

Detroit Edison
Fermi 2 Nuclear Power Plant

Turbine Incident Recovery
Radiological Performance Report
12/26/94 - 4/13/94

Radiological Performance Summary

Total Dose for Period	22.364 Rem
Total Personnel Contaminations for Period	18
Dose Related to Turbine Recovery	14.717
Turbine Related Personnel Contaminations	7

Although majority of Turbine Recovery work has been completed,
Turbine Recovery totals may increase due to work after 4/13/94.

Prepared by: Daniel T. Craine

Reviewed by: George E. MacAdam

Approved by: Ed F. Kokosky

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TURBINE INCIDENT RADIOLOGICAL PERFORMANCE REPORT

I. Executive Summary

A. Description of Event

On December 25, 1993 at 1315 Fermi 2 experienced a turbine trip, followed by a reactor scram due to a catastrophic mechanical failure of the turbine and generator. As a result of the turbine failure, large volumes of General Service Water (GSW) (i.e. lake water) and Turbine Building Closed Cooling Water (TBCCW) were released into plant systems and buildings. Additionally, turbine lubricating oils were also released into the Turbine Building when the failure of the turbine severed the oil supply lines. The mixing of these oils and water with the normal radioactive material content of radwaste systems and the turbine building sumps resulted in a large volume of slightly contaminated oily water. Through normal system functions some of this water was automatically pumped over to the Radwaste Building from the turbine building sumps, but most of the water that flooded the radwaste basement came from floor drains in the turbine building basement that drain to sumps in the radwaste basement. Eventually the water reached equilibrium between the two buildings (turbine basement elevation is 564' while the radwaste basement elevation is 557' 6"). The end result of this flooding was normal radwaste system functions were no longer available. With the normal liquid radwaste systems unavailable, temporary systems were installed to process water for reuse and prior to discharge to ensure doses to the public were maintained As Low As Reasonably Achievable (ALARA). The following is a list of the Temporary Modifications (TM) and Safety Evaluations (SE) approved and installed for the processing of water for reuse or release as liquid radwaste:

- TM 94-0007/SE 94-0004 - Alternate Discharge Path Using the Condensate Storage Tank (CST)
- TM 94-0009/SE 94-0016 - Installation of Temporary Power for Radwaste Instrumentation
- TM 94-0010/SE 94-0016 - Operation of Temporary Demins for Processing Liquid Radwaste
- SE 94-0001 - Radiological Aspects of Processing Equipment Outside in a Diked Area
- SE 94-0002 - Pumping Out the Radwaste Basement to the Condenser Hotwell
- SE 94-0003 - ODCM Changes for Alternate Discharge Method using the CST
- SE 94-0005 - Installation/Operation of CST Processing Equipment
- EDP 26303 - Install Hot Taps to Allow Hookup of TM 94-0010

The failure of the turbine also resulted in numerous condenser tubes being severed, allowing Circulating Cooling Water (lake water) to enter the condenser hotwell. This resulted in poor quality water being supplied to plant systems, thus degrading the quality of water in those systems. Also, when the level in the condenser exceeded the high level setpoint, the water in the hotwell was

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automatically pumped to the CST. The input of lake water from the hotwell into the CST resulted in water with high conductivity and low radioactivity levels.

Due to the large amount of water from the turbine failure event, not all of it was contained within the Radiologically Restricted Area (RRA). TBCCW and GSW cascaded down from the turbine building second floor to the first floor of the turbine building via normal non-contaminated pathways such as stairways, pipe chases, elevator shafts, and floor penetrations. Once the water reached the first floor turbine some of it flowed into the turbine building basement, while other water flowed out of the building into the Office Service Building and out the turbine building truck bay roll-up door. Radiological surveys of spill areas outside the RRA were analyzed for the presence of radioactive isotopes. The results showed that no radioactive material was released by these pathways. See attachment 1 for direction of water flows and areas contaminated as a result of the turbine failure.

An evaluation was performed to determine if radioactive gaseous effluents were released when the Turbine Building Ventilation tripped and the roof vents opened at the time of the event. All potential release pathways were reviewed and no radioactive material in excess of normal operating effluent limits was released to the environment as a result of the turbine failure incident.

B. Plant Impacts

1. Plant Chemistry

The introduction of poor quality water into make-up water systems resulted in high conductivity water in systems throughout the plant. The primary systems of concern were the Reactor Water Cleanup System (RWCU), Reactor Recirc System including the water in the reactor vessel, Condensate Transfer and Storage System (supplies the Control Rod Drives (CRD)), and the Residual Heat Removal System. The primary concern was the impact of poor water chemistry on system components, reactor vessel internals, fuel assemblies, and purification media. To provide water cleanup capabilities, several temporary processing systems were installed on plant systems. These required several temporary modifications and safety evaluations to ensure that each modification would meet the design basis for the systems. They were to provide adequate water cleanup capability and to ensure that the designs incorporated ALARA principles for minimizing the dose required for installation, operation, and removal of the modifications, as well as maintaining dose to the public ALARA. The following is a listing of the Temporary Modifications and Safety Evaluations performed to provide water cleanup capabilities.

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- TM 93-0012/SE 93-0080 - Provide Condensate Return Tank (CRT) Water Supply to CRD's
- TM 93-0013/SE 93-0082 - Provide Demineralized Letdown Path from Rx Vessel to CRT
- TM 93-0015/SE 93-0085 - Install Side stream Demineralizers for RWCU/Rx Vessel Cleanup
- TM 94-0002/SE 94-0006 - Provide Reject Path From the Torus to the CRT
- TM 94-0005/SE 94-0012 - Provide Higher Flow Rate Path From CRT to CRD's to Rx to CRT
- EDP 26281 - Install Hot Taps to Allow Hookup of TM 94-0005

2. Plant Systems

Several plant systems were impacted by the turbine failure event. Some were impacted by the poor water chemistry, while others were affected by the flooding of the Radwaste and Turbine Building Basements. Summarized below (excluding turbine repairs) are the major impacts to plant systems as result of the turbine event.

Radwaste Processing Systems - Unavailable due to flooding

Liquid Discharge Path - Unavailable due to flooding, no normal alternate path

Condensate Storage and Transfer Systems - High conductivity, poor quality water

RWCU System - High conductivity, higher than normal radioactivity, no cleanup capability

CRD System - Unavailable due to poor quality water source to CRD's

Recirc System - High conductivity, poor water quality

RHR System - Degraded water quality, high Torus level

Condensate System - High conductivity, poor water quality, no cleanup capability

How each system was recovered or an alternate temporary system installed is discussed within the body of this report. It should be noted that the excellent overall coordinated team effort by all organizations resulted in restoring most of these systems to normal operation in a relatively short period of time.

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C. Radiological Summary

1. Contamination Control

The overall effort to control the spread of contamination from the turbine failure event was excellent. Contributing to this was the overall cleanliness of the plant prior to the event, as well as the low Source Term of the plant. The initial cleanup response by Radwaste personnel was excellent. Many areas of the turbine building were restored within a few days of the event, with the exception of the turbine deck which was isolated for investigation into the failure and the turbine basement which was flooded. Additionally, plugs were installed (via temporary modification) in selected drains in the turbine basement to prevent the back flow of water from the Radwaste basement. The radwaste basement was flooded when contaminated tanks and sumps overflowed from water that was drained (by design) from the turbine building basement via floor drains. Access to the radwaste basement was restricted until plans were developed, procedures written, equipment and vendor services contracted, and SE's approved for disposition of the water and oil as well as recovery of the radwaste basement. The radwaste basement was decontaminated using a pressure washer utilizing hot water and soap. The radiological controls used for deconning were very effective. Respiratory requirements were relaxed after airborne concentrations remained < 0.3 DAC during the decontamination of the radwaste basement. The basement remains posted as a contaminated area to facilitate the extensive repairs being performed to return systems to service.

The Turbine Building basement was flooded when contaminated sumps overflowed from water that was coming from the turbine failure. The turbine basement was decontaminated using the same method as used for decontaminating the radwaste basement. Radiological Control methods learned from the radwaste basement clean up were effective for the turbine basement cleanup effort as well.

During the time period of this report (12/26/93 - 04/13/94) there were **18 personnel contaminations**. **None of the personnel contaminations occurred on the day of the event and only 7 are directly related to the recovery effort.** Only 1 of the personnel contaminations involved a part of the body, the others were clothing contaminations. The personnel contaminations range from 150 cpm to 10,000 cpm, with half of them < 1000 cpm.

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2. Exposure Summary

Total combined personnel exposure (TLD plus DRD) for the time period for the turbine failure event was 22.364 Rem. This number represents the sum of TLD and DRD dose for the period from 12/26/93 to 04/13/94. **Total DRD exposure for all tasks during the turbine failure time period was 22.760 Rem.** Of that, **14.717 Rem was related to the turbine failure recovery and 8.043 Rem for all other work.** A complete exposure breakdown by RWP/task for turbine failure related exposure and exposures not turbine related can be found in later sections of this report.

The overall effort to minimize personnel exposures by all organizations involved in the recovery of the plant and systems was excellent. Many individuals and work groups, together with RP, worked as a team to incorporate ALARA principles into designs, work plans, and work schedules to ensure that personnel exposures were kept ALARA. As a result of this teamwork, exposure minimization techniques and actions were identified upfront so that equipment, materials, and manpower needs were in place and ready when needed.

D. Summary of Lessons Learned

The turbine failure and subsequent recovery effort provided many challenges to the Fermi 2 organization. Overall, the site organizations responded very well to these challenges. Many of the tasks that were performed by individuals and departments, required close coordination and teamwork to complete. As a result of this coordinated effort several good practices and lessons learned were developed and implemented. The following is a brief summary of the lessons learned from the turbine failure event that enabled Fermi 2 to successfully meet the challenges encountered during the turbine recovery effort. A complete list of good practices and lessons learned can be found at the end of this report.

- The formation of teams for the root cause investigation for the turbine failure, water recovery effort, and system/equipment restoration proved to be the corner stone for successfully meeting many of the challenges faced by the site as a result of the turbine failure. This has proven to be an effective means to respond to unusual circumstances and should be continued in the future.
- The low radioactive Source Term within plant systems which is a direct result of high quality reactor coolant chemistry, replacement of control rod blades and condenser tubes, and the cobalt reduction plan minimized the radiological consequences of the event.

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- The overall cleanliness of the plant prior to the turbine failure contributed significantly to being able to recover many areas of the plant in a short period of time. Additionally, the initial response by Radwaste personnel to the cleanup effort helped minimize the radiological impacts on the recovery effort for many organizations. Maintain this level of cleanliness in the future to reduce the radiological impact that events like the turbine failure can cause.
- The use of consultants with regulatory backgrounds to assist in developing plans for processing water and developing plans for establishing a discharge path worked well. This enabled the water recovery team to develop and implement plans to process and discharge the excess water from the turbine failure event, while keeping the dose to the public ALARA.
- The practice of identifying and evaluating temporary shielding requirements as part of the design package for installation and operation of design. This allowed Plant Engineering to allocate resources for such evaluations at the time the design was being developed instead of after the design was issued when engineering time may not have been available.
- The use of consultants/vendors with expertise in non-nuclear applications helped Fermi 2 meet some of the challenges encountered. Vendors such as Marine Pollution Control which was contracted to assist in the oil recovery effort, proved to a valuable resource even though they had no experience in a nuclear environment.

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II. Radiological Controls

A. Design/Temporary Modifications

As a result of the turbine failure event many design/temporary modifications were installed to temporarily restore certain system capabilities. These modifications were reviewed for ALARA principles as well as additional radiological controls that may be required for installation, operation, and demobilization/removal. Described below is the purpose for each modification along with a summary of the radiological controls associated with each temporary modification. These controls include those which were incorporated into the design/temporary modifications as well as the controls used for installation, operation, and removal.

1. Temporary Demineralizers

- **TM 93-0012** - Provided CRT water supply to CRD's and reactor through the CRD cooling/charging line. This allowed flushing of CRD's as well as feed and bleed of the reactor coolant (along with TM 93-0013) using the CRT as a clean water source. This modification was removed after TM 94-0005 was placed in service.

Radiological Controls

No radiological controls required for the temporary modification or field implementation.

- **TM 93-0013** - This temporary modification provided a demineralized letdown path from the RWCU system to the CRT. This was needed for two reasons. The first was to provide a letdown path from the RWCU letdown line to the CRT. The CRD's were being supplied with water from the CRT for flushing purposes, which meant that a letdown path was needed to control vessel level. The second purpose was to demineralize the water before returning it to the CRT because it was the only clean source of water available. This temporary modification was removed when TM 94-0005 was placed in service.

