Site-Specific License Renewal for the Fort St. Vrain (FSV) Independent Spent Fuel Storage Installation (ISFSI)

Presentation to the United States Nuclear Regulatory Commission

Rockville, MD

September 27, 2007

EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

FSV ISFSI Representatives

- ***U.S. Department of Energy, Idaho Office (DOE-ID)***
  - Jan Hagers, Licensing Manager
  - Barb Beller, Materials Disposition Project Engineer

- ***CH2M-WG Idaho, LLC (CWI)***
  - James Kaylor, Project Director, Nuclear Material Disposition
  - Randy Elwood, Manager ISFSI Management
  - Ted Borst, FSV ISFSI Facility Manager
  - Greg Hall, Regulatory Compliance Lead
  - Jim Stalnaker, System Engineer

Purpose of Meeting

- ***Provide Information to the NRC Concerning:***
  - DOE-ID's planned submittal of a License Renewal Application (LRA) for the FSV ISFSI
  - Overview of Approach
  - Schedule for submittal to the NRC
- ***Obtain NRC Feedback***
  - Status of NRC preliminary renewal guidance
  - Other considerations

Overview of Presentation

- ***Background***
  - FSV High Temperature Gas Cooled Reactor (HTGR)
  - FSV ISFSI
    - *Licensed material*
    - *License conditions*
    - *General arrangement*
    - *Fuel element*
    - *Fuel storage container*
- ***License Renewal Approach***
- ***Need for License Amendment***
- ***Schedule***
- ***Discussion***

Background – FSV HTGR

- ***Operated by Public Service Company of Colorado (PSCo) from***
- ***1974 to 1989***
- ***Reactor designed by General Atomics utilizing same fundamental principles that formed the basis of the Peach Bottom High Temperature Gas Cooled Reactor prototype***
  - Utilized a uranium-thorium fuel cycle
  - Graphite moderator, fuel cladding, core structure, and reflector
  - Helium used as primary coolant
- ***842 Megawatts (Mw) thermal with net electric output of 330 Mw***
  - Average neutron flux of 6.2 E13 n/cm^2–sec (thermal < 2.38 eV) and 3.3E13 n/cm^2–sec (fast > 0.18 MeV)
  - Average to maximum fuel temperatures from 1,500 to 2,300 degree F respectively
- ***Active core consisted of 1,482 hexagonal graphite fuel elements***
  - Stacked six-high in 247 vertical columns

Background – FSV HTGR (cont.)

- ***One sixth of core replaced during each fuel cycle (segment)***
  - Segment 1 (1/74 to 2/79) – 174 EFPD
  - Segment 2 (2/79 to 5/81) – 189 EFPD
  - Segment 3 (5/81 to 2/84) – 295 EFPD
  - Segments 4, 5, 6, 7, 8, and 9 (2/84 to 8/89) – 945 EFPD
- ***Reactor net capacity factor of 14.6%***
- ***Spent nuclear fuel (SNF) from Segments 1, 2, 3, and 18 elements from Segment 4 stored in Idaho***
  - Under 1965 contractual agreement between PSCo and AEC whereby successor DOE owned and would store first 8 Segments at DOE's Idaho site (DOE-ID)
- ***Remainder of the FSV SNF stored in the FSV ISFSI***
  - DOE precluded from receiving further FSV SNF shipments by 1995 legal Settlement Agreement with State of Idaho

Background – FSV ISFSI

- ***PSCo decision to build FSV ISFSI necessitated by:***
  - Need to defuel/decommission reactor and terminate 10 CFR Part 50 license
  - Inability to ship remaining SNF to DOE-ID for interim storage
- ***PSCo received a 20-year renewable NRC license on November 4, 1991 pursuant to 10 CFR 72***
  - Materials License No. SNM-2504, Docket No. 72-09
- ***Remaining SNF was transferred from the FSV HTGR to the FSV ISFSI between December 26, 1991 and June 10, 1992***
- ***PSCo filed lawsuit for breach of contract due to DOE-ID inability to fulfill commitment to accept FSV SNF shipments to the Idaho site***
  - Lawsuit settled out of court by contract signed February 9, 1996
    - *DOE "purchased" the FSV ISFSI and two TN-FSV shipping packages*
    - *DOE took ownership of SNF Segment 9 from PSCo*
    - *DOE committed to apply for transfer of NRC license to DOE*
- ***License transferred by NRC from PSCo to DOE-ID June 4, 1999***
- ***Current License term expires November 30, 2011***

Background – FSV ISFSI (cont.)

