RETURN TO 396-SS PDR M-32

Department of Energy
Idaho Operations Office
West Valley Project Office
P.O. Box 191
West Valley, NY 14171

February 4, 1986

Dr. A. T. Clark Jr.
Advanced Fuel/Spent Fuel Licensing Branch
Fuel Cycle & Material Safety Division
U. S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: West Valley Demonstration Project (WVDP) Responses to NRC Comments and Questions

Dear Dr. Clark:

The attached responses have been prepared to address your comments and questions raised in your December 6, 1985, letter regarding Volume I of the Safety Analysis Report, the Supernatant Treatment System, and the Cement Solidification System. Note that the published reports requested are not included because they were previously sent to you.

Sincerely,

P.E. Shea for

W. H. Hannum, Director
West Valley Project Office

Attachment:
As noted

cc: J. P. Hamric, DOE-ID

EM:017:86

26430

WVDP RESPONSES TO NRC COMMENTS AND QUESTIONS

Reference: Letter of December 2, 1985, A. T. Clark, Jr, NRC/FCMS to W. H. Hannum, DOE/WVPO with attachments

STS Questions

These questions first came to our attention in a letter from J. E. Hammelman, SAIC to A. T. Clark, Jr, NRC, dated October 16, 1985, which was informally transmitted to WVNS via DOE/WVPO. They were discussed at length during the NRC/SAIC visit to West Valley on November 18-20, 1985. As stated at that November meeting, these questions will be addressed in the STS Safety Analysis Report. A draft of this report is nearing completion at this time.

General Questions

1. What are the minimum education and experience requirements for the management personnel who play a key role in protecting public health and safety?

Response

It was mutually agreed at the November 19 meeting that WVNS would provide information concerning the actual education and experience of the key managers. The following individuals have been identified as having major responsibilities for protecting public health and safety (as of January 20, 1986):

D&D Operations Manager - H. F. Daugherty

Facilities Manager - R. F. Gessner

Radiation & Safety Manager - D. J. Harward

Radiation & Environmental Safety Manager - R. E. Lawrence, Jr.

Technical Director - S. Marchetti

Safety & Environmental Assessment Manager - C. J. Roberts

The educational background and experience of the above listed individuals is summarized in Attachment A.

2. What are the education and experience requirements for membership on the Radiation and Safety Committee? Are there guidelines with respect to the kinds of disciplines and experience that WVNS is trying to maintain on the Radiation and Safety Committee? Does the committee examine and approve operation procedures?, operating philosophy?, designs?, design approaches? What does the committee do if there is a dissenting member or two? How are the decisions of the cognizant manager audited?

Response

The comments on question 1 are also applicable to number 2. The present makeup of the Radiation and Safety Committee is J. L. Knabenschuh, Chairman, R. E. Lawrence, Jr., Vice-Chairman, H. F. Daugherty, J. V. Denero, R. F. Gessner, and S. Marchetti. Alternates are J. M. Pope, C. J. Roberts and M. F. Salisbury. The education and experience of these members and alternates are summarized in Attachment A.

WVNS Policy and Procedure WV-906, Safety Review Program, provides general policies for the composition of the Radiation and Safety Committee. The Committee does not review or approve operating philosophy or procedures. It does approve design criteria, but not design approaches. Committee actions are determined by majority vote of members (or their alternates) including the chairman (WV-906). Strong dissenting opinions must be reflected in the minutes of Committee meetings.

Decisions and actions of cognizant managers are audited from several perspectives. All activities having health and safety implications are appraised by the Manager of Radiation and Safety and his professional staff. Managerial decisions in general are reviewed by the appropriate staff manager and WVNS President, the DOE West Valley Project Office and the Idaho Operations Office. EH/S concerns also come under the purview of the local Radiation and Safety Committee and the Westinghouse Waste Technology Services Division Radiation and Safety Committee.

3. How are operational safety requirements defined, developed, implemented? What independent check of compliance is performed?

Response

Refer to WV-365, Rev. 1, Preparation of Operational Safety Requirements and WV-906, Rev. 3, Safety Review Program, copies of which were provided during the November 19, 1985 meeting.

Implementation and compliance with any given OSR is the responsibility of the cognizant manager. Appraisals are conducted periodically by the Radiation and Safety Committee to ensure that operations are in compliance with applicable OSRs.