Radiological Controls

1. Hoses routed through low traffic area
2. Demins placed in E. Drains Cooler Room labyrinth to use shielding from walls
3. Lag demin placed in front of lead demin for shielding
4. Door way shielded with 2" thick solid lead shields
5. RP Survey checklist developed

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6. Plan established for remote monitoring of lead demin dose rate
7. Forklift was shielded for movement to OSSF
8. Flush connection installed as part of temp. mod.
9. Camera installed in Drains Cooler Room to monitor for leakage
10. Modification leak tested prior to placing in service
11. Dry run was performed prior to moving demin to OSSF
12. AMS-3 placed in area to monitor airborne radioactivity level

• **TM 93-0015** - Provided a means to cleanup reactor coolant with normal RWCU system flow paths. Due to the poor reactor coolant chemistry (peak conductivity 182 μ S/cm, 12.3 ppm chlorides, 16.4 ppm sodium) the normal filter demins would exhaust in approximately 30 minutes. This coupled with only enough space for 14 backwashes left in the RWCU Phase Separators and all liquid radwaste processing lost due to flooding of the Radwaste Basement, a side stream demin system was designed and installed. The side stream demin system was designed so that resin changeouts, storage of used resin, re-use of demin flush water, and recharging of the demins could all be performed independent of the normal radwaste systems.

This system was installed on the refuel floor and was connected to the RWCU system via hard piping installed on chemical cleaning connections in the RWCU valve room on RB-4.

Radiological Controls

1. Hoses routed through low traffic area
2. Demins placed on refuel floor by equipment hatch to easier control access
3. Lag demin placed in front of lead demin for shielding
4. Shielded with 2" thick solid lead shields on all four sides
5. RP Survey checklist developed
6. Plan established for remote monitoring of lead demin dose rate
7. Majority of modification was hard piped from RWCU system to the temp. demins
8. Flush connection installed as part of temp. mod.
9. Camera installed on refuel floor to monitor for leakage at the demin connections
10. Modification leak tested prior to placing in service
11. Sluicing liner placed in shipping cask for shielding
12. Sluicing liner placed between shielded demins and operator for additional shielding
13. Area access restricted while in operation
14. Temporary modification removed from service when crud bursts were expected

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15. Normal RWCU filter demins placed in service to filter crud from crud bursts
16. Shielded piping with temporary shielding to lower general area dose rates
17. AMS-3 placed in area to monitor airborne radioactivity level
18. HEPA ventilation and containment used for removal of temporary modification piping

• **TM 94-0002** - Provided a reject path from the Torus to the CRT to lower water level in the Torus. Additionally, it provided dilution water to improve water quality in the CRT.

Radiological Controls

No radiological controls required for temporary modification or field implementation.

• **TM 94-0005/EDP 26281** - Provided higher flow rate path from CRT to CRDs to Rx to CRT to allow for flushing the CRD's. This modification allowed for stroking of all the CRDs with normal system flow rates and pressures. The CRDs were stroked several times each to ensure that each one worked properly and was flushed with normal system flows and pressures. The EDP associated with the temporary modification allowed for installation of permanent system taps for hooking up the temporary modification to the systems. The flow path for return to the CRT is the same as that for TM 93-0013 with the exception that the demins were put in parallel to allow for the increased flow. This modification allowed for feed and bleed of the reactor coolant for water cleanup as well as demineralizing the water returned to the CRT to also improve water quality of the CRT.

Radiological Controls

1. Hoses routed through low traffic area
2. Demins placed outside E. Drains Cooler Room for ease of movement for changeout
3. Demins double shielded with 2" thick solid lead shields on three sides
4. RP Survey checklist developed
5. Plan established for remote monitoring of demin dose rate
6. Forklift was shielded for movement to OSSF
7. Flush connection installed as part of temp. mod.
8. Shielding installed for installation of hot taps for EDP 26281
9. Modification leak tested prior to placing in service
10. Dry run was performed prior to moving demin to OSSF
11. AMS-3 placed in area to monitor airborne radioactivity level
12. Administrative maximum dose rate established for demins

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• **SE 94-0005** - Provided for Installation/Operation of CST Processing Equipment using equipment and procedures supplied by Chem Nuclear Systems Inc. (CNSI). This SE was performed on the procedures for processing the CST prior to discharge to the lake. Water that was pumped from the Radwaste Basement to the condenser hotwell was transferred through the Condensate Filter Demins to the CST for processing. The temporary processing system consisted of; a pump installed into the CST through the manway on the top of the tank, a processing trailer containing four demineralizers in parallel for filtration, a steel liner for sluicing of resin from the demineralizers, filters downstream from the demineralizers to prevent resin from entering the tank and to provide mechanical filtration of the water, connection to the temporary discharge path (TM 94-0007) and a temporary dike installed around the trailer. Additional safety evaluations were performed to determine the safety impact of processing outside (SE 94-0001), impact to the ODCM controls and limitations (SE 94-0003), and for the CNSI procedures. All radiological controls were placed in the CNSI procedure prior to approval of the RWP for operating the equipment. This temporary system is still installed, but not operating.

Radiological Controls

1. Hoses double banded to prevent leakage
2. Outside storm drains in the area plugged
3. Dike installed around processing equipment trailer, RRA established around diked area
4. RP Survey checklist developed including areas occupied by members of the public
5. Plan established for remote monitoring of demin dose rate
6. PVC piping to contain hoses between the CST dike and the processing trailer dike
7. Flush connection installed as part of temp. mod.
8. Shielding installed on demins and outside the trailer to lower dose rates at RRA boundary
9. Modification leak tested prior to placing in service
10. One piece hoses for going from the CST dike to inside the CST
11. AMS-3 placed in area to monitor airborne radioactivity level
12. Administrative maximum dose rate established for demins
13. HEPA filter installed on liner to filter air displaced by resin/water during filling operations

• **TM 94-0009/TM 94-0010/EDP 26303** - Provided temporary power for Radwaste Instrumentation and operation of temporary processing equipment for cleanup/reuse and storage/discharge of liquid radwaste using the Waste Sample Tanks and the Waste Surge Tank. The EDP 26303 installed permanent system tie-ins at the tanks and the normal discharge line, so that the temporary processing system could be installed. The system was designed to process the

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tanks and then tap into the normal plant discharge line upstream of the normal Discharge Radiation Monitor, so the water could either be transferred to the CRT for reuse or discharged to the lake. This system is still installed and in use.

Radiological Controls

1. Hoses double banded to prevent leakage
2. RP Survey checklist developed
3. Plan established for remote monitoring of demin dose rate
4. Flush connection installed as part of temp. mod.
5. Shielding installed on demins
6. Modification leak tested prior to placing in service
7. Administrative maximum dose rate established for demins

2. Temporary Discharge Pathway

• **TM 94-0007** - Provided an alternate discharge pathway for releasing the excess water generated by the turbine failure. This modification was designed to allow for the discharge of liquid radwaste using the CST as a water source. The system tied into the CST processing system, then was hard piped to the discharge line from the Neutralization Tank. This pathway was chosen because it taps in into the Circulating Water Decant Line upstream of the normal liquid radwaste discharge tie-in. This allowed for the use of the normal decant flow for dilution and radiation monitoring using the Decant Line Radiation Monitor. The temporary system consisted of carbon steel piping, dual mechanical filters upstream of a temporary radiation monitor, and a flow meter to determine discharge flow rate. This system is still installed.

Radiological Controls

1. Carbon steel piping to prevent leakage
2. RP Survey checklist developed
3. Continuous monitoring for discharge so the system could be isolated if problems occurred
4. Flush connection installed as part of temp. mod.
5. Additional mechanical filters to further filter the water prior to discharge
6. Modification leak tested prior to placing in service
7. Calibrated temporary radiation monitor for additional monitoring capability
8. Drains in the Auxiliary Boiler House were plugged or sand bagged in area of temp. mod.

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B. Engineered Controls

1. Temporary Shielding

- Shielded vertical run of the side stream hard piping on RB-4 and couplings on RB-4 and RB-5 prior to placing the system in service. Placed additional shielding on all piping after the system was in operation to lower general area dose rates. Contact dose rates were reduced from an average of 35 mRem/hr to 8 mRem/hr, with general area dose rates of 2-5 mRem/hr at 30 cm.
- Shielded RWCU side stream demineralizers on RB-5 with (4) CNSI shield walls. The demineralizer configuration was two trains of demins consisting of (2) demins hooked up in series. Highest contact exposure rate was 23 Rem/hr on the demineralizer, 260 mRem/hr contact dose rate on the shield wall with 120 mRem/hr at 30 cm. The dose rate at the operators station was <0.2 mRem/hr.
- Shielded hotspot on CST demineralizers located in tractor trailer. The configuration consisted of (4) demineralizers hooked up in parallel. The highest contact dose rate on the demineralizers was 190 mRem/hr and 90 mRem/hr @ 30 cm prior to shielding. After shadow shielding was installed contact dose rates on the shielding were 5 mRem/hr and 0.3 mRem/hr at the RRA Boundary.
- Shielded RWCU letdown demineralizers on TB-1 for TM 93-0013 with (2) CNSI shield walls in front of the doorway of the East Drains Cooler Room. The demineralizer configuration was one train of demineralizers consisting of (2) demins hooked up in series, place in the labyrinth of the East Drains Cooler Room. The lag demineralizer was placed in front of the lead demineralizer for additional shielding. Highest contact dose rate was 10 Rem/hr on the lead demineralizer, 2 mRem/hr contact dose rate on the shield wall and 0.2 mRem/hr at 30 cm. The dose rate at the radiation area boundary was <0.2 mRem/hr.
- Shielded RWCU letdown demineralizers on TB-1 for TM 94-0005 with (6) CNSI shield walls. The demineralizer configuration was two demineralizers hooked up in parallel. The shield walls were placed around the demineralizers just outside the East Drains Cooler Room on TB-1. Highest contact exposure rate was 690 mRem/hr on the demineralizer with 1.5 mRem/hr contact dose rate on the shield wall. The dose rate at the radiation area boundary was 0.6 mRem/hr.

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- Shadow shielded RWCU letdown line in the TB-B for installation of hot taps for EDP 26281 with lead blankets. Highest contact dose rate was 280 mRem/hr on the piping prior to shielding and 16-45 mRem/hr general area on the work platform. After shadow shielding was installed general area dose rates on the work platform were reduced to 6-18 mRem/hr.
- Shielded temporary Radwaste Processing demineralizers in the RW-B for TM 94-0010 with (1) CNSI round demineralizer shield made of 1" thick carbon steel for the lead demineralizer and lead blankets for the lag demineralizer. The demineralizer configuration is one train of demineralizers consisting of (2) demins hooked up in series. Highest contact exposure rate when shutdown on 4/8/94 was 1.5 mRem/hr on the demineralizer, 1 mRem/hr contact dose rate on the shield and 0.2 mRem/hr at 30 cm. These demineralizers are still in operation.

2. Temporary HEPA Ventilation

- HEPA ventilation was used during removal of piping installed for the RWCU side stream demineralizers. The piping was removed using a bandsaw to cut the pipe. A containment device was positioned at the location of the cut for horizontal piping with HEPA ventilation hooked up to the containment, no airborne radioactivity >0.3 DAC's was measured. For the vertical sections of piping a catch was installed below the area to be cut with HEPA ventilation directed at the work area, no airborne radioactivity >0.3 DAC's was measured. The combination of ventilation and containment's was very successful in preventing the spread of contamination and airborne radioactivity.

C. Contamination Controls

1. Radwaste Basement Pumpdown/Cleanup

As a result of the turbine failure on December 25, 1993, the radwaste basement was flooded up to a level of 6 foot. Contaminated tanks and sumps overflowed with water that was (by design) drained from the turbine building basement floor drains. The radioactivity levels ranged from $3.0\text{E-}04$ $\mu\text{Ci/ml}$ to $8.0\text{E-}04$ $\mu\text{Ci/ml}$ for various samples. The nuclides present were Cr-51, Mn-54, Co-58, Co-60, Zn-65, I-131, Cs-134 and Cs-137. An AR-20 probe submerged in the radwaste basement water indicated an exposure rate of 5 mRem/hr. The liquid transfer process from the radwaste basement to the condenser hotwell was governed by controls in Safety Evaluation 94-0002 and associated procedures. The post drain down initial entry radiological surveys for the general access hallways

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on the walls and floors. There were also several small piles of sludge reading 10-15 mRem/hr.

The Radwaste basement was decontaminated with a 500 - 2000 psi-pressure washer with 180°F water. Radiological Controls have been effective. The respiratory requirements have been relaxed based on airborne concentrations < 0.3 DAC. Deconners are now wearing face shields vs. respirators. The gross decon of the general access hallway floors and walls in the radwaste basement has been successful in reducing contamination levels from 4 - 24 mRad/hr beta to 4000 dpm/100cm².