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Background – FSV ISFSI Licensed Material

- ***1,482 irradiated FSV HTGR fuel elements using thorium and uranium enriched to not greater than 93.15% U-235***
  - In the form of irradiated TRISO coated (Th:U)C_2 fuel particles inside graphite fuel elements
  - Maximum of 1,036 kg U and 14,540 kg thorium initially contained in fuel elements
- ***Transuranium elements, source material, byproduct material, and associated radioactive material related to receipt, storage, and transfer of fuel elements***
  - In the form of irradiated fuel elements, contaminated ISFSI equipment, depleted uranium shielding materials, and low-level radioactive waste
  - Maximum quantity contained in:
    - *1,482 irradiated HTGR fuel elements,*
    - *270 contaminated fuel storage containers,*
    - *one contaminated container handling machine,*
    - *three contaminated storage wells,*
    - *three depleted uranium shielding components, and*
    - *low-level radioactive waste related to receipt, storage, and transfer of fuel elements*

Background – FSV ISFSI Licensed Material (cont.)

- ***Byproduct and special nuclear material related to receipt, storage, and transfer of fuel elements***
  - In the form of calibration and sealed sources used for sample analysis and instrument calibration

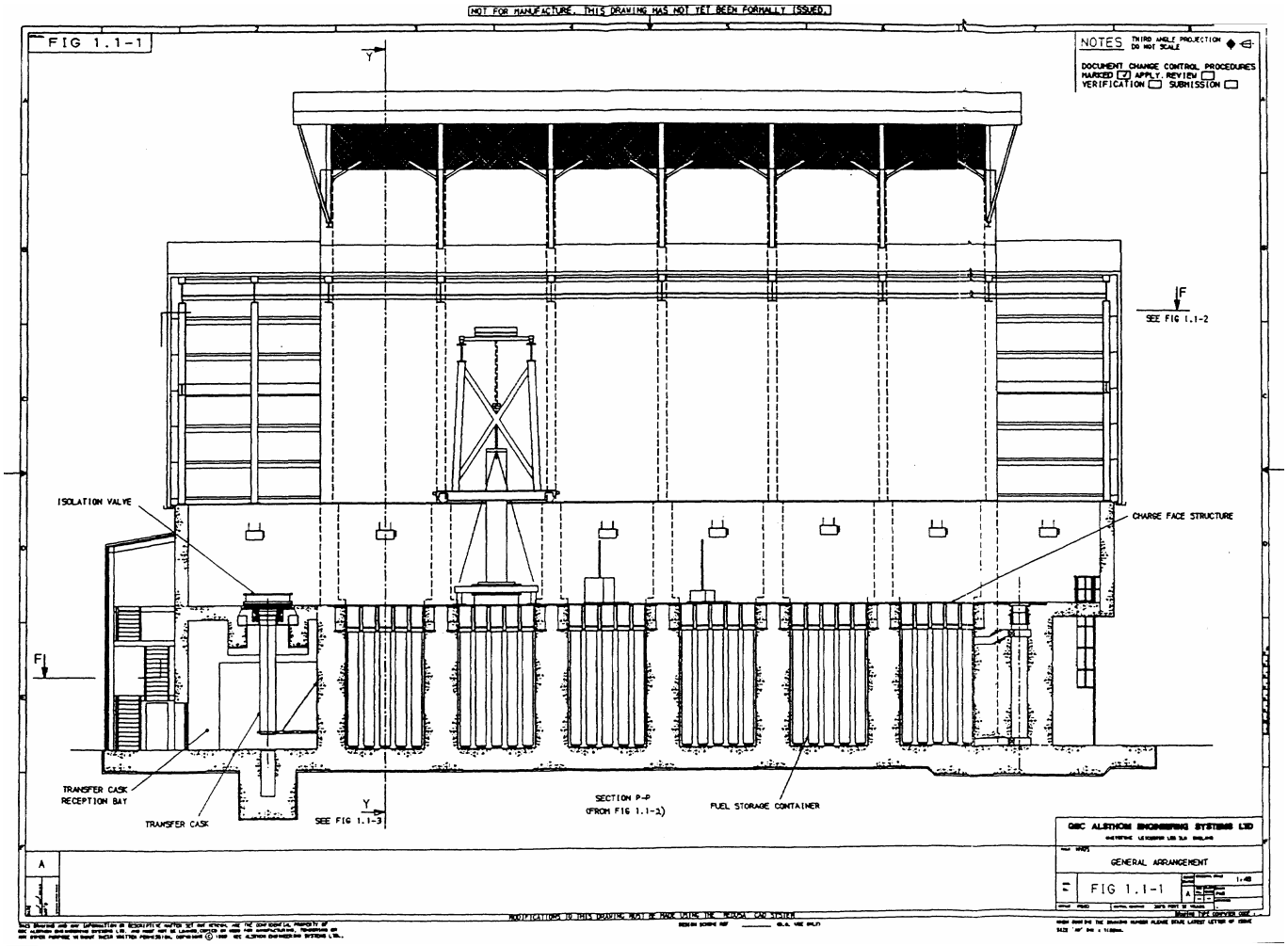
Background – FSV ISFSI License Conditions