4. How are the contents of the training program developed for specific operations? How is the training program audited?

Response

Operators responsible for the control of processes, equipment and for generation of acceptable product are required to understand the function of the system they are operating with respect to the theory of operation and product quality expected. They are trained in normal mode of operation, how to detect abnormal conditions using the instrumentation available and via visual monitoring of the components, as well as actions to be taken when unusual situations occur. Operations are performed in accordance with written, approved procedures. Each operator must pass a series of written and/or oral exams to progress through various skill levels.

Training for these vital functions includes classroom, self study of procedures and manuals, and hands-on processes. The curriculum is developed by Operations management, engineers who are responsible for the design, installation and startup of the system and coordinated by the Training Department. The operator training and qualification follows an outline in a qualification standard which is a written document, approved by Operations and Training, requiring supervisory examination and sign off for completion of each step. Upon completion of the qualification sign offs, written examinations are administered with oral exams required for Senior Specialist levels.

Auditing is performed by Quality Assurance in two separate modes:

a) Process surveillance of systems and operators in action. QA reviews operators' compliance with procedures and that operators are trained to perform the activity for which they are responsible. This is done as a regularly scheduled QA function but surveillance frequency or schedule is unknown to Operations personnel.

b) Periodic QA audits of the Training Department in which qualification standards, training materials, and classroom presentations are subject to surveillance. Content of training media and presentations is reviewed for compliance with Quality requirements.

5. What independent check is there on the content of procedures and of operational compliance with procedures?

Response

All written procedures are prepared and approved in accordance with Facilities Standard Operating Procedure SOP 002 - Guidelines for the Preparation of Facilities Work Instruction Documents.

Briefly, the review cycle includes the engineer and his management, Radiation and Safety, Quality Assurance and Operations management. Each department reviews the procedure for compliance with:

a) Technical content - established by the responsible engineer and confirmed by Engineering management. Conditions expected during operation, controls, and boundary conditions are specified and checked. The initiators are also responsible for implementation of controls imposed by approved SAR's, safety class of system and OSR's.

b) Radiation and Safety reviews and approves based on compliance with WNVS Radiological Controls Manual, Industrial Hygiene and Safety Manual, and compares SAR and OSR requirements to the procedure.

c) Quality Assurance reviews and approves considering content with respect to Quality and Safety Class Requirements, adequacy of inspections, process controls, sampling and testing requirements.

d) Operations reviews and approves the procedure on the basis that it is workable as written, operators are available and qualified, equipment and safety systems are in operable condition. An independent check is also made by Operations management that the procedure contains steps to assure compliance with SAR's, OSR's and that provisions are made for appropriate emergency situations.

e) During early stages of procedure development an engineering peer review is often performed.

Operational compliance with the procedures is assured using three overviews:

a) Operations Supervisors and higher management perform surveillance and routine checks of operations (including back shifts and weekends) to assure compliance.

b) Quality Assurance performs routine surveillance of operations to verify compliance with procedures. Areas of deviation during operation or problems with personnel, procedures, or equipment are identified to Operations Management via Non-Conformance reports which require Operations management corrective action and response.

c) Radiation and Safety Committee performs or sponsors periodic surveillance of operations to verify compliance with approved SAR's and OSR's.

6. What procedures are there for analyzing environmental monitoring data for consistency with stack release data?

Response

DOE Order 5484.1A requires the WVDP surveillance program to determine the validity and effectiveness of the models used to predict environmental concentrations.

At present (1983-85) the release of radioactivity via the plant stack has been so low that detectable concentrations in environmental media would not be expected and were not observed. To this extent, environmental and stack monitoring data have been found to be consistent. If future stack releases increase to a level which results in measurable activity in sampled media, these data will be analyzed and the results will be reviewed in the annual monitoring report which the Project is required to prepare each year.

7. Is the Safety Committee discussed in Technical and Administrative Approach for the West Valley Demonstration Project Safety Program the same as the Radiation Safety Committee mentioned in Steve Brown's August 26, 1985 letter to R. R. Borisch or the same as the WVNS Radiation and Safety Committee discussed in WVNS Procedure WV-906, revision 3, dated 5/14/84?

Response

Yes.

8. If available, we request a computer tape which has a copy of the upgraded hourly meteorological observations of wind speed, wind direction and atmospheric stability and temperature at 10 m and 60 m heights of the on-site tower.