The initial phase of the Radwaste basement recovery began on February 02, 1994. I&C technicians entered the basement to open electrical equipment boxes on instrument racks. The objective was to drain water out of them and to do an initial damage assessment. RP and deconners continue to work very closely with maintenance to successfully integrate the decon effort with the recovery objectives.

2. Installation/Removal of Designs

The installation of all the temporary modifications and designs went very well from a contamination control stand point. All the system tie-in points were either "hot tapped" or existing tie-in points utilized with no spread of contamination. Each modification was leak tested with demineralized water prior to placing it into service. This ensured that if leakage occurred during the leak test it would not be contaminated and that little or no leakage would occur during operation of the modifications.

There were however several instances of spills while performing different evolution's involving the RWCU letdown demineralizers and the CST processing system. Critiques were performed for each incident and in some cases DERs were written to investigate the causes. A summary of these incidents can be found in the lessons learned section of this report.

- Several of the temporary modifications that were installed to support the turbine recovery effort are still in place with some still in operation (in one form or another). The one modification that has been removed is the RWCU side stream temporary modification (TM 93-0015). The demobilization of that temporary modification went very well with no spread of contamination to unposted areas. The controls utilized for removal were HEPA ventilation for removal of piping and temporary shielding. The piping was removed using a bandsaw to cut the pipe. A containment device was positioned at the location of the cut for horizontal piping with HEPA ventilation hooked up to the containment. No airborne radioactivity >0.3 DACs was measured. As the

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location of the cut for horizontal piping with HEPA ventilation hooked up to the containment. No airborne radioactivity >0.3 DACs was measured. As the piping was cut the ends were taped over to prevent the spread of contamination. For the vertical sections of piping a catch was installed below the area to be cut with HEPA ventilation directed at the work area. The combination of ventilation and containment's was very successful in preventing the spread of contamination and airborne radioactivity.

3. Turbine Building Basement Pumpdown/Cleanup

As a result of the turbine failure, the Turbine Building basement was flooded when contaminated sumps overflowed from water that was cascading down from the turbine area. The radioactivity level was $1.05E-3$ $\mu\text{Ci/ml}$ for the water pumped to the condenser hotwell. The nuclides present were Cr-51, Mn-54, Co-58, Co-60, Zn-65, I-131, Cs-134 and Cs-137. The liquid transfer process from the turbine basement to the condenser hotwell was governed by controls in Safety Evaluation 94-0002 and associated procedures. The post drain down initial entry radiological surveys for the basement general access hallways indicated <0.2 - 0.8 mRem/hr general area and smear results ranging from <500 - $28,000$ dpm/100cm² on the walls and floors. There were also several small piles of sludge reading up to 10 mRad/hr.

The turbine basement was decontaminated with a 500 - 2000 psi-pressure wash with 180 F water. Radiological Controls learned from the radwaste basement clean up were effective for the turbine basement cleanup effort as well. The respiratory requirements were relaxed when airborne concentrations were <0.3 DAC. The gross decon of the general access hallway floors and walls in the turbine basement has been successful in reducing contamination level from $28,000$ dpm/100cm² to <500 dpm/100cm² in most areas.

TURBINE INCIDENT RADIOLOGICAL PERFORMANCE REPORT

III. Personnel Exposure Summary

A. Designs/Temporary Modifications

The following temporary modifications and safety evaluations were performed to support the overall turbine failure recovery effort. This included the Water Recovery Plan, recovery of the radwaste and turbine basement, and flushing of CRD mechanisms. The exposure for installation and operation of these temporary modifications is summarized below. The only modification that has been removed is TM 93-0015. The rest of the modifications are still in place with some still service. The dose received for removal of these modifications will be addressed in the RF04 Post Outage ALARA report.

Temp Mod 93-0012 - Provide CRT water supply to vessel via CRD system

Installation Dose - 0 Rem Operation Dose - 0 Rem

TM 93-0013/TM 94-0005 - Provides letdown path from vessel to CRT Via RWCU letdown line.

Installation Dose - .218 Rem Operation Dose - .272 Rem

TM 93-0015 - RWCU Side Stream Demineralizer system to cleanup reactor coolant

Installation Dose - .040 Rem Operation Dose - .253 Rem
Removal Dose .197 Rem

TM 94-0007 - Provide for alternate discharge path from CST to Circulating Water Decant Line

Installation Dose - 0 Rem Operation Dose - 0 Rem

TM 94-0002 - Provides path to reject torus water to CRT

Installation Dose - .005 Rem Operation Dose - 0 Rem

SE 94-0001/SE 94-0005 - Supports CST Processing System

Installation Dose - 0 Rem Operation Dose - .587 Rem

B. Radwaste Basement Recovery/Cleanup

The following tasks were performed to recover the radwaste basement as a result of the turbine failure. The dose received in the radwaste basement for

TURBINE INCIDENT RADIOLOGICAL PERFORMANCE REPORT

oil skimming, decontamination, initial entry into rooms, and equipment repairs up to 4/14/94 are summarized below. The exposure for installation of EDP 26303 is also summarized below. The dose for removal of these modifications and completion of equipment repairs will be addressed in the RF04 Post Outage ALARA report.

Task	Expended ManRem
Oil Skimming	0.104 Rem
Decontamination	1.121 Rem
Entry into Rooms	0.028 Rem
Equipment Repair	1.025 Rem
EDP 26303 Hot Taps	0.057 Rem

C. Turbine Building Basement Recovery/Cleanup

The majority of the cleanup operations for the turbine basement were performed on the routine specific RWP for decontamination. The dose received for specific evolution's such as cleaning out and removing the sludge from the sumps as well as repairing equipment are listed below. The remainder of the dose received for recovery of the turbine basement from the turbine failure will be summarized in the RF04 Post Outage ALARA Report.

Sump Cleanup/Desludging	0.070 Rem
Equipment Repair	0.016 Rem

D. Exposure Breakdown By RWP/Department/Building

To better identify the breakdown of dose received during the turbine failure event, tasks were divided into 2 categories; tasks which were directly related to the recovery effort and tasks related to already ongoing work or RF04 preparations. Additionally, to determine the impact of the turbine failure on departmental annual dose estimates, the dose is summarized in graphic form for each department as well as their overall contribution to the site dose. The dose breakdown for each building is also graphically depicted so that the impact to different areas of the plant due to the turbine failure can be better understood.

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Turbine Event Related Exposure Summary

RWP Number	Task/Job Description	Actual ManRem
93-1001	Operation Routine RWP	0.085
93-1002	Chemistry Routine RWP	0.028
93-1003	Radiation Protection Routine RWP	0.098
93-1004	Radwaste Laundry Routine RWP	0.045
93-1005	Radwaste Decontamination Routine RWP	0.090
93-1007	Security Routine RWP	0.004
93-1009	Tours and Inspections Routine RWP	0.078
93-1010	Maintenance Routine RWP	0.008
93-1011	I&C Routine RWP	0.003
93-1023	Operations High Radiation Area Rounds	0.023
93-1262	B31F023A&B, B31F031A&B Repair	1.945
93-1263	Install G33 Hot Tap for TM 93-0013	0.040
94-1001	Operation Routine RWP	1.582
94-1002	Chemistry Routine RWP	0.175
94-1003	Radiation Protection Routine RWP	1.634
94-1004	Radwaste Laundry Routine RWP	0.822
94-1005	Radwaste Decontamination Routine RWP	0.431
94-1006	Radwaste OSSF Routine RWP	0.227
94-1007	Security Routine RWP	0.310
94-1008	Fire Protection Routine RWP	0.155
94-1009	Tours and Inspections Routine RWP	0.615
94-1010	Maintenance Routine RWP	1.219
94-1011	I&C Routine RWP	0.204
94-1014	Radwaste Processing Routine RWP	0.190
94-1015	CRD Drive Water Filter Changeout RWP	0.005
94-1023	Operations High Radiation Area Rounds	0.240
94-1025	Scram Discharge Volume Calibrations	0.107
94-1026	HCU Repairs	0.006
94-1031	Setup and Operate TM 94-0005	0.312
94-1032	Recirc/Treatment/Cleanup of CST	0.569
94-1034	Install TM 93-0015	0.040
94-1036	Perform Oil Skimming in the Radwaste Bsmt.	0.104
94-1038	Operate TM 93-0015	0.253
94-1039	Initial RP Survey of the Drywell	0.082
94-1041	N20 System RWP	0.005
94-1042	N21 System RWP	0.021
94-1045	N61 & N62 System RWP	0.015
94-1048	Remove Insulation in the Turbine Building	0.029
94-1049	Rework/Repair Turbine HP&LP Valves	0.088
94-1050	Main Condenser Initial Entry	0.005
94-1051	Condenser Hotwell Initial Entry	0.008

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94-1056	MSR Inspection/Repair	0.061
94-1096	Install TM-94-0002	0.005
94-1098	Radwaste Basement Equipment Repair	1.026
94-1099	Initial Entry into Radwaste Basement Rooms	0.028
94-1102	Decontamination of Radwaste Basement	1.121
94-1123	Install EDP 26281 Hot Taps	0.178
94-1176	Install EDP 26303 Hot Taps	0.057
94-1178	Clean Turbine Building HVAC Duct Work	0.001
94-1179	Sandblast Turbine Rotors	0.010
94-1180	P4400F615 Dual Indication	0.074
94-1181	Inspect Condenser	0.025
94-1191	CST/CRT Diving Operations	0.010
94-1200	Changeout MPC Oil Coalescer Filters	0.008
94-1202	Repair Turbine Building Equipment from Flood	0.016
94-1208	Remove TM 93-0015	0.197
Total		14.717

Note: Routine RWP's do not have ManRem estimates.

Non Turbine Event Exposure Summary

RWP Number	Task/Job Description	Actual ManRem
93-1240	Torus Room Lighting EDP	1.066
94-1013	Fermi 1 Routine RWP	0.028
94-1028	New Fuel Receipt (RB-1)	0.020
94-1029	New Fuel Receipt (Refuel Floor)	0.355
94-1037	Install and Remove Drywell Baseline Shielding	2.920
94-1057	RP Refuel Floor RWP	0.042
94-1058	Rx Vessel Disassembly/Reassembly (Floor)	0.139
94-1059	Fuel Sipping	0.137
94-1061	Rx Vessel Disassembly (Cavity)	0.097
94-1063	Decontamination of Refuel Floor Equipment	0.074
94-1067	Torus Diving Operations	0.040
94-1070	Torus Hatch Removal/Reinstallation	0.025
94-1072	Reactor Building MOV PM's	0.020
94-1074	Reactor Building Maintenance Routine RWP	0.321
94-1075	Reactor Building I&C Routine RWP	0.020
94-1078	Reactor Building Scaffolding/Temp. Lighting	0.252

TURBINE INCIDENT RADIOLOGICAL PERFORMANCE REPORT

94-1090	RCIC System RWP	0.041
94-1094	Operations Drywell Routine RWP	0.217
94-1095	Radiation Protection Drywell Routine RWP	0.327
94-1097	Drywell/RB-1 Steam Tunnel Pre-job Walkdown	0.043
94-1108	Remove/Reinstall Drywell Downcomer Covers	0.122
94-1112	Open/Close Drywell Equipment Hatches	0.050
94-1114	Drywell Snubber ISI	0.166
94-1118	Drywell MOV PM's	0.002
94-1121	I&C Pre-Undervessel Work	0.134
94-1122	Perform Decontamination in the Drywell	0.013
94-1128	MSIV's Repair/Rework/Nose Cone Mod.	0.141
94-1182	Drywell Insulation Removal/Installation	0.045
94-1184	Drywell Scaffolding/Temp. Power and Lighting	0.587
94-1188	E1100F119 Disassemble/Repair/Reassemble	0.010
94-1195	Perform Radiography in OSSF	0.014
94-1198	Install Torus Tubing Protection Platforms	0.015
94-1201	Condenser Waterbox Pumpdown Mod.	0.033
94-1213	CRD Pre-Flush Tank Work	0.055
94-1221	Drywell Sump Piping Modification	0.377
94-1224	Modify Dryer/Separator Drain Line EDP 13714	0.005
94-1225	Install ADHR Block Valves	0.070
94-1226	Westinghouse Undervessel Walkdowns	0.020