- ***All byproduct, source, and/or special nuclear material, and chemical and/or physical form must be related to spent fuel storage and is authorized for receipt, possession, storage, and transfer***
  - Includes use of sealed sources for calibration and sample analysis
- ***Authorized place of use is the FSV ISFSI in Platteville, CO as described in the Safety Analysis Report and per the Technical Specifications***
- ***Technical Specifications are incorporated into the License including***
  - Functional and Operating Limits for spent fuel elements stored at the FSV ISFSI
  - Limiting Conditions for Operation and Surveillance Requirements
    - *MVDS Cooling System*
    - *Container Handling Machine*
    - *Fuel Storage Container*
  - Design Features
  - Administrative Controls
    - *Includes a Natural Gas and Oil Monitoring Program*

Background – FSV ISFSI License Conditions (cont.)

- ***Must follow the Physical Protection Plan***
- ***Repackaging of fuel elements is not authorized***
- ***Inform NMSS of planned replacement of DOE's operations contractor for the FSV ISFSI at least 90 days in advance***
  - Assess performance of replacement contractor within 180 days of replacement
- ***Request necessary funds from Congress to ensure compliance of FSV operations and decommissioning under the license***
  - Notify NRC in writing of anticipated or forecasted shortfalls
  - Submit plan detailing specific measures to prevent adverse impacts on ISFSI operations