Response

Please see Attachment B.

9. What procedure(s) define the methods used by WVNS to assure that sufficient health physics personnel, fire brigade personnel, and trained system operators are present to support operations during regular work hours, evenings, and weekends?

Response

The Radiological Controls Manual (WVDP-010) Article 113 requires a Radiation Work Permit (RWP) for all operations in radiologically controlled areas. When the RWP is approved, the extent of health physics support is determined and personnel scheduled to provide support. This job-specific support is scheduled and provided for any period that the specific work is performed.

For periods outside regular working hours, Health Physics support for normal plant operations is scheduled as follows: two personnel on swing and mid shift and one person on Saturday and Sunday day shift.

Fire brigade requirements are listed in the WVDP Industrial Hygiene and Safety Manual, Article 5.3.5 which designates the Plant Operations Shift Supervisor as Fire Brigade Leader and two other operators as members. At least three Fire Brigade members are on-site 24 hours/day, 7 days/week.

Operations personnel are scheduled a month in advance to assure there are three people (minimum) on-site seven days per week, 24 hours per day. The number of people will increase as the radioactive waste processing systems (STS, LWTS, CSS, CTS) come on-line and are fully staffed (with operators, supervisors, and R/S technicians). All operators are trained members of the Fire Brigade; Shift Supervisors and Senior Specialists receive training in emergency response and part of their oral exam is to demonstrate proper action in resolving all types of emergencies.

10. Define the fire protection system including the system philosophy, the requirements for fire brigade membership, and the interface arrangements with off-site fire departments.

Response

The fire protection system is an "improved risk" system as defined in the WVDP Industrial Hygiene and Safety Manual, Articles 5.1 and 5.3.1 (see Attachment C) and DOE Order 5480.1.

Fire brigade membership is based on job assignment, related availability and knowledge of plant systems; therefore, Operations personnel are the primary members with Maintenance Department personnel serving as backup.

WVDP has a working arrangement with the West Valley VFD. They provide support to the facility, assist in annual fire hose pressure testing and participate in periodic fire drills.

11. Who is responsible for systematically reviewing, integrating and maintaining WVNS technical specifications?

Response

As described in WV-906, each cognizant manager is responsible for reviewing and maintaining the OSRs (technical specifications) which are applicable to his operations. If a revision or a new OSR is required, the cognizant manager is responsible for completing a safety analysis to provide the basis for the OSR and for submitting the analysis and OSR to the Radiation and Safety Committee for review and approval. The Safety and Environmental Assessment Manager is responsible for maintaining a compilation of all current OSRs which have been approved by the Committee.

CSS Questions Volume IV

See attachment D which contains responses to all questions on the CSS.

ATTACHMENT A

DAUGHERTY, H. F., D&D Operations Manager
B. S. Mechanical Engineering
22+ years Nuclear Experience

DENERO, J. V., Quality Assurance Manager
B. S. Ceramics
30+ years Nuclear Experience
2+ years Additional Experience

GESSNER, R. F., Facilities Manager
B. S. Metallurgical Engineering
35+ years Nuclear Experience

HARWARD, J. R., Radiation and Safety Manager
B. S. Chemistry
14+ years Nuclear Experience
8+ years Additional Experience

KNABENSCHUH, J. L., V.P. & Sr. Technical Consultant
B. S. General Engineering
30+ years Nuclear Experience
10+ years Additional Experience

LAWRENCE, R. E. Jr., Radiological and Environmental Safety Manager
B. S. Applied Science
M. S. Engr/Applied Science
15+ years Nuclear Experience

MARCHETTI, S., V.P. & Technical Director
B. S. Biology
M. S. Physiology
14+ years Nuclear Experience
3+ years Additional Experience

POPE, J. M., Process Technology & Engineering Manager
B. S. Metallurgical Engineering
M. S. Metallurgy
Ph.D. Metallurgy
14+ years Nuclear Experience
5+ years Additional Experience

ROBERTS, C. J., Safety & Environmental Assessment Manager
B. S. Engineering Physics
Ph.D. Biophysics
31+ years Nuclear Experience

SALISBURY, M. F., Operations Manager
B. S. Chemical Engineering
1+ years Nuclear Experience
7+ years Additional Experience

