
| LF0H               | Kohno   | TEM              | JLF1         | 0.010       | AS16    |
| LF0K               | Kohno   | TEM              | JLF1         | 0.010       | AS16    |
| LH09               | Kohno   | TEM              | F82H         | 0.010       | AS16    |
| LH0A               | Kohno   | TEM              | F82H         | 0.010       | AS16    |
| LH0B               | Kohno   | TEM              | F82H         | 0.010       | AS16    |
| LH0D               | Kohno   | TEM              | F82H         | 0.010       | AS16    |
| LH0F               | Kohno   | TEM              | F82H         | 0.010       | AS16    |
| LH0G               | Kohno   | TEM              | F82H         | 0.010       | AS16    |
| LH0H               | Kohno   | TEM              | F82H         | 0.010       | AS16    |
| LH0K               | Kohno   | TEM              | F82H         | 0.010       | AS16    |
| LM19               | Kohno   | TEM              | JLFMn1       | 0.010       | AS16    |
| LM1A               | Kohno   | TEM              | JLFMn1       | 0.010       | AS16    |
| LM1B               | Kohno   | TEM              | JLFMn1       | 0.010       | AS16    |
| LM1D               | Kohno   | TEM              | JLFMn1       | 0.010       | AS16    |
| LM1F               | Kohno   | TEM              | JLFMn1       | 0.010       | AS16    |
| LM1G               | Kohno   | TEM              | JLFMn1       | 0.010       | AS16    |
| LM1H               | Kohno   | TEM              | JLFMn1       | 0.010       | AS16    |
| LM1K               | Kohno   | TEM              | JLFMn1       | 0.010       | AS16    |
| LM29               | Kohno   | TEM              | JLFMn2       | 0.010       | AS16    |
| LM2A               | Kohno   | TEM              | JLFMn2       | 0.010       | AS16    |
| LM2B               | Kohno   | TEM              | JLFMn2       | 0.010       | AS16    |
| LM2D               | Kohno   | TEM              | JLFMn2       | 0.010       | AS16    |
| LM2F               | Kohno   | TEM              | JLFMn2       | 0.010       | AS16    |
| LM2G               | Kohno   | TEM              | JLFMn2       | 0.010       | AS16    |
| LM2H               | Kohno   | TEM              | JLFMn2       | 0.010       | AS16    |
| LM2K               | Kohno   | TEM              | JLFMn2       | 0.010       | AS16    |
| TR56               | Ohnuki  | TEM              | 316-0.3Ti    | 0.011       | AS16    |
| TR57               | Ohnuki  | TEM              | 316L         | 0.011       | AS16    |
| TR58               | Ohnuki  | TEM              | 316L         | 0.011       | AS16    |
| TR59               | Ohnuki  | TEM              | 316-0.3Ti    | 0.011       | AS16    |
| TR61               | Ohnuki  | TEM              | 316-0.3Zr    | 0.011       | AS16    |
| TR62               | Ohnuki  | TEM              | 316-0.3Zr    | 0.011       | AS16    |
| TR63               | Ohnuki  | TEM              | 316-0.3Hf    | 0.011       | AS16    |
| TR64               | Ohnuki  | TEM              | 316-0.3Hf    | 0.011       | AS16    |
| TR65               | Ohnuki  | TEM              | 316-0.3Nb    | 0.011       | AS16    |
| TR66               | Ohnuki  | TEM              | 316-0.3Nb    | 0.011       | AS16    |
| TR67               | Ohnuki  | TEM              | 316L/CW      | 0.011       | AS16    |
| TR68               | Ohnuki  | TEM              | 316L/CW      | 0.011       | AS16    |
| TR69               | Ohnuki  | TEM              | 316L/CW      | 0.011       | AS16    |