Background – FSV ISFSI General Arrangement



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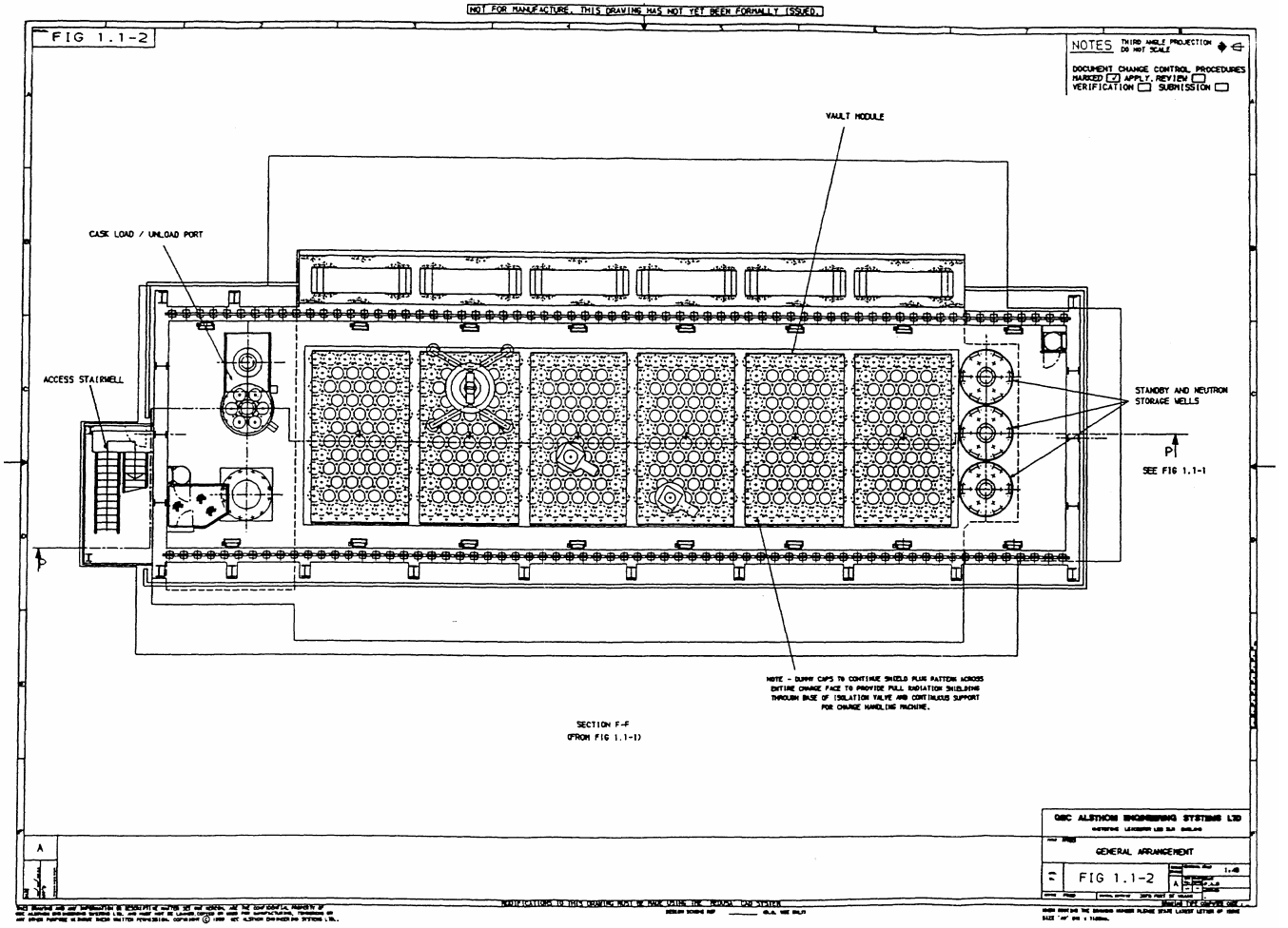