ATTACHMENT B

WD:85:0779

West Valley
Nuclear Services Company
Incorporated

P.O. Box 191
West Valley, New York 14171-0191

December 10, 1985

Dr. W. H. Hannum, Director
West Valley Demonstration Project
U. S. Department of Energy
P. O. Box 191
West Valley, New York 14171-0191

SUBJECT: Response to NRC/SAIC Request for On-Site Meteorological Data

Dear Dr. Hannum:

At the last on-site meeting with NRC, SAIC and WVDP participants, a request was made by NRC/SAIC for on-site meteorological data. Subsequent telephone conversations with Ms. Debbie Ryan at SAIC determined that it is not necessary to provide a computer tape of on-site data at this time, but a copy of the data tables presented in Volume 1 of the Project SAR would be sufficient. Two copies of these data are included with this letter. Please forward one copy to:

Ms. Debbie Ryan
SAI Corporation
10210 Campus Point Drive
San Diego, California 92121

Very truly yours,

C. J. Roberts, Manager
Safety and Environmental Assessment
West Valley Demonstration Project

JPE:blc

Attachments

cc: Mr. E. Maestas - DOE/WVPO

HE:85:0245

ATTACHMENT C

INDUSTRIAL HYGIENE + SAFETY MANUAL

5.1 General Information

5.1.1 Standards

It is WVNS policy to pursue a Fire Protection Program meeting the "improved risk" or "highly protected risk" criteria of general industry insurers.

Applicable [redacted]

A. National Fire Protection Association (NFPA) Codes.

B. Factory Mutual Standards.

C. DOE Order 5480.1, Chapter VII, "Fire Protection".

D. DOE Order 5480.4, "Environmental Protection, Safety and Health".

E. DOE-ID Appendix 0550, "Standard Operational Safety Requirements", Part IV, "Fire Protection"

F. DOE Order 6430.1, "General Design Criteria".

G. DOE-ID 12044, "Operational Safety Design Criteria Manual".

5.1.2 Fire Hazard

a. The facilities of the West Valley Demonstration Project (WVDP) encompass the normal range of fire risk and loss potential similar to other industrial establishments. Major process buildings are of non-combustible concrete and steel construction, and generally contain very light fire-loading. These areas are provided with portable fire extinguishers and standpipe hose stations.

b. Administrative and office areas, most of which are housed in trailer structures, represent the greatest fire hazard due to construction and contents. These areas are all protected by automatic sprinkler systems.

c. The two warehousing areas within the plant have an intermediate fire loading, contributed primarily by their contents, and are sprinkler protected. The remote Bulk Storage Warehouse, which is not served by the plant fire water system, has smoke detectors only, and storage is, therefore, limited to low value contents.

5.3 Industrial Fire Prevention

5.3.1 General

The level of fire protection at WVNS facilities shall meet the requirement of "improved" risk" as defined in DOE Order 5480.1 and industrial fire insurance standards, and shall include the following:

a. Use of professional fire protection techniques to determine probable loss and impact values. Where values and/or hazards are unusually high, take special measures to reduce the fire risk and plan special fire fighting capabilities.

b. Provision of facilities for preventing ignition and spread of fire; for detection, control, and extinguishment of fires; and for maximum safety of personnel in the event of fire.

c. Maintain adequate "first aid" fire suppression equipment to combat and extinguish all types of fires.

d. Maintain adequately trained and competent personnel to conduct fire protection, prevention, and inspection functions.

e. Make line supervisicn responsible for inaugurating and maintaining adequate fire prevention and protection capability by training of employes in fire safety.

f. Maintain a program for safe evacuation of personnel in the event of fire.

g. Provide watchman service, generally in accordance with NFPA 601, for the purpose of verifying status of fire protection system and early fire detection.

h. Maintain a minimum fire risk in facilities where radioactive and fissile materials are stored and used; arrange the area so that any necessary fire fighting will be carried out with a minimum chance of nuclear criticality or spread of contamination.

i. Immediately report any unusual or special fire hazard (such as a possible hazardous process or experiment), storage of hazardous materials or fire protection impairment, to the WVDP DOE representative.

j. Coordinate the fire safety program with the West Valley Volunteer Fire Department.

k. Maintain a fire protection impairment control system to limit impairments to as short a time as possible.