| TR70               | Ohnuki  | TEM              | 316-0.3Ti/CW | 0.011       | AS16    |
| TR71               | Ohnuki  | TEM              | 316-0.3Ti/CW | 0.011       | AS16    |
| TR72               | Ohnuki  | TEM              | 316-0.3Ti/CW | 0.011       | AS16    |
| TR73               | Ohnuki  | TEM              | 316-0.3Zr/CW | 0.011       | AS16    |
| TR74               | Ohnuki  | TEM              | 316-0.3Zr/CW | 0.011       | AS16    |
| TR75               | Ohnuki  | TEM              | 316-0.3Zr/CW | 0.011       | AS16    |
| YA23               | Yoshida | TEM              | FeCrNi (1)   | 0.010       | AS16    |
| YA24               | Yoshida | TEM              | FeCrNi (1)   | 0.010       | AS16    |
| YA25               | Yoshida | TEM              | FeCrNi (2)   | 0.010       | AS16    |
| YA26               | Yoshida | TEM              | FeCrNi (2)   | 0.010       | AS16    |
| YA27               | Yoshida | TEM              | FeCrNi (3)   | 0.010       | AS16    |
| YA28               | Yoshida | TEM              | FeCrNi (3)   | 0.010       | AS16    |
| YA29               | Yoshida | TEM              | FeCrNi (4)   | 0.010       | AS16    |

| Specimen ID No. | Lab.     | Specimen Type | Mat'l/Heat | Mass (g) | Subcap. |
|-----------------|----------|---------------|------------|----------|---------|
| YA30            | Yoshida  | TEM           | FeCrNi(4)  | 0.010    | AS16    |
| YA31            | Yoshida  | TEM           | FeCrNi(5)  | 0.010    | AS16    |
| YA32            | Yoshida  | TEM           | FeCrNi(5)  | 0.010    | AS16    |
| YA33            | Yoshida  | TEM           | FeCrNi(6)  | 0.010    | AS16    |
| YA34            | Yoshida  | TEM           | FeCrNi(6)  | 0.010    | AS16    |
| YA35            | Yoshida  | TEM           | FeCrNi(7)  | 0.010    | AS16    |
| YA36            | Yoshida  | TEM           | FeCrNi(7)  | 0.010    | AS16    |
| YA37            | Yoshida  | TEM           | FeCrNi(8)  | 0.010    | AS16    |
| YA38            | Yoshida  | TEM           | FeCrNi(8)  | 0.010    | AS16    |
| YA39            | Yoshida  | TEM           | FeCrNi(9)  | 0.010    | AS16    |
| YA40            | Yoshida  | TEM           | FeCrNi(9)  | 0.010    | AS16    |
| YA41            | Yoshida  | TEM           | FeCrNi(10) | 0.010    | AS16    |
| YA42            | Yoshida  | TEM           | FeCrNi(10) | 0.010    | AS16    |
| YA43            | Yoshida  | TEM           | FeCrNi(11) | 0.010    | AS16    |
| YA44            | Yoshida  | TEM           | FeCrNi(11) | 0.010    | AS16    |
| G315            | A.Kimura | TEM           | JLM-1      | 0.010    | AS16    |
| G316            | A.Kimura | TEM           | JLM-1      | 0.010    | AS16    |
| G317            | A.Kimura | TEM           | JLM-1      | 0.010    | AS16    |
| G318            | A.Kimura | TEM           | JLM-1      | 0.010    | AS16    |
| G319            | A.Kimura | TEM           | JLM-1      | 0.010    | AS16    |
| G320            | A.Kimura | TEM           | JLM-1      | 0.010    | AS16    |
| G321            | A.Kimura | TEM           | JLM-1      | 0.010    | AS16    |
| G322            | A.Kimura | TEM           | JLM-1      | 0.010    | AS16    |
| G323            | A.Kimura | TEM           | JLM-1      | 0.010    | AS16    |
| G324            | A.Kimura | TEM           | JLM-1      | 0.010    | AS16    |
| G325            | A.Kimura | TEM           | JLM-1      | 0.010    | AS16    |
| G345            | A.Kimura | TEM           | NLM-D      | 0.010    | AS16    |
| G346            | A.Kimura | TEM           | NLM-D      | 0.010    | AS16    |