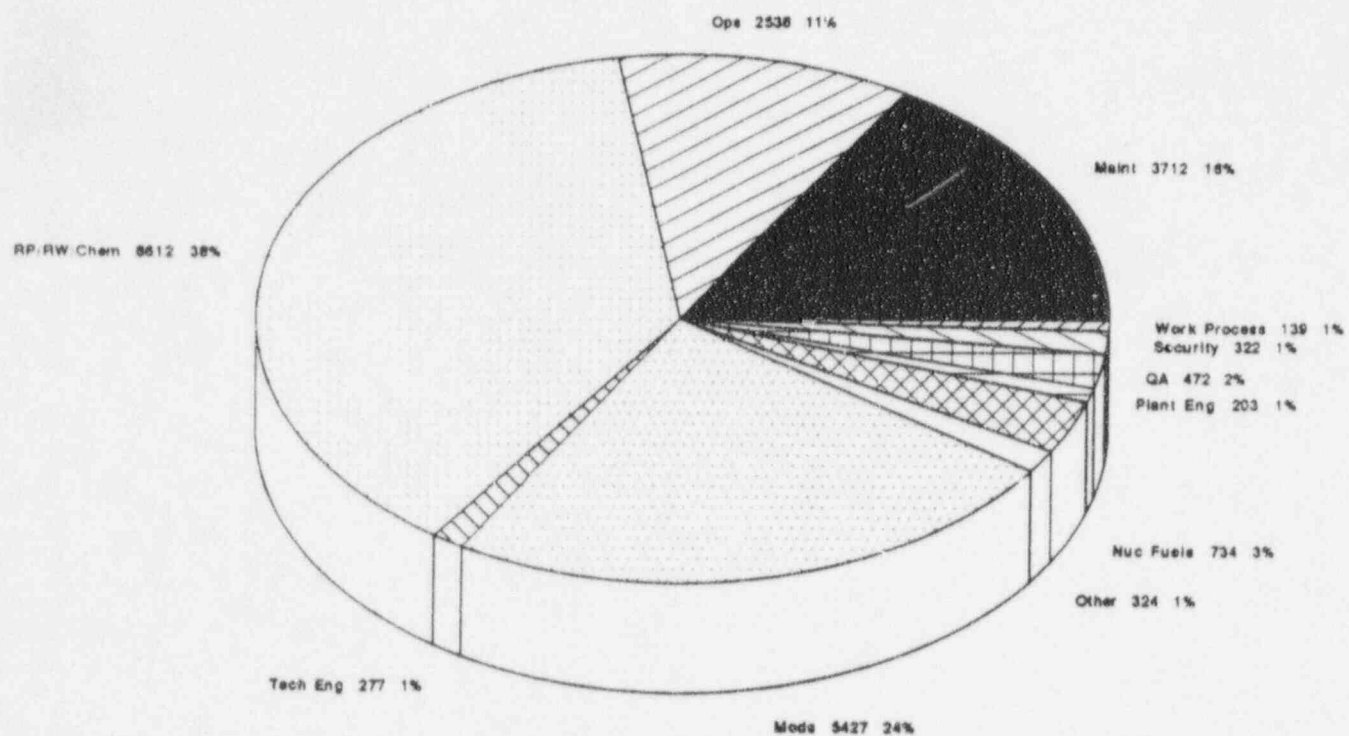
Total		8.043
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Total for All Work Performed During Turbine Recovery	22.760
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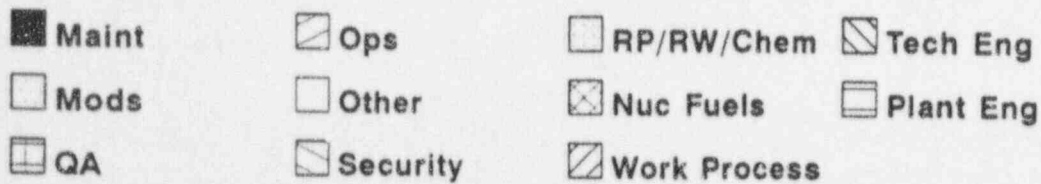
Note: The above work was performed during the turbine recovery time period, but is not directly related to turbine recovery work.

TURBINE INCIDENT RADIOLOGICAL PERFORMANCE REPORT

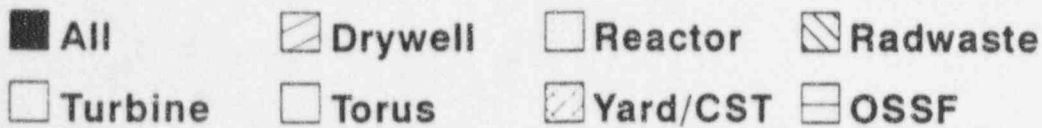
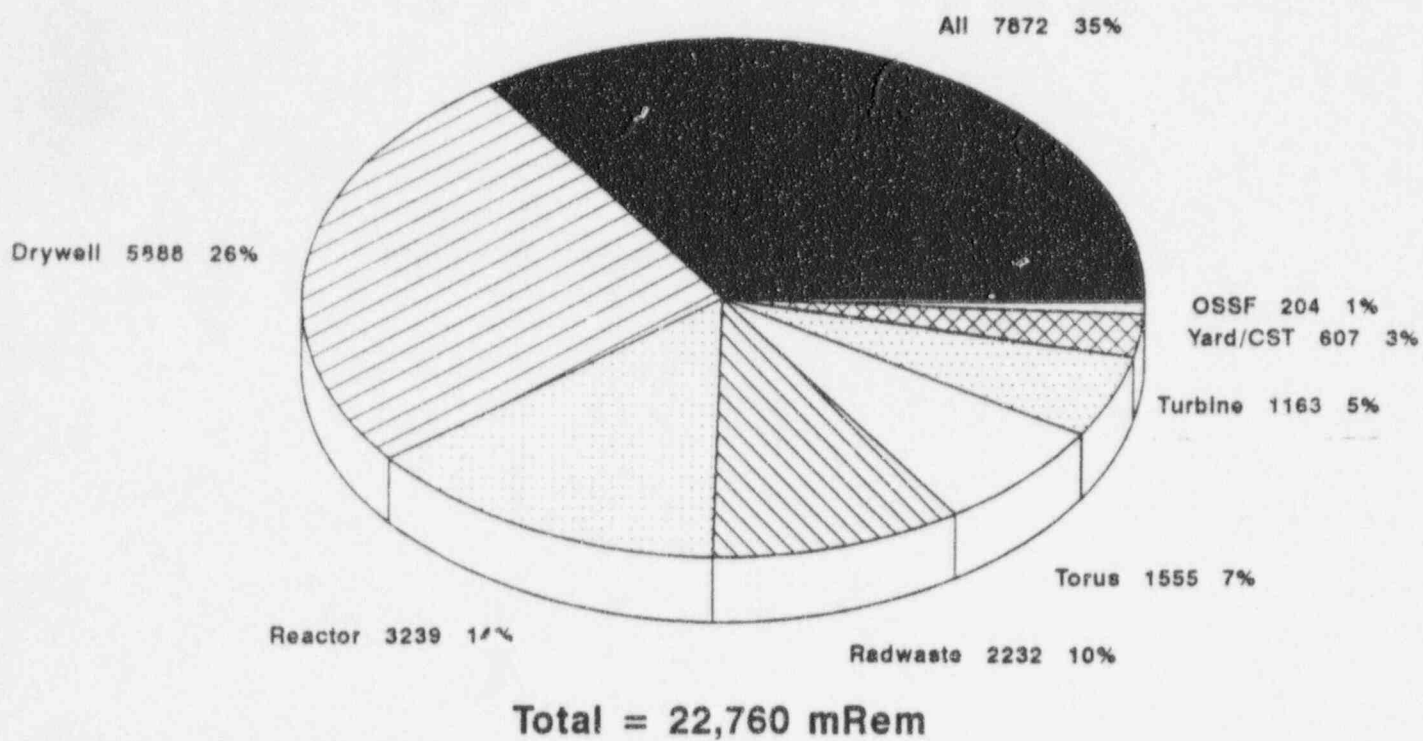
Exposure By Department



Total = 22,760 mRem



Exposure By Building



Note: All refers to Routine RWP's for all buildings

TURBINE INCIDENT RADIOLOGICAL PERFORMANCE REPORT

IV. Personnel Contamination Summary

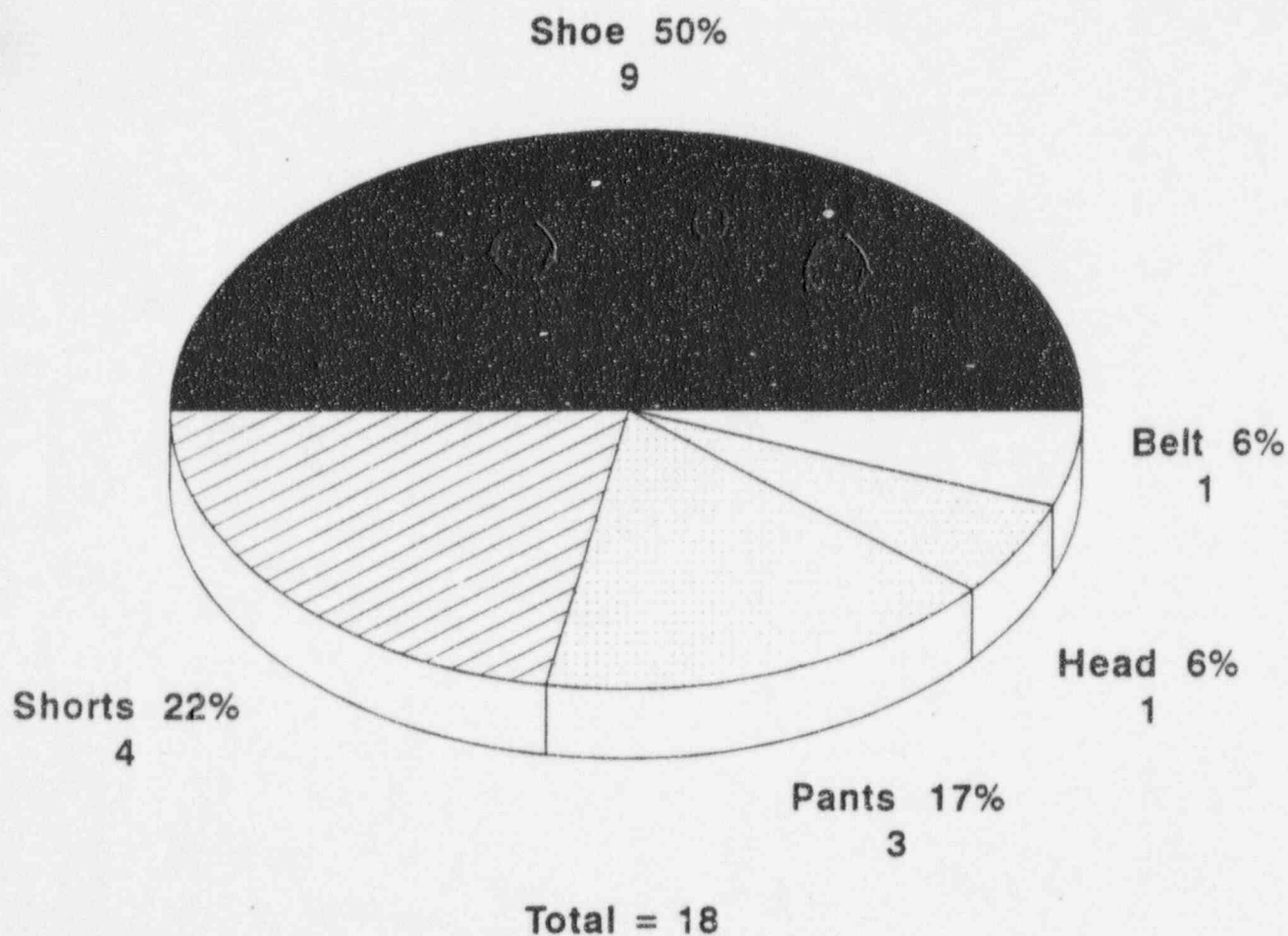
During the time period for the turbine failure and initial area recovery, there were 18 personnel contaminations. None of the personnel contaminations occurred on the day of the event and only 7 were directly related to the turbine incident recovery. Of the 18 personnel contaminations 17 were from contaminated clothing and shoes. Only 1 personnel contaminations involved a part of the body, and that was to the head when a workers hood came off in one of the MSR. The personnel contaminations range from 150 cpm to 10,000 cpm with half less than 1000 cpm. A large percentage (7 out of 18) of the personnel contaminations were from cross contamination of personal clothing while wearing protective clothing (PC's), only 2 of these were directly related to the turbine incident recovery. Only 2 of the personnel contaminations were due to poor worker practices. The following graphical summary of personnel contaminations by location, work group, cause, and building will show that only one factor or trend can be found as the major cause of personnel contaminations. That cause is cross contamination from protective clothing. As a result of this, an investigation was performed to determine the root cause. Several of these persons were apparently caused by contamination transfer from the protective clothing (PCs). As a result, monitoring of the incoming PCs from Interstate Nuclear Services (INS) has been escalated. As well as finding some PCs above the plant acceptance level of 5,000 cpm β/γ per frisker probe area, there were discoveries of alpha contamination and hot particles.