5.3.2 Fire Education

ATTACHMENT D

WVDP RESPONSES TO NRC COMMENTS FROM T. C. JOHNSON

November 13, 1985

Reference: NRC memo T. C. Johnson to R. J. Starmer, 201.3/TCJ/8/26/85, Review of West Valley Documents, dated August 26, 1985

I. WASTE FORM

Comments on "Low-Level Waste Cement Encapsulation for West Valley-Final Report"

Comment

1. West Valley Nuclear Services Company (WVNSC) states that "the lower activity wastes (Class A) do not require stabilization, but should be solidified or absorbed to meet the free liquid requirements (i.e., no more than 1.0 percent of the waste volume as free liquid)". For disposal at a commercial burial site, Class A solidified wastes should be free standing monoliths and have no more than 0.5 percent free liquid (see the final Technical Position on Waste Form, page 4, section C 1(a)).

Response

All cement encapsulation recipes developed for West Valley wastes had a requirement that there be no free water. Therefore, the West Valley waste forms will have less than 0.5 percent free liquid. An errata sheet to the final cement encapsulation report will be issued.

Comment

2. All leach testing should be conducted in conjunction with ANS 16.1 which specifies 90 day leach testing. The method identified in ANS 16.1 considers an effective diffusivity after more than 20 percent of the radionuclide has been leached. This method considers integral data as opposed to the incremental data analyzed prior to 20 percent of the radionuclide being leached.

Response

All leach testing was conducted in accordance with the ANS 16.1 Procedure. The effective diffusivity was calculated based on integral data after 20% of the contaminant was leached. This was done using a shape specific solution of the mass transport equation as noted in Report No. 84-8B3-EASTV-R2 (attached).

Comment

3. The detection of biological growth on the cement samples should have been followed by an extraction to determine if the growth is surficial. WVNSC should consider either performing this extraction or determining the rate of biological growth by using the Barther Pramer test specified in the Technical Position on Waste form

Response

As noted in the report, the biological growth was microscopic and was not visible with the naked eye. Discussions between L. Eisenstatt and NRC personnel (Tim Johnson) supported the position that the intent of the NRC "Branch Technical Position - Waste Form" Rev. 0, was that any growth should be visible with the naked eye (see attached telecon memo dated 11/18/83). Further testing of the samples is thus not justified. Due to the nature of cement encapsulated wastes, i.e., high pH, it is believed that biological growth would not be supported and thus should not be an area of concern in terms of its effect on the structural stability of the waste form.

Comment

4. General - We would appreciate receiving the following references cited in this report:

"Leachability of Cement Encapsulated West Valley Waste Streams" 84-8B3-EASTV-R2, February 15, 1984.

E. E. Smeltzer, D. C. Grant and M. C. Skriba, "Low-Level Waste Cement Encapsulation for West Valley - Biological Stability", 84-8B3-EASTV-R4, June 28, 1984.

Response

Copies of these reports are attached.

Comment

4a. WVNSC should consider specifying the waste streams (identified in Table G.8.2-1) which are to be stabilized in the West Valley Cement Solidification System and shipped as low-level waste.

Response

The waste streams identified in Table G.8.2-1 are those which will be stabilized in the CSS. It is anticipated that the bulk of this material will be classified as low-level waste and disposed of on-site. Alternatives for this on-site permanent disposal are the subject of an Environmental Assessment which currently is undergoing internal review.

A fraction (expected to be relatively small) of several of the waste streams may prove to be TRU waste and, therefore, will be shipped off-site. At this time it is not possible to predict with any high degree of confidence the fraction of a given waste stream that will be shipped as TRU waste. No low-level waste will be shipped, however.

Comment

4b. WVNSC should consider providing leach tests results for Cs, Sr, and Ce for the waste streams to be stabilized in the cement solidification system. The results should be reported in the ANS 16.1 format as presented for uranyl nitrate solutions (report entitled Cement Encapsulation and Waste Qualification Testing of Uranyl Nitrate Waste Streams). The summary of leach indices presented in Table 5.12 ("Leachability Index of Cement Encapsulated Waste") should be supplemented with these data.

Response

Only the leachability of cesium was examined because experience has shown it to have a much higher leach rate than strontium or cerium. As shown in the report entitled "Cement Encapsulation and Waste Qualification Testing of Uranyl Nitrate Waste Stream," the cerium leach rate is very low, which is due to its low solubility in the high pH environment of cement. Cesium represents a worst case; thus,—if it meets the NRC leachability guideline, then without question, strontium and cerium will meet that guideline.