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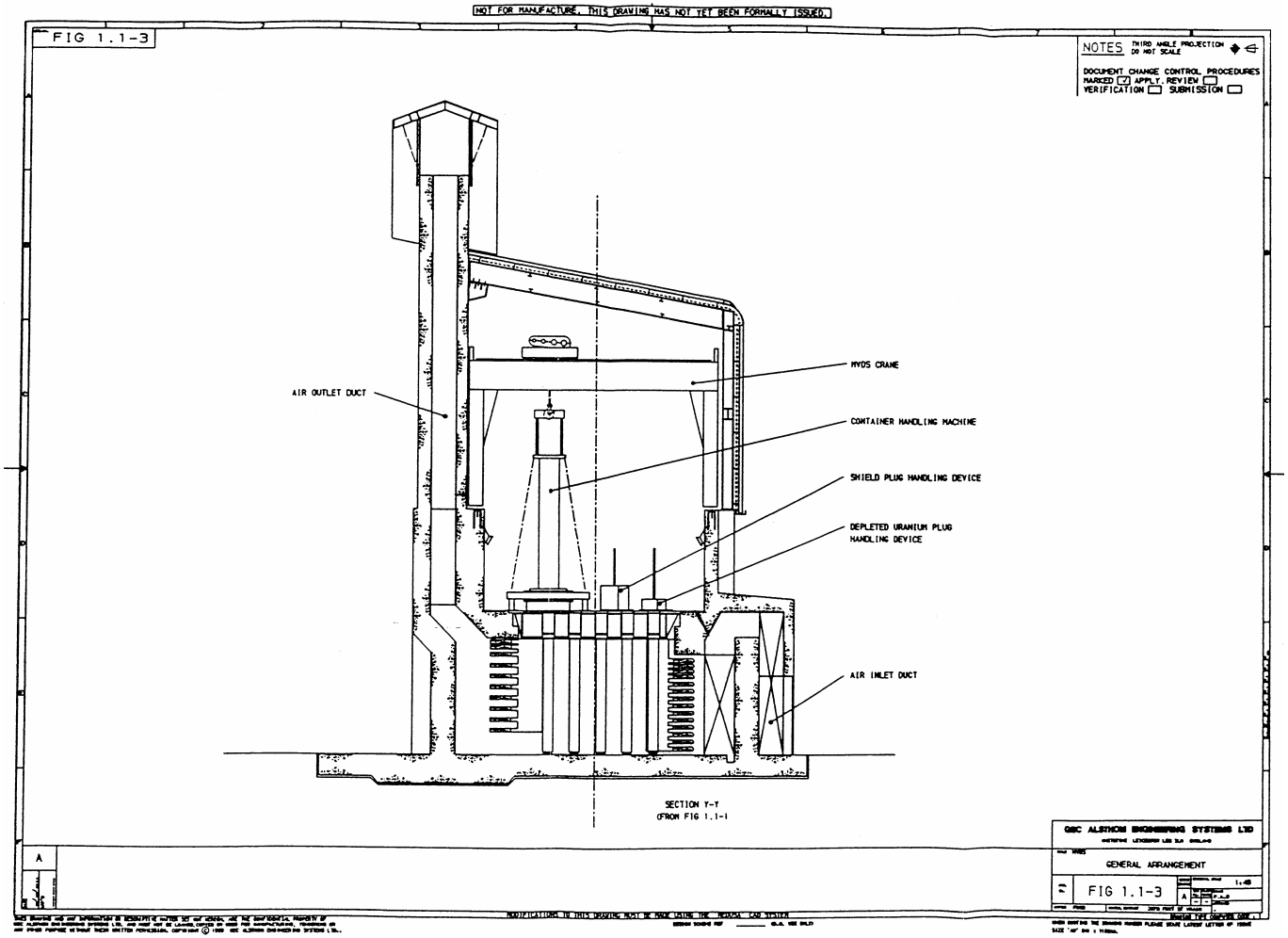