Plants normally initiate increased alpha monitoring programs when field surveys indicate a need. Fermi 2 has not had alpha contamination problems to date and the alpha discovered indicates cross contamination from other sites which contract with INS for laundry services. Palisades is one of the seven sites which sends PCs to the INS facility in Morris, Illinois. It has recently had alpha contamination problems. It is possible that PCs we received were worn at other plants previously or may have picked up contamination from other laundry batches previously washed in the same machines.

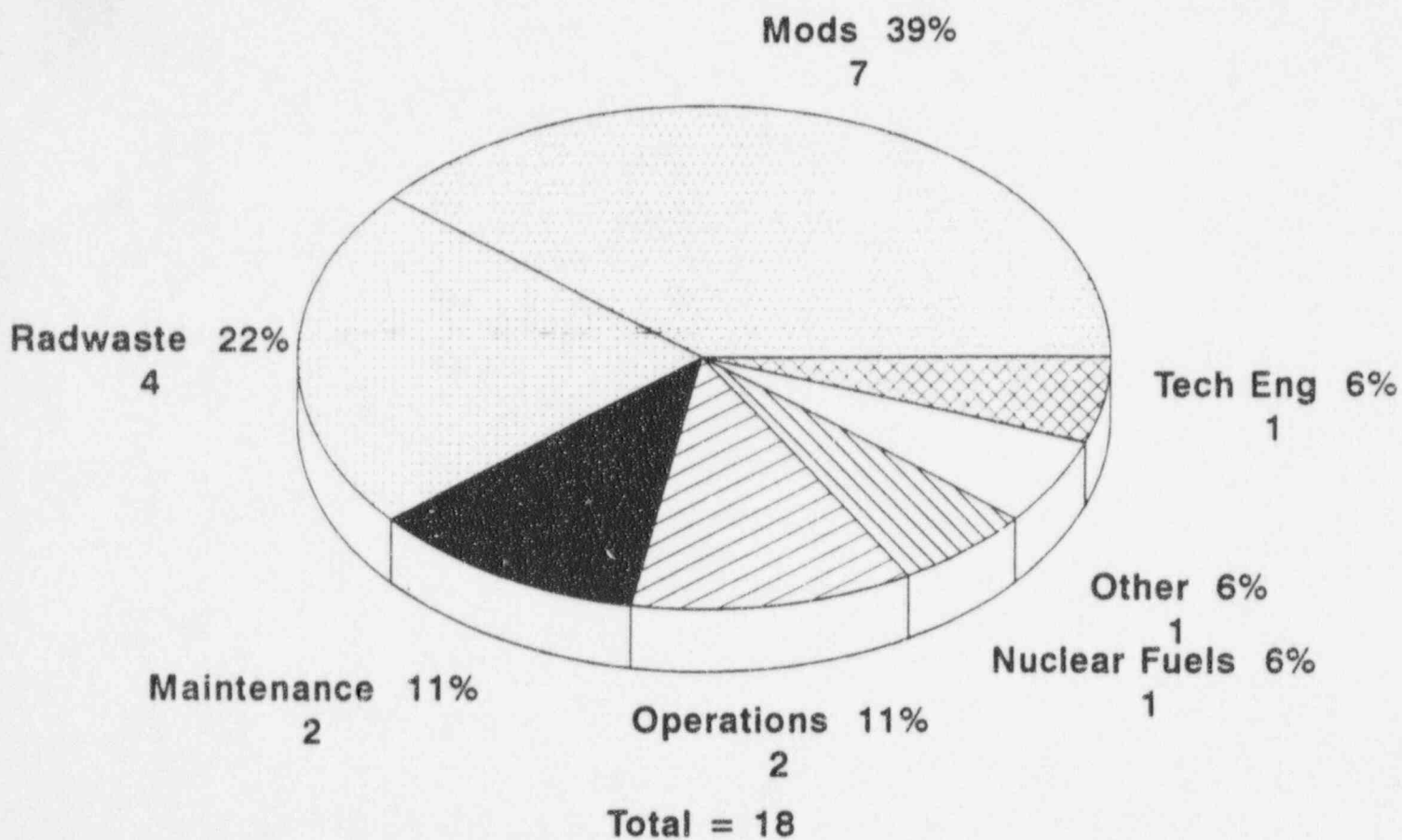
Hot particles have also been found on laundered PCs. This presents not only a personnel contamination potential, but a skin dose problem as well. It is also possible for unmonitored skin dose if a particle of sufficient activity were to be against the skin while the PCs were worn but stayed with the PCs when they were removed. Hot particles could also be transferred from other plants as described above.

As a result of the evaluation performed the following steps are being taken. Perform surveys of laundry on some random frequency, including checking for alpha on the PCs and containers. Continue site audits of the vendor and verify that steps to mitigate cross-contamination are implemented.

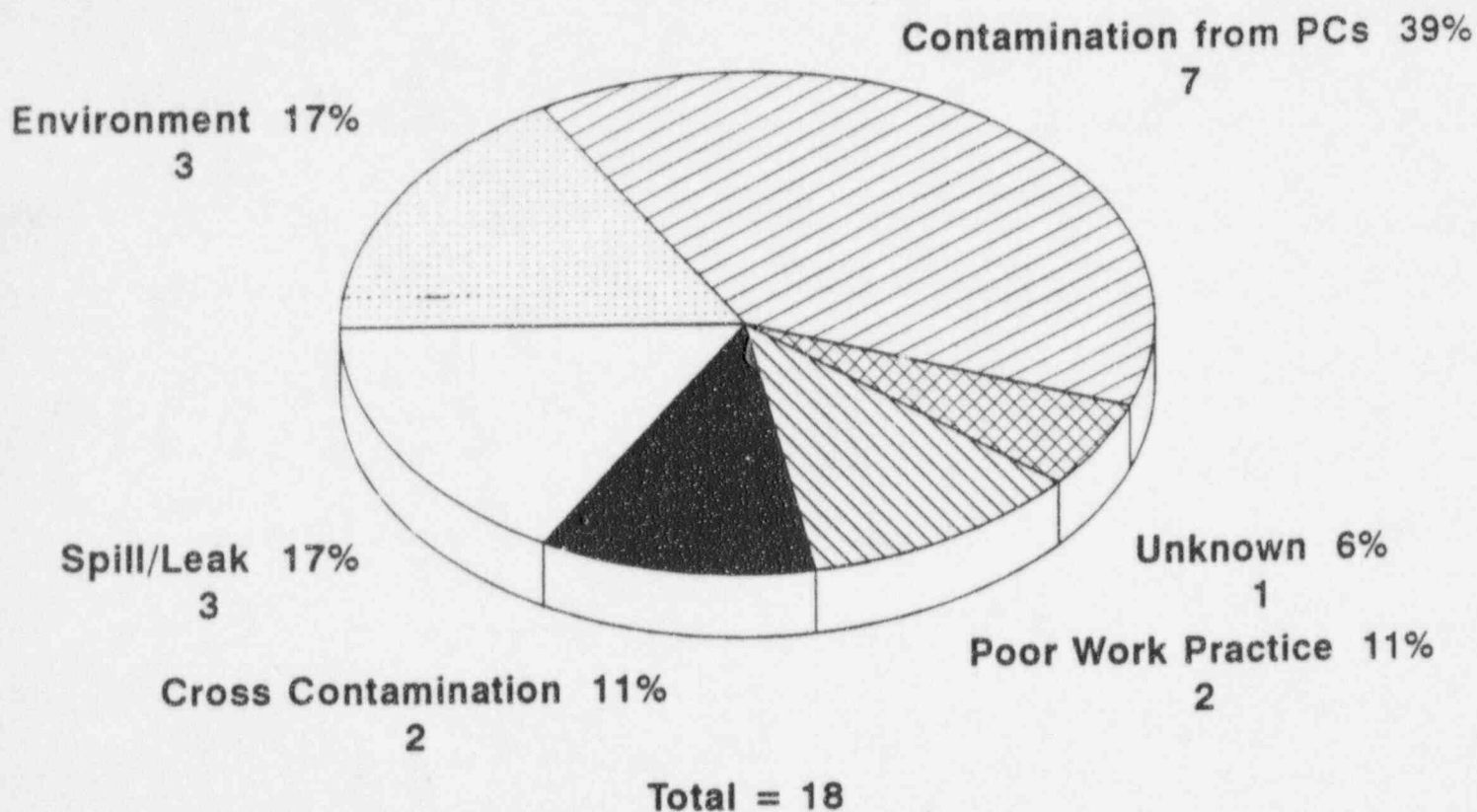
Personnel Contaminations By Location



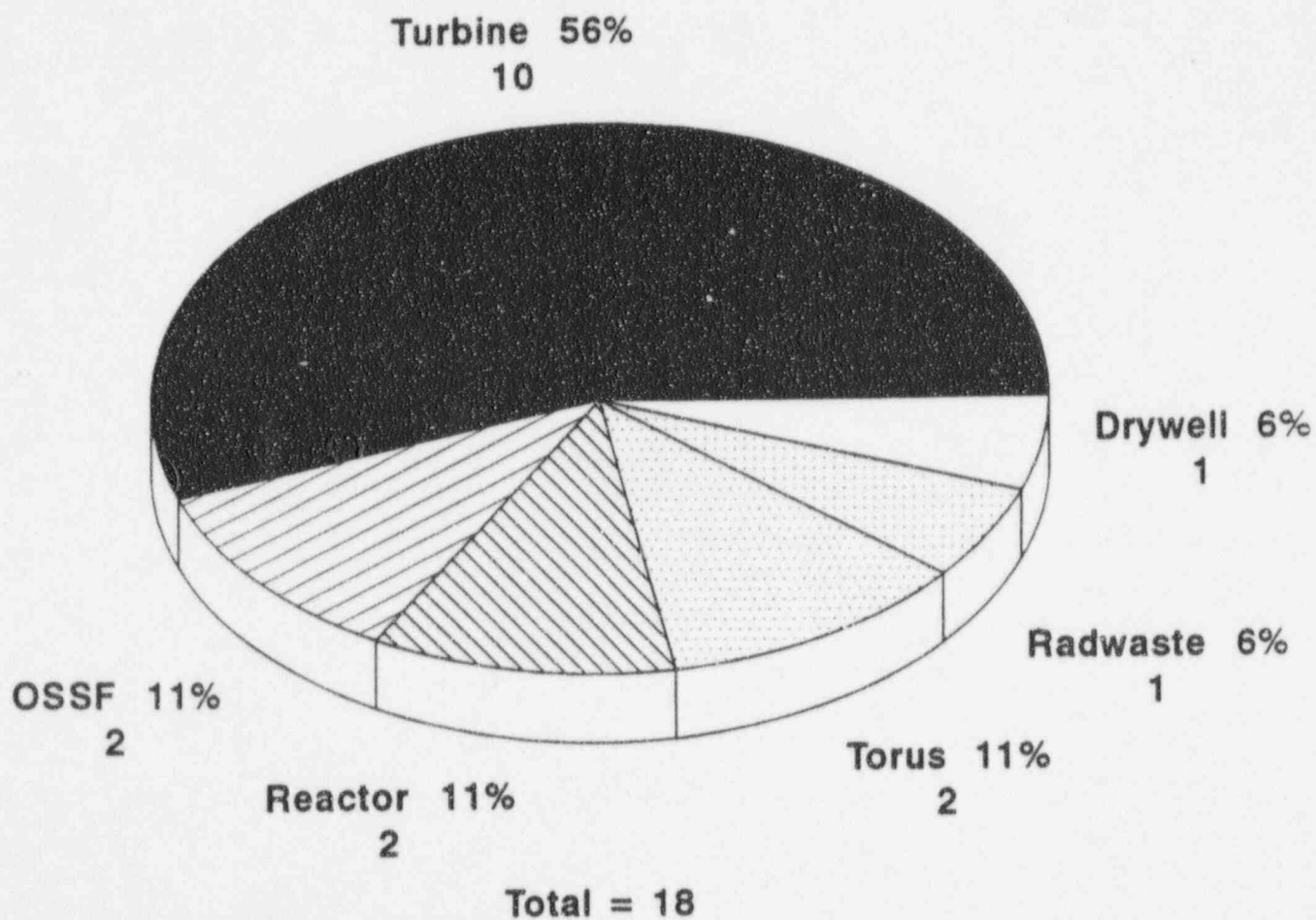
Personnel Contaminations By Workgroup



Personnel Contaminations By Cause



Personnel Contaminations By Building



TURBINE INCIDENT RADIOLOGICAL PERFORMANCE REPORT

V. Radwaste Summary

As a result of the turbine failure and subsequent flooding, large areas of the Turbine and Radwaste building were contaminated that are not normally contaminated areas. **Prior to the turbine failure there was 28,959 square feet of the contaminated areas throughout the plant. After the turbine failure there was 102,335 square feet of contaminated area, an increase of 73,626 square feet.** The major areas that contributed to the increase are the Turbine Deck, Turbine Building Basement, and the Radwaste Building Basement. Currently there is 61,104 square feet of contaminated areas within the plant (14.8 %), some of which is from work activities related to the current refuel outage.