The leachability data tables requested are given in Report No. 84-8B3-EASTV-R2. In addition, leach testing was performed on actual decontaminated supernatant from 8D-2 at West valley which included cesium, strontium and plutonium. The results support the R&D work. (See attached study "Leachability of Cement Encapsulated Supernatant by L. E. Rykken, dated September 30, 1985).

Comment

4c. WVNSC should institute a process control plan (PCP) to assure that waste chemistries and radionuclide concentrations will be within the range of projections indicated in simulated waste preparation.

Response

WVNSC has prepared and is instituting a process control plan (PCP) for uranyl nitrate solidification, the first waste stream to be solidified in the cement solidification system (CSS). Additional process control plans will be prepared as required to cover processing other waste streams in the cement solidification system.

Comment

4d. WVNSC should provide information on the decontamination reagents which will be used in the processes that will generate waste potentially exceptable [sic] for shallow land burial. This should also include the quantities of chelating agents as well as a detailed description of the waste formulations which were tested to assure 10 CFR Part 61 stability and results of these tests.

Response

WVNSC is aware of the drawbacks to the use of chelating agents in decontamination solutions and avoids the use of these products as much as practicable. D&D activities to date have involved the use of water, dilute nitric acid, dilute sodium hydroxide, household laundry detergent (Tide®) and an alkaline foam detergent. RADIAC, a commercial decontamination solution which contains EDTA, has been used sparingly for hot spot decontamination. These liquid streams are presently being sent to the HLW tank (8D-2). Should decontamination agents require processing in the radwaste treatment system in the future, the waste form will be developed and tested in the same manner as waste forms described in the subject report.

II. WASTE CLASSIFICATION OF PRODUCTS FROM TANK 8D-2

Comment

1. Before the low-level portion of these waste are accepted for shallow land burial, NRC recommends that a performance assessment be completed to determine the effect of the disposal of these waste in a commercial burial ground. This is necessary due to the unevaluated source term (The Final Environmental Statement for 10 CFR Part 61 did not consider these wastes) which will contribute unknown impacts to the disposal site.

Response

Low-level waste generated from materials in tank 8D-2 will not be disposed of by shallow land burial. Rather, they will be disposed of above the natural ground surface in an earth mound or tumulus. A performance assessment of the tumulus has been made and is described in the Environmental Assessment for Project Low-Level Waste Disposal, WVDP-045, which is currently undergoing review within the DOE organization. The results of the analysis show that the disposal will result in maximum individual doses which are well below the criteria in 10 CFR 61.

Comment

2. West Valley Nuclear Service Center (WVNSC) should provide the basis for their belief that the waste dispensing vessels will contain homogeneous supernatant from tank 8D-2 (will sludge be present). What provisions are available for limited radiochemical sampling to assure that the WV/CSS will be processing supernatant with the same normalized radiological compositions (reported in Table G.8.2-2) after transfer of waste from 8D-2.

Response

The effluent from the supernatant treatment system (STS) will be sampled in the collections tank (Tank 8D-3). The sample will be transferred using a pneumatic sample transport system to the analytical cell where it will undergo complete radiochemical characterization. Only after this final check of on-line process monitors will the batch of decontaminated supernatant be transferred to the LWTS (specifically to tank 35104).

Tank 8D-2 sludge will be separated from the supernatant using a prefilter, located upstream of the ion exchange columns, and a post-filter, located downstream of the ion exchange columns, all of which are components of the STS. Therefore, no sludge will be present in the waste dispensing vessel.

Comment

3. Indirect determination of radionuclide concentrations in waste drums by exposure rate (mR/hr) does not provide reasonable assurance of correlation with actual radionuclide concentrations in the waste. How does WVNSC plan to provide this correlation particularly since all other radionuclide concentrations (including TRU) are based on normalized Cs-137 determinations? Will gamma spectroscopy data and correlations be available? Will corrections be made for attenuation.

Response

As indicated above, decontaminated supernatant will be sampled and characterized radiochemically to determine the concentration of isotopes identified in 10 CFR 61 prior to being sent to CSS.

WVDP RESPONSES TO NRC/SAIC QUESTIONS ABOUT CSS

November 14, 1985

Reference: Attachment III, "CSS Questions", to letter from J. E. Hammelman, SAIC to A. T. Clark, Jr. dated October 16, 1985

Comment

1. What specific waste recipes will be used in the CSS? What limits or controls will be associated with these recipes? How will new recipes be developed if needed?