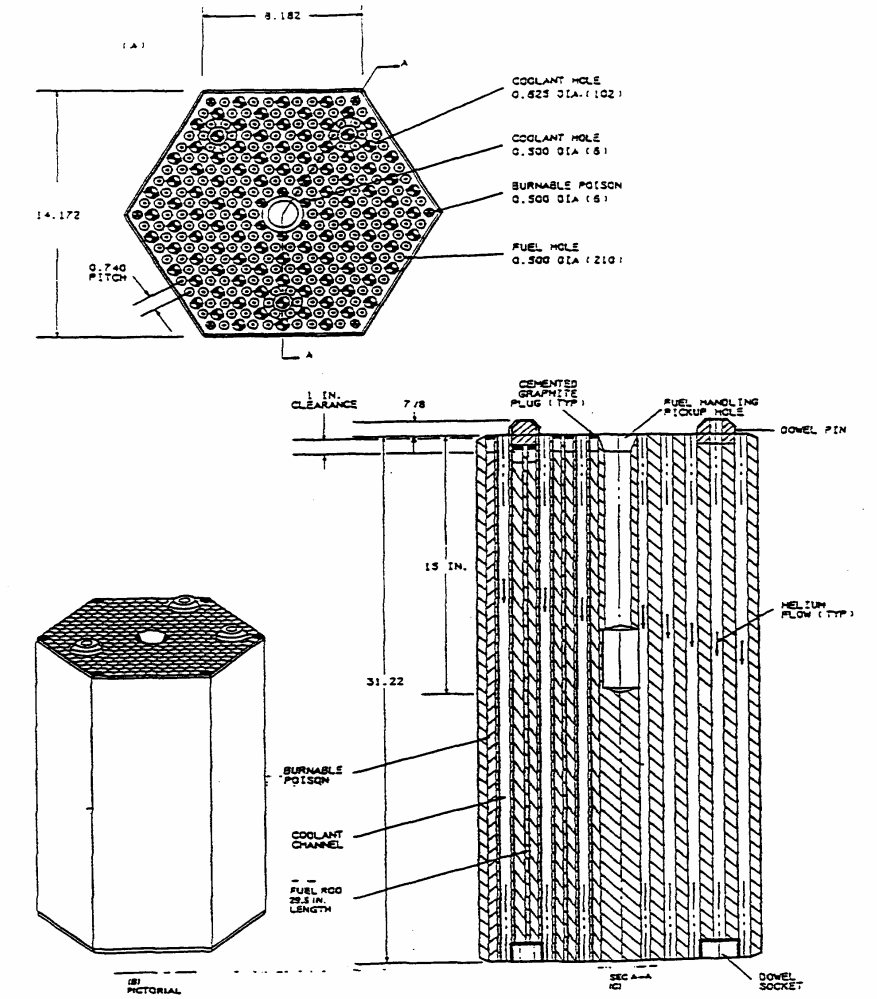
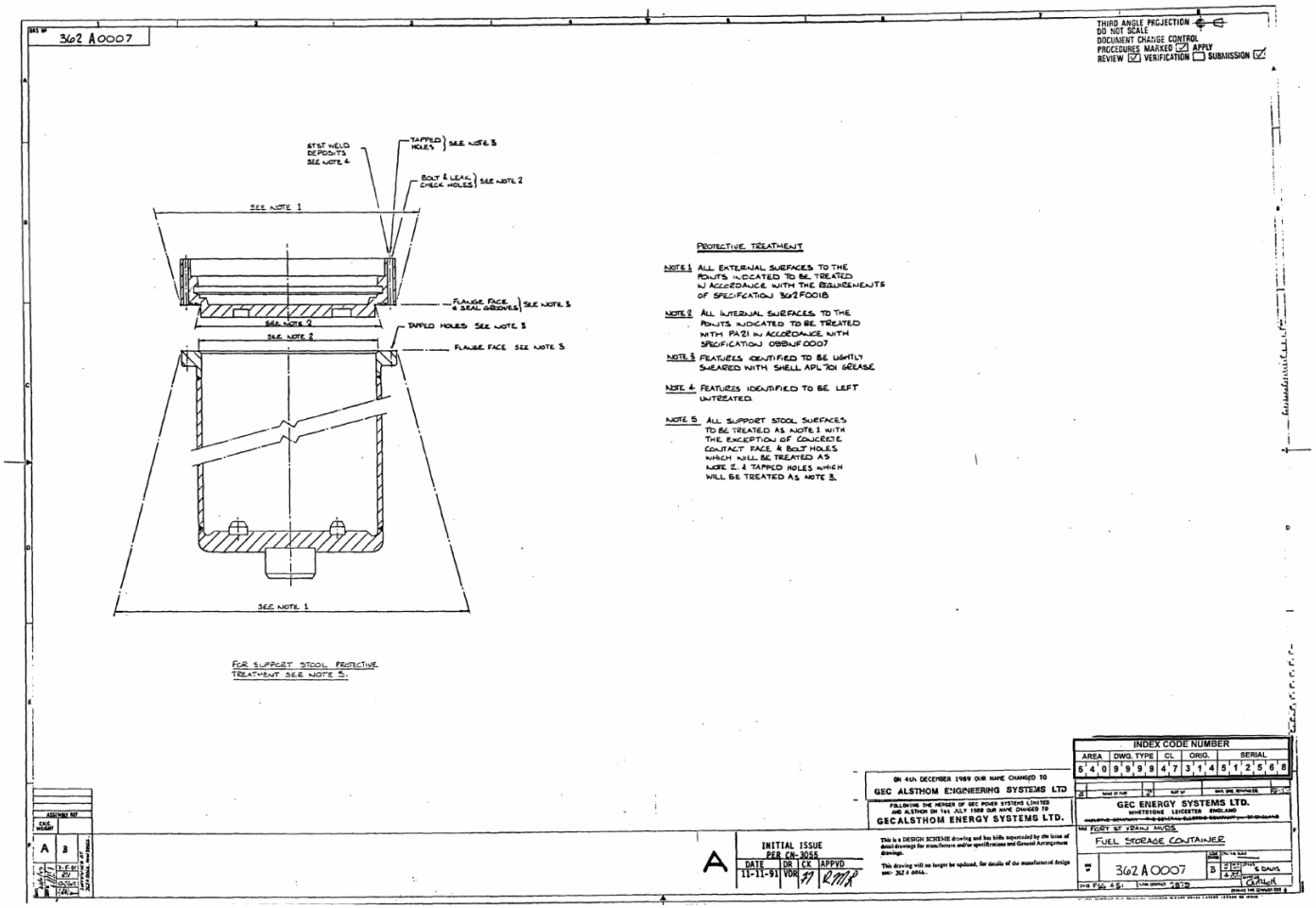