Another impact from the turbine event is the generation of radioactive waste. The following is a summary of the radwaste generated as a result of the turbine failure.

<u>Type of Waste</u>	<u>Amount</u>
Resin	752 ft cu. ft.
Incinerable Waste	13 LSA Boxes, 1 Alaron Box
Potentially Clean Trash (PCT)	7 LSA Boxes, 1 LSA Box of Metal
Other	3 Alaron Boxes (Compact) 5 Sea Vans (Insulation, PCT, PC's etc.)

TURBINE INCIDENT RADIOLOGICAL PERFORMANCE REPORT

VI. Lessons Learned

A. Good Practices

- The formation of multi-departmental teams such as the Water Recovery Team to deal with events that are unique or abnormal in nature was successful. This allows for all departments to be informed of plans and manpower needs for such events. Additionally, the resources required to solve difficult problems, perform evaluations, designs, procedure reviews, and emergent problems are available as part of the team. This practice worked very well during the turbine failure event.
- The use of consultants and vendors that have the expertise and equipment to assist in the evaluation, planning, and operation of equipment proved to be invaluable. Additionally, consultants with a regulatory background were used to assist in evaluating sensitive issues such as alternate discharge paths, ODCM evaluations, and supporting safety evaluations. Their experience in these areas proved to be very helpful in formulating plans for developing a alternate discharge path, applicable controls, and methods for monitoring the discharge.
- The practice of performing "dry runs" for difficult high radiation radwaste movements work well. This was especially true for moving temporary demineralizers to the OSSF from TM 93-0013 using a shielded forklift. Total dose for moving these demineralizers was 17 mRem.
- The development of radiation protection checklists for coverage and specific evolution's. Checklists were developed for most temporary modifications that were installed and operated. These checklists let the technician know what was expected of them as well as letting the rest of the organizations know what controls were in place for each modification.
- The practice of incorporating temporary shielding evaluations as part of the temporary modifications and designs should continue. This allows for proper planning for installation and operation of the modification. Additionally, engineering time is identified up front instead of after the design is completed when additional engineering time is required to perform these same evaluations.
- The practice of joint walkdowns by all groups involved in a modification should be continued. This allows for input from all groups into the design so that all impacts are identified prior to completion of the design.

TURBINE INCIDENT RADIOLOGICAL PERFORMANCE REPORT

- The method used to decontaminate the turbine and radwaste basements worked very well. Manhours and dose were saved by using this method, which should be considered for other large decontamination projects in the future.

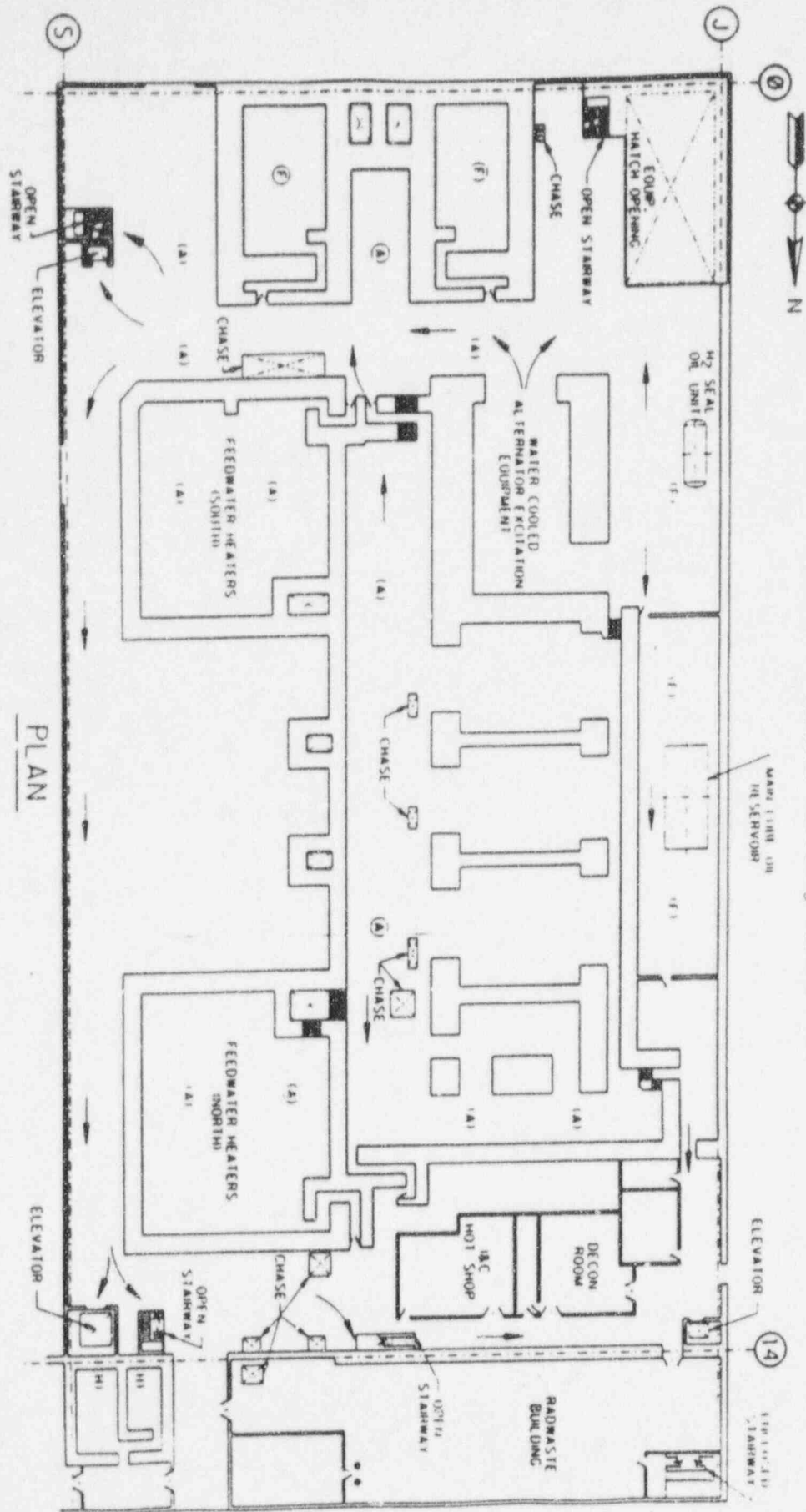
B. Lessons Learned

- The estimation of dose rate buildup on the temporary demineralizers was very difficult to predict. There are many factors that affect the rate of buildup such as total activity of the water, flow rate of the system, construction of the demineralizer and type of resin used just to name a few. These buildup estimations should only be used for design purposes only, not for establishing control levels for changeout or sluicing of the demineralizers. The actual buildup on the demineralizers should be tracked to verify that the shielding and radiological controls put into place are adequate and changeout should be based on the total estimated dose required to perform the changeout.
- Temporary demineralizers should not be used to cleanup crud bursts. On the RWCU letdown demineralizers dose rates built up at a higher rate than anticipated. An evaluation was performed to determine the cause. It was concluded that a trip of the RWCU system had occurred while the temporary system was in service, which caused a crud burst. When the RWCU system was restarted, only one of RWCU filter demineralizers was placed in service which resulted in less mechanical filtration of the reactor coolant. This reduced the length of time the temporary demineralizer was in service, which impacted the cleanup of the reactor coolant, as well as flushing the CRDs. However, the lessons learned from the evaluation that was performed were applied to other temporary demineralizers that were in service.
- On one occasion a contractor operating a demineralizer side stream system fell asleep. This was discovered by a NRC inspector. Corrective measures were taken to provide more relief's for personnel that operated equipment around the clock. In the future for work of this nature, relief for personnel should be factored into work schedules and manpower needs.
- One very important lesson as a result of the turbine failure event is the value of keeping the plant clean. If not for the cleanliness of the plant at the time of the event, the radiological impact would have been much worse. The cleanliness of the plant coupled with the low source term of the plant, greatly mitigated the consequences of the event. This high standard should be maintained in the future to lessen the impact should any further events of this nature occur.

TURBINE INCIDENT RADIOLOGICAL PERFORMANCE REPORT

C. Summary of Radiological Incidents

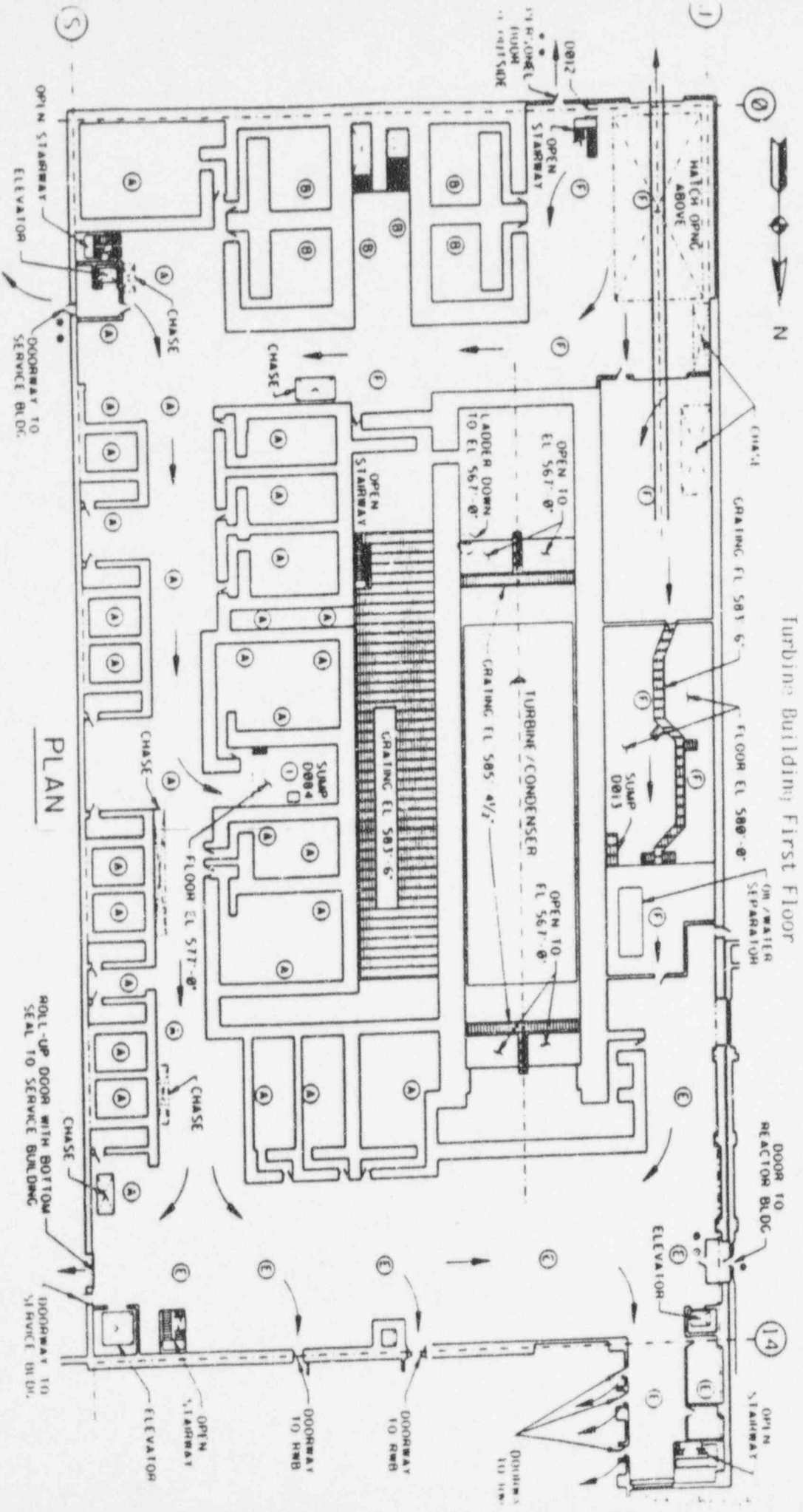
- A resin spill occurred in the East Drains Cooler Room when changing out temporary demineralizers for TM 94-0005. The cause of this event was a combination of several different factors. The major factors include identifying incorrect procedures in the work request for isolating the temporary modification. This, along with a lack of attention to detail by operators isolating the demineralizers with the wrong procedure, caused the spill to occur. See Operations Critique 94-001.
- CST water was spilled outside of the diked areas during draining of the CST treatment system pre-filter for changeout. During the draining operation 200 gallons was expected in order to drain the pre-filter and associated hoses. This water would be drained to 55 gallon drums. When draining started, the time required to fill one drum was timed a 45 minutes. The operator was making rounds of the draining evolution every 15 minutes. While filling the sixth drum, water overflowed out of the drum and onto a temporary plastic sheet under the drum. It was estimated that one gallon leaked onto the plastic sheet and about a quart spilled onto the ground. It was then discovered that about 15 gallons leaked out of the filter housing vent into the CST diked area. RP surveyed both areas and found no detectable contamination. The primary causes for this event were; draining to barrels outside of diked area, no continuous monitoring of the drums during draining, more water was drained to the drums than anticipated (only 200 gallons was anticipated and when the event occurred they were draining to the sixth barrel), lack of direct Detroit Edison supervision for the evolution, and possibly a valve leaking by. See Operations Critique 94-002.
- During desludging operations for the CST, approximately 30 gallons of water spilled onto the top of the CST. During the desludging operation, the filters installed to remove the sludge plugged. A meeting was held and it was decided not to changeout the filters until the following day. During the night water was discovered to have gotten into the hydraulic lines of the pump. A decision was made to repair the pump and changeout the filters on night shift to allow processing to resume on dayshift. Dayshift decided to first pump the contents of the demineralizer screen backwash liner to the CST. After the valve line-up was performed and the pump was started, it was discovered that the pump discharge had not been put back into the CST. Pumping was stopped immediately. The cause of this spill was the operation's procedure did not cover pumping the liner to the CST but CNSI procedure did. Also no walkdown of the system was performed prior to the start of pumping operations. See Operations Critique 94-003. DER 94-0127 was written to cover evaluating and identifying what actions need to be taken to prevent further occurrences of this nature. Initial response is due 5/2/94.