Response

The following wastes have been identified for solidification in the CSS:

1. Evaporator concentrate from the Liquid Waste Treatment System (starting 1st Quarter FY 1987). This concentrate will come from:

   a. Decontaminated Supernatant
   b. Sludge Wash
   c. Plant Wastes (predominately $NaNO_3$ streams)

2. Organic ion exchange resins from the Liquid Waste Treatment System (starting 1st Quarter FY 1987)

3. Zeolite ion exchange resin from the Liquid Waste Treatment System (starting 1st Quarter FY 1987)

4. Filter backwash slurry from the Liquid Waste Treatment System (starting 1st Quarter FY 1987)

5. Uranyl nitrate hexahydrate (Dec. 1985)

The uranyl nitrate recipe has been developed and tested per the requirements of 10 CFR 61 at Westinghouse R&D. In addition, the experimental system operating tolerances have been used to calculate conservative recipes for system operation as follows:

Uranyl Nitrate Hexahydrate (UNH) Recipe (95 l batch)

Nominal: 60.85 l (UNH); 2.29 l (50% NaOH); 69.43 kg (Cement) Water/Cement wt. ratio - 0.85;

99% Confidence Level: 59.30 l (UNH); 2.73 l (50% NaOH); 71.59 kg (Cement) water/cement wt. ratio - 0.80.

The nominal recipe represents the maximum waste loading recipe developed through laboratory testing. The "99% Confidence Level" recipe is based on a statistical analysis of the Cement Feed System, the Waste Feed System and the Chemical Metering System. This recipe will assure that the actual waste loading will fall below the maximum waste loading and therefore have a higher cement content. This leads to a higher compressive strength and assures no free liquid will be present.

The 99% confidence level recipe will be the one used for solidification of Uranyl Nitrate. Waste feed is controlled automatically by a programmable controller, and cement feed is controlled by a micro processor-based gravimetric (loss-in-weight) feeder. Once the input values are set and verified, feeds are controlled automatically. Variations in feed delivery have been incorporated into the statistical analysis. This is covered in the UNH Process Control Plan.

UNH is the first waste stream that will be processed in the CSS, and the only one analyzed to include actual system operating tolerances.

The following maximum waste loading recipes have been developed and tested per the requirements of 10CFR61.

Waste	W/C	Waste (1)	Cement (kg)
39 w/o Supernatant	0.70	67.13	76.65
53 w/o Supernatant	0.66	68.78	69.25
55 w/o Sludge Wash	0.70	67.13	64.79
20 w/o $NaNO_3$	0.45	57.67	116.85
40 w/o $NaNO_3$	0.35	53.83	121.79
55 w/o $NaNO_3$	0.40	64.14	101.84
Neat Cement (No waste)	0.45	55.67	123.69

WVNS intends to develop a method to utilize the above data to determine solidification recipes for sodium nitrate streams of various $NaNO_3$ concentrations without further waste form testing.

Testing is currently under way to determine the optimum organic and zeolite resins to be used for a Liquid Waste Treatment System at WVNS. Spent resins will be solidified in the CSS prior to disposal. When the optimum resins have been selected, recipes will be developed in the lab using simulated waste, test samples will be produced in a full size high-shear mixer, and the test samples will be tested per the requirements of 10CFR61. This procedure will be used for new waste streams that are substantially different from the waste streams tested.

All waste streams processed in the CSS will be covered by a process control program similar to the one in place for Uranyl Nitrate.

Comment

2. Will the preoperational testing using synthetic waste recipes (pg. 80 of the SAR) be performed for all waste recipes or just a few?

Response

The preoperational testing will only use the synthetic waste recipe for synthetic supernatant. It will not be done for all waste recipes.

DOCKET NO. M-32
CONTROL NO. 26430
DATE OF DOC. 02/04/86
DATE RCVD. 02/11/86

FCUF _____ PDR _____
FCAF ✓ LPDR _____
WM _____ I&E REF. ✓
WMUR _____ SAFEGUARDS ___
FCTC _____ OTHER Boyle, JRoth

DESCRIPTION:

Responses to NRC Comments and Questions

02/11/86 INITIAL CEC