Background – FSV ISFSI Fuel Element



Background – FSV ISFSI Fuel Storage Container



License Renewal Approach

- ***10 CFR 72.42(a): Each license issued under this part must be for a fixed period of time to be specified in the license.***
  - The license term for an ISFSI must not exceed 20 years from the date of issuance.
  - Licenses may be renewed by the Commission at the expiration of the license term upon application by the licensee and pursuant to the requirements of this rule.
- ***10 CFR 72.7: The Commission may, upon application by any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest.***

License Renewal Approach (cont.)

- ***An exemption from 10 CFR 72.42(a) will be submitted in accordance with 10 CFR 72.7 for a yet to be determined extended license term to accommodate:***
  - A February 13, 1996 agreement between DOE and the Governor of Colorado requiring that all SNF at the FSV ISFSI be shipped out of Colorado no later than January 1, 2035
  - Allowance for adequate time for subsequent decontamination and decommissioning of the ISFSI required for license termination.
- ***DOE plans to issue a letter to the Governor of Colorado, the Honorable Bill Ritter, explaining the need to extend the FSV ISFSI license term beyond the standard 20-year renewal term***

License Renewal Approach (cont.)

- ***The Manager of the Department of Energy's Idaho Operations Office (DOE-ID) has been designated as the Secretary of Energy's authorized representative to hold and operate under Materials License SNM-2504***
  - Accordingly, DOE-ID will submit the License Renewal Application for the FSV ISFSI under the delegated authority
- ***Pending future guidance, DOE-ID has reviewed and will base its application on the following precedent:***
  - Preliminary NRC Staff Guidance for 10 CFR Part 72 License Renewal, U. S. Nuclear Regulatory Commission, March 29, 2001 (Dominion Letter Serial No. 01-203)
  - Preliminary NRC Staff Guidance for 10 CFR Part 72 License Renewal, U. S. Nuclear Regulatory Commission, May 17, 2001 (CP&L Letter Serial No. RRA-01-0054)
  - Surry Independent Spent Fuel Storage Installation, Comments on NRC Preliminary Guidance, June 26, 2001 (Dominion Letter Serial No. 01-367)

License Renewal Approach (cont.)

- ***DOE-ID staff has reviewed the following from the aspects of both precedent and lessons learned:***
  - Virginia Electric and Power Company, Surry Independent Spent Fuel Storage Installation (ISFSI), License Renewal Application, Docket No. 72-2, License No. SNM-2501, April 29, 2002
  - H. B. Robinson Steam Electric Plant, Unit No. 2 Independent Spent Fuel Storage Installation, Docket No. 72-3, License No. SNM-2502, Request for Renewal of Independent Spent Fuel Storage Installation, February 27, 2004
  - Oconee Independent Spent Fuel Storage Installation License Renewal Meeting, SECY-06-0202 – Weekly Information Report – Week Ending September 15, 2006, Office of Nuclear Material Safety and Safeguards Items of Interest, U.S. Nuclear Regulatory Commission

Schedule

- ***Pre-Submittal Activities: 2007, 2008, 2009***
  - Scoping evaluation of Safety Significant Components (SSCs) that are to be evaluated in an aging management review process (Completed)
  - Aging management review and effects management of the SSCs (Ongoing)
  - Time-limited aging analyses
  - License basis document changes (Ongoing)
  - Development and submittal of a license renewal application
  - Interface meetings with NRC as appropriate and necessary
- ***Submittal to NRC: During third quarter of 2009***
  - Required Submittal Date: November 30, 2009

Summary

- ***DOE-ID needs to continue operation of the FSV ISFSI***
- ***Accordingly, DOE-ID will submit:***
  - A 10 CFR Part 72 license renewal application during third quarter 2009
  - A 10 CFR 72.7 request for exemption from 10 CFR 72.42(a) in applying for an extended renewal term
- ***The License Renewal Application will incorporate the NRC Preliminary Guidance***
  - Following precedent set by the Surry, Robinson, and Oconee ISFSI license renewal applications