| G347            | A.Kimura | TEM           | NLM-D      | 0.010    | AS16    |
| G348            | A.Kimura | TEM           | NLM-D      | 0.010    | AS16    |
| G349            | A.Kimura | TEM           | NLM-D      | 0.010    | AS16    |
| G350            | A.Kimura | TEM           | NLM-D      | 0.010    | AS16    |
| G351            | A.Kimura | TEM           | NLM-D      | 0.010    | AS16    |
| G352            | A.Kimura | TEM           | NLM-D      | 0.010    | AS16    |
| G353            | A.Kimura | TEM           | NLM-D      | 0.010    | AS16    |
| G354            | A.Kimura | TEM           | NLM-D      | 0.010    | AS16    |
| G355            | A.Kimura | TEM           | NLM-D      | 0.010    | AS16    |
| G375            | A.Kimura | TEM           | NLM-E      | 0.010    | AS16    |
| G376            | A.Kimura | TEM           | NLM-E      | 0.010    | AS16    |
| G377            | A.Kimura | TEM           | NLM-E      | 0.010    | AS16    |
| G378            | A.Kimura | TEM           | NLM-E      | 0.010    | AS16    |
| G379            | A.Kimura | TEM           | NLM-E      | 0.010    | AS16    |
| G380            | A.Kimura | TEM           | NLM-E      | 0.010    | AS16    |
| G381            | A.Kimura | TEM           | NLM-E      | 0.010    | AS16    |
| G382            | A.Kimura | TEM           | NLM-E      | 0.010    | AS16    |
| G383            | A.Kimura | TEM           | NLM-E      | 0.010    | AS16    |
| G384            | A.Kimura | TEM           | NLM-E      | 0.010    | AS16    |
| G385            | A.Kimura | TEM           | NLM-E      | 0.010    | AS16    |

Subcapsule AS17

|      |        |         |                  |       |      |
|------|--------|---------|------------------|-------|------|
| A4   | ANL    | Creep   | 832665           | 0.650 | AS17 |
| AJZ3 | Abe    | 1.5CVN  | V-5Cr-5Ti-1SiAlY | 0.265 | AS17 |
| AJZ4 | Abe    | 1.5CVN  | V-5Cr-5Ti-1SiAlY | 0.265 | AS17 |
| AN08 | Matsui | 1.5CVN  | V-4Cr4Ti/832665  | 0.264 | AS17 |
| AN09 | Matsui | 1.5CVN  | V-4Cr4Ti/832665  | 0.264 | AS17 |
| AN10 | Matsui | 1.5CVN  | V-4Cr4Ti/832665  | 0.264 | AS17 |
| AN11 | Matsui | 1.5CVN  | V-4Cr4Ti/832665  | 0.264 | AS17 |
| 47   | ANL    | CVNM45  | BL-47            | 1.680 | AS17 |
| 47   | ANL    | CVNM45  | BL-47            | 1.680 | AS17 |
| 47   | ANL    | CVNM45  | BL-47            | 1.680 | AS17 |
| 47   | ANL    | SS-3 TS | BL-47            | 0.318 | AS17 |

| Specimen<br>ID No. | Lab. | Specimen<br>Type | Mat'l/Heat       | Mass<br>(g) | Subcap. |
|--------------------|------|------------------|------------------|-------------|---------|
| 47                 | ANL  | SS-3 TS          | BL-47            | 0.318       | AS17    |
| 72                 | ANL  | SS-3 TS          | T87              | 0.318       | AS17    |
| AJD0               | Abe  | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS17    |
| AJD1               | Abe  | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS17    |
| AJD2               | Abe  | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS17    |
| AJD3               | Abe  | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS17    |
| AJD4               | Abe  | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS17    |
| AJD5               | Abe  | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS17    |
| AJD6               | Abe  | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS17    |
| AJD7               | Abe  | MT TS            | V-5Cr-5Ti-1SiAlY | 0.059       | AS17    |