PLAN

Turbine building Second Floor

Arrows show direction of water flow
Cross hatched areas are areas contaminated from the turbine failure

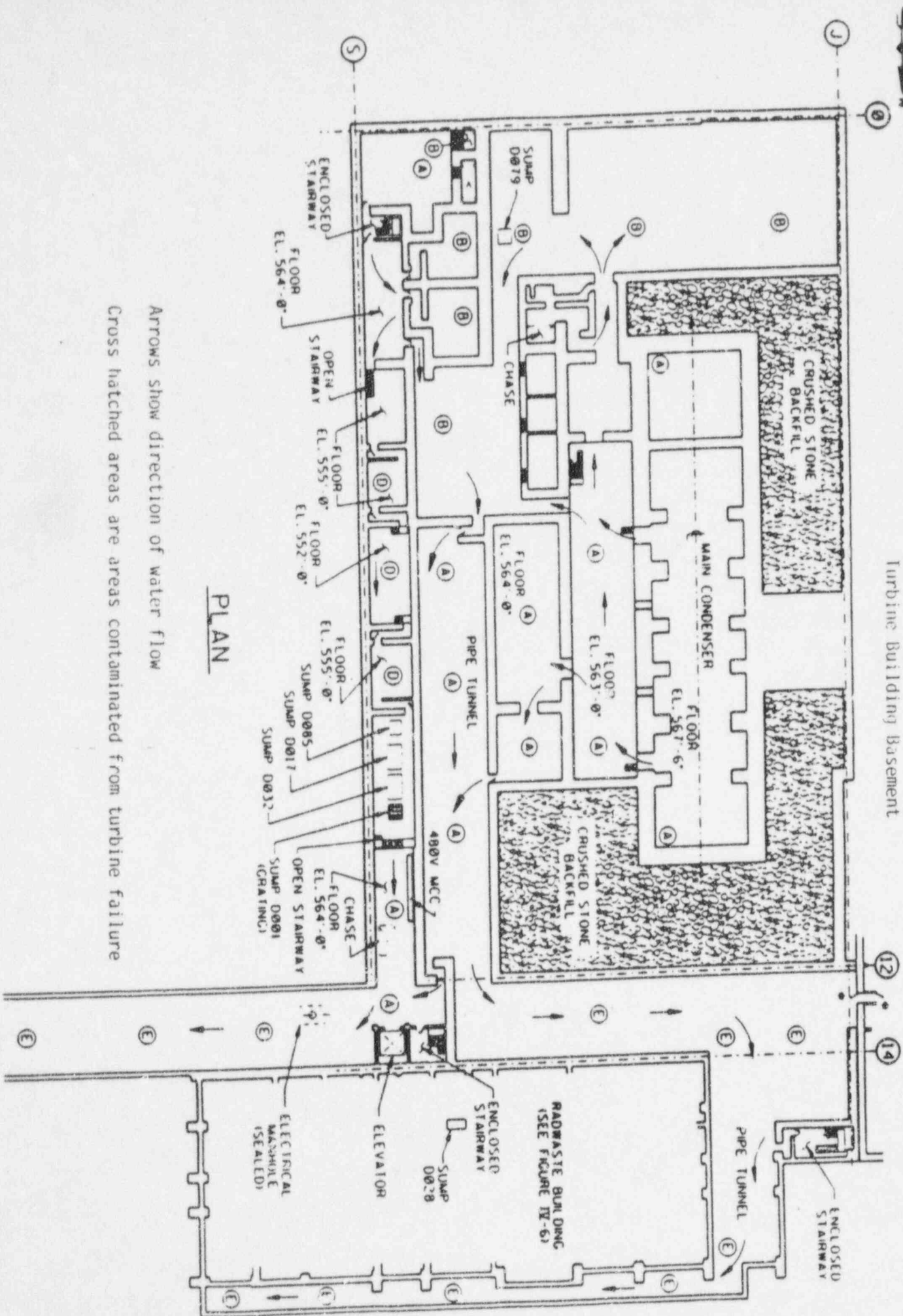


Turbine Building First Floor

Arrows show direction of water flow

Cross hatched areas are areas contaminated from turbine failure

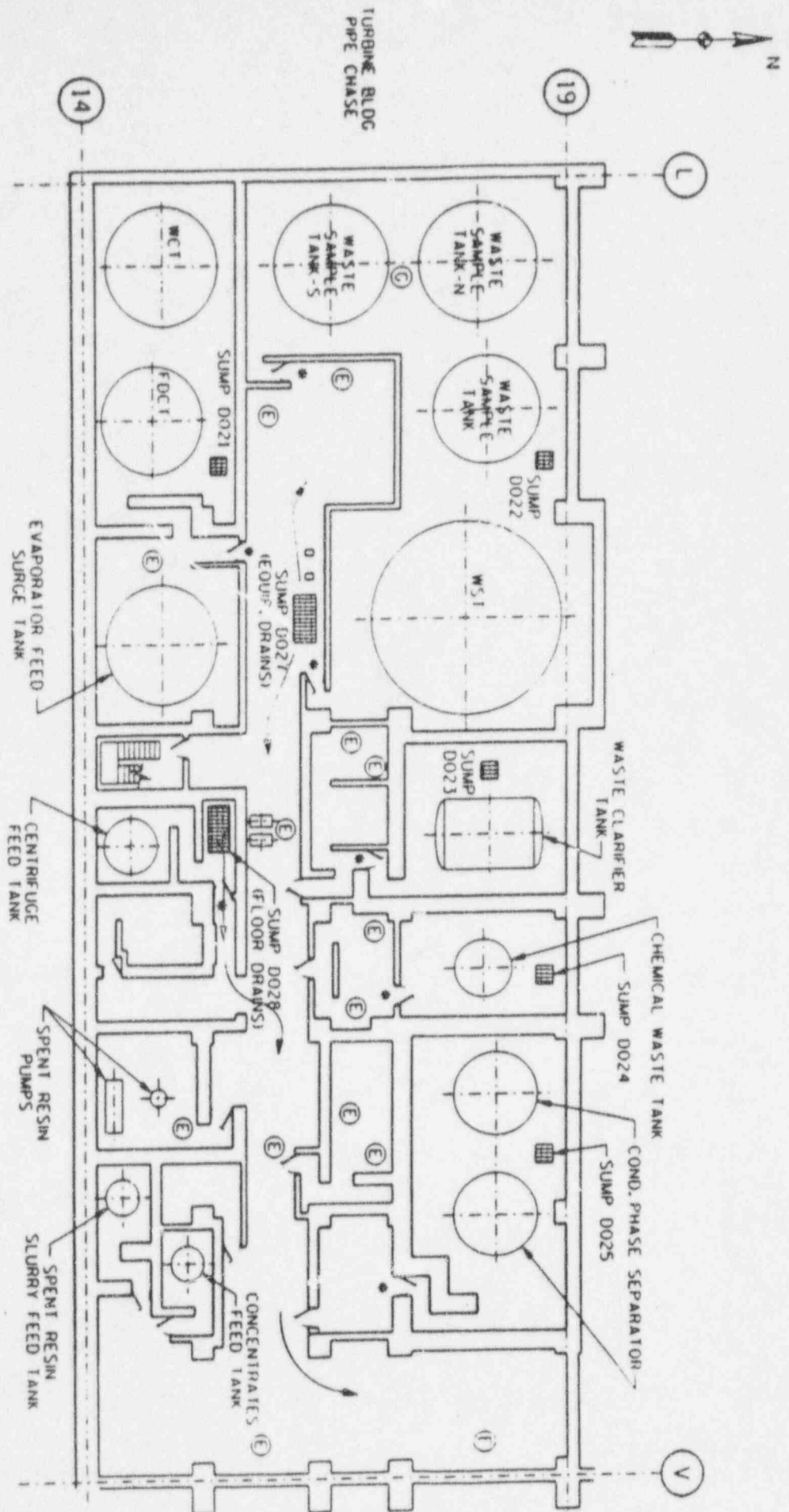
Turbine Building Basement



PLAN

Arrows show direction of water flow
Cross hatched areas are areas contaminated from turbine failure

Radwaste Building Basement



Arrows show direction of water flow
 Cross hatched areas are areas contaminated from the turbine failure

Fermi 2 Water issues

Date of analysis: FEB 17, 1994

Volume(gal)= 693000
(l)= 2.623E+06

Flow Rates: (gpm)
Dilution= 10000
CST dchg 400

Isotope	Eff Conc uCi/ml (10CFR20)	Result uCi/ml	Conc./EC	Activity (mCi)
Cr-51	5.000E-04	3.390E-07	6.780E-04	8.893E-01
Mn-54	3.000E-05	2.060E-07	6.867E-03	5.404E-01
Co-60	3.000E-06	7.520E-07	2.507E-01	1.973E+00
I-131	1.000E-06	7.700E-08	7.700E-02	2.020E-01
Cs-134	9.000E-07	7.080E-07	7.867E-01	1.857E+00
Cs-137	1.000E-06	6.370E-07	6.370E-01	1.671E+00
Sr-89	8.000E-06	5.800E-07	7.250E-02	1.522E+00
H-3	1.000E-03	1.000E-06	1.000E-03	2.623E+00
Totals		4.299E-06	1.832E+00	1.128E+01
(w/Dilution)		1.653E-07	7.048E-02	4.338E-01

D-1

Fermi 2 Water issues

Date of analysis: FEB 21, 1994

Volume(gal)= 532000
(l)= 2.014E+06

Flow Rates: (gpm)
Dilution= 15000
CST dchg 400

Isotope	Eff Conc uCi/ml (10CFR20)	Result uCi/ml	Conc./EC	Activity (mCi)
Cr-51	5.000E-04	3.080E-07	6.160E-04	6.203E-01
Mn-54	3.000E-05	0.000E+00	0.000E+00	0.000E+00
Co-58	2.000E-05	8.740E-08	4.370E-03	1.760E-01
Co-60	3.000E-06	5.060E-07	1.687E-01	1.019E+00
Sb-125	3.000E-05	9.130E-08	3.043E-03	1.839E-01
I-131	1.000E-06	6.650E-08	6.650E-02	1.339E-01
Cs-134	9.000E-07	1.300E-07	1.444E-01	2.618E-01
Cs-137	1.000E-06	1.000E-07	1.000E-01	2.014E-01
Sr-89	8.000E-06	5.800E-07	7.250E-02	1.168E+00
H-3	1.000E-03	4.000E-04	4.000E-01	8.055E+02
Totals (w/Dilution)		4.019E-04 1.044E-05	9.601E-01 2.494E-02	8.093E+02 2.102E+01

Fermi 2 Water issues

Date of analysis:

FEB 24, 1994

cst_224a.wks

Volume(gal)= 532000
(l)= 2.014E+06

Flow Rates: (gpm)
Dilution= 20000
CST dchg 400

Isotope	Eff Conc uCi/ml (10CFR20)	Result uCi/ml	RESULT/EC	Activity (mCi)
Cr-51	5.000E-04	2.199E-07	4.398E-04	4.428E-01
Mn-54	3.000E-05	0.000E+00	0.000E+00	0.000E+00
Co-58	2.000E-05	9.511E-08	4.756E-03	1.915E-01
Co-60	3.000E-06	4.184E-07	1.395E-01	8.426E-01
Sb-125	3.000E-05	1.096E-07	3.653E-03	2.207E-01
I-131	1.000E-06	2.702E-08	2.702E-02	5.441E-02
Cs-134	9.000E-07	1.415E-07	1.572E-01	2.850E-01
Cs-137	1.000E-06	1.567E-07	1.567E-01	3.156E-01
Sr-89	8.000E-06	5.800E-07	7.250E-02	1.168E+00
H-3	1.000E-03	4.800E-04	4.800E-01	9.666E+02

Totals		4.817E-04	1.042E+00	9.702E+02
(w/Dilution)		9.446E-06	2.043E-02	

Fermi 2 Water issues

Date of analysis:

FEB 24, 1994

CST_224.WKS

Volume(gal)= 532980
(l)= 2.018E+06

Flow Rates: (gpm)
Dilution= 15500
CST dchg 400

Isotope	Eff Conc uCi/ml (10CFR20)	Result uCi/ml	Conc./EC	Activity (mCi)
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Fermi 2 Water issues

cst_ave.wks

Date of analysis:

Average

Volume(gal)= 480528

(l)= 1.819E+06

Flow Rates: (gpm)

Dilution= 15500

CST dchg 380

Isotope	Eff Conc uCi/ml (10CFR20)	Result uCi/ml	Conc./EC	Activity (mCi)
Cr-51	5.000E-04	3.240E-07	1.551E-05	5.894E-01
Co-58	2.000E-05	6.355E-08	7.604E-05	1.156E-01
Co-60	3.000E-06	4.455E-07	3.554E-03	8.104E-01
I-131	1.000E-06	3.630E-08	8.686E-04	6.603E-02
Cs-134	9.000E-07	1.545E-07	4.108E-03	2.810E-01
Cs-137	1.000E-06	1.670E-07	3.996E-03	3.038E-01
Sr-89	8.000E-06	1.200E-06	3.589E-03	2.183E+00
H-3	1.000E-03	4.800E-04	1.149E-02	8.731E+02
Totals		4.824E-04		8.775E+02
(w/Dilution)		1.154E-05	2.769E-02	

Fermi 2 Water issues

cst_ave.wks

Date of analysis:

Average

Volume(gal)= 480528
(l)= 1.819E+06

Flow Rates: (gpm)
Dilution= 15500
CST dchg 380

Isotope	Diff Conc /ml (10CFR20)	Result uCi/ml	Conc./EC	Activity (mCi)
Cr-51	5.000E-04	3.240E-07	6.480E-04	5.894E-01
Co-58	2.000E-05	6.355E-08	3.178E-03	1.156E-01
Co-60	3.000E-06	4.455E-07	1.485E-01	8.104E-01
I-131	1.000E-06	3.630E-08	3.630E-02	6.603E-02
Cs-134	9.000E-07	1.545E-07	1.717E-01	2.810E-01
Cs-137	1.000E-06	1.670E-07	1.670E-01	3.038E-01
Sr-89	8.000E-06	1.200E-06	1.500E-01	2.183E+00
H-3	1.000E-03	4.800E-04	4.800E-01	8.731E+02

Totals		4.824E-04	1.157E+00	8.775E+02
(w/Dilution)		1.154E-05	2.769E-02	

Fermi 2 Water issues

cst_ave.wks

Date of analysis: Average

Volume(gal)= 480528
(l)= 1.819E+06

Flow Rates: (gpm)
Dilution= 15500
CST dchg 380

Isotope	Eff Conc uCi/ml (10CFR20)	Result uCi/ml	Conc./EC	Activity (mCi)
Cr-51	5.000E-04	3.240E-07	1.551E-05	5.894E-01
Co-58	2.000E-05	6.355E-08	7.604E-05	1.156E-01
Co-60	3.000E-06	4.455E-07	3.554E-03	8.104E-01
I-131	1.000E-06	3.630E-08	8.686E-04	6.603E-02
Cs-134	9.000E-07	1.545E-07	4.108E-03	2.810E-01
Cs-137	1.000E-06	1.670E-07	3.996E-03	3.038E-01
Sr-89	8.000E-06	1.200E-06	3.589E-03	2.183E+00
H-3	1.000E-03	4.800E-04	1.149E-02	8.731E+02

Totals		4.824E-04		8.775E+02
(w/Dilution)		1.154E-05	2.769E-02	

Comparison of CST Sample Splitting Results Michigan Dept. of Radiological Health and Fermi 2				
Radionuclide	Mich Rad Health	Fermi 2	Ratio (Fermi/Mich)	Agreement (NRC Criteria)
Cr-51	3E-07 μ Ci/ml ($\pm 2E-07$)	6.1E-07 μ Ci/ml ($\pm 1.8E-07$)	2.0	yes
Co-58	8E-08 μ Ci/ml ($\pm 3E-08$)	1.0E-07 μ Ci/ml ($\pm 2.2E-08$)	1.25	yes
Co-60	4.5E-07 μ Ci/ml ($\pm 0.7E-07$)	5.2E-07 μ Ci/ml ($\pm 5.0E-08$)	1.16	yes
I-131	7E-08 μ Ci/ml ($\pm 3E-08$)	6.0E-08 μ Ci/ml ($\pm 1.4E-08$)	0.86	yes
Sb-125	1.5E-07 μ Ci/ml ($\pm 0.7E-07$)	1.2E-07 μ Ci/ml ($\pm 0.47E-07$) [*]	0.80	yes
Cs-134	1.1E-07 μ Ci/ml ($\pm 0.4E-07$)	1.5E-07 μ Ci/ml ($\pm 0.32E-07$)	1.4	yes
Cs-137	8E-08 μ Ci/ml ($\pm 2E-08$)	6.7E-08 μ Ci/ml ($\pm 3.2E-08$)	0.84	yes

* Sb-125 was not identified as a confirmed peak by the gamma spectral software. Data review provided this result.

↑
Michigan
Sample

↑
Fermi Sample
observed by Dr. Fleming

D-2

 23-FEB-94 08:39:52 *****

CST SAMPLE SPLIT WITH FERMI2 AND STATE OF MICHIGAN

SPECTRAL FILE NAME: L940401.FEV
 SAMPLE DATE: 21-FEB-94 09:27:00
 SAMPLE IDENTIFICATION: 94-040
 TYPE OF SAMPLE: LIQUID
 SAMPLE QUANTITY: 500.7500 UNITS: GM
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 23-FEB-94 08:04:51 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 2000. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 2000. SEC * SHAPE PARAMETER : 5.0 %
 ELAPSED LIVE TIME: 2000. SEC * NBR ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY:MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHNL: .4697016 * HALF LIFE RATIO: 8.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	185.78	34.	111.	1.19	310.74	306	9	1.70E-02	56.5	
2	0	238.17	18.	112.	.76	422.29	420	10	8.89E-03	****	
3	0	319.96	44.	83.	1.02	596.41	593	9	2.21E-02	41.4	
4	0	364.85	64.	75.	1.95	692.00	686	12	3.18E-02	32.5	
5	0	661.53	77.	63.	1.00	1323.62	1318	12	3.84E-02	23.3	
6	0	795.82	87.	39.	1.32	1609.52	1604	12	4.36E-02	19.1	
7	0	810.32	66.	39.	1.30	1640.39	1634	14	3.31E-02	22.1	
8	0	1091.86	14.	5.	1.20	2239.81	2236	7	6.93E-03	42.2	
9	0	1172.96	291.	23.	1.65	2412.46	2402	18	1.45E-01	7.2	
10	0	1332.44	284.	16.	1.96	2751.99	2743	16	1.42E-01	6.6	
11	0	1460.63	118.	0.	1.79	3024.92	3015	18	5.90E-02	10.7	
12	0	1764.20	35.	7.	.70	3671.21	3664	13	1.73E-02	21.0	

PEAK SEARCH COMPLETED (REV 15.8 - ND PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 2000. CORRECTED LIVE TIME: 2000.

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR
1	0	185.78	34.	111.	1.19	310.74	306	9	1.70E-02	56.5
2	0	238.17	18.	112.	.76	422.29	420	10	8.89E-03	****
3	0	319.96	44.	83.	1.02	596.41	593	9	2.21E-02	41.4
4	0	364.85	64.	75.	1.95	692.00	686	12	3.18E-02	32.5
5	0	661.53	77.	63.	1.00	1323.62	1318	12	3.84E-02	23.3
6	0	795.82	87.	39.	1.32	1609.52	1604	12	4.36E-02	19.1
7	0	810.32	66.	39.	1.30	1640.39	1634	14	3.31E-02	22.1
8	0	1091.86	14.	5.	1.20	2239.81	2236	7	6.93E-03	42.2

9	0	1172.90	271.	25.	1.05	2412.40	2402	10	1.45E-01	7.2
10	0	1332.44	284.	16.	1.96	2751.99	2743	16	1.42E-01	6.6
11	0	1460.63	118.	0.	1.79	3024.92	3015	18	5.90E-02	10.7
12	0	1764.20	35.	7.	.70	3671.21	3664	13	1.73E-02	21.0

FILE-UP CORRECTION COMPLETED

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
CR-51	AP	320.08	44.	83.	9.83*	4.127E+00	3.084E -7	1.278E -7
CO-58	AP	810.76	66.	39.	99.40*	2.099E+00	8.736E -8	1.934E -8
CO-60	AP	1173.22	291.	23.	100.00	1.600E+00	4.909E -7	3.522E -8
		1332.49	284.	16.	100.00*	1.457E+00	5.271E -7	3.458E -8
NI-65	AP	366.27	64.	75.	4.61	3.758E+00	3.971E -1	1.291E -1
		1115.52	0.	0.	14.80	0.000E+00	.000E 0	.000E 0
		1481.84	0.	0.	23.50*	0.000E+00	.000E 0	.000E 0

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
I-131	HFP	284.30	0.	0.	6.05	0.000E+00	.000E 0	.000E 0
		364.48	64.	75.	81.20*	3.758E+00	6.654E -8	2.163E -8
		636.97	0.	0.	7.26	0.000E+00	.000E 0	.000E 0
		722.89	0.	0.	1.80	0.000E+00	.000E 0	.000E 0

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
RH-105	FP	306.10	0.	0.	5.13	0.000E+00	.000E 0	.000E 0
		318.90	44.	83.	19.20*	4.127E+00	3.772E -7	1.562E -7
CS-134	FP	563.23	0.	0.	8.38	0.000E+00	.000E 0	.000E 0
		569.32	0.	0.	15.43	0.000E+00	.000E 0	.000E 0
		604.70	0.	0.	97.60*	0.000E+00	.000E 0	.000E 0
		795.85	87.	39.	85.40	2.127E+00	1.299E -7	2.486E -8
		801.93	0.	0.	8.73	0.000E+00	.000E 0	.000E 0
CS-137	FP	661.65	77.	63.	85.12*	2.436E+00	9.998E -8	2.328E -8

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
K-40	NP	1460.81	118.	0.	10.67*	1.362E+00	2.191E -6	2.338E -7
RA-226	NP	186.21	34.	111.	3.28	5.814E+00	4.803E -7	2.714E -7
		241.98	0.	0.	7.49	0.000E+00	.000E 0	.000E 0
		295.21	0.	0.	19.20	0.000E+00	.000E 0	.000E 0
		351.92	0.	0.	37.20	0.000E+00	.000E 0	.000E 0
		609.31	0.	0.	46.30*	0.000E+00	.000E 0	.000E 0
		1120.29	0.	0.	15.10	0.000E+00	.000E 0	.000E 0
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	35.	7.	15.80	1.186E+00	4.972E -7	1.044E -7
		2204.22	0.	0.	4.98	0.000E+00	.000E 0	.000E 0
TH-232	NP	238.63	18.	112.	44.60	5.045E+00	2.133E -8	2.576E -8
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0	.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	0.	0.	35.86*	0.000E+00	.000E 0	.000E 0

ELAPSED LIVE TIME: 2000. (PILE-UP CORRECTED)

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
U-235	NP	143.76	0.	0.	10.50	0.000E+00	.000E 0	.000E 0
		185.72	34.	111.	54.00*	5.814E+00	2.917E -8	1.648E -8

ELAPSED LIVE TIME 2000. (PILE-UP CORRECTED)

UNIDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
2	0	238.17	18.	112.	.76	422.29	420	10	8.89E-03	****	5.05E+00
6	0	795.82	87.	39.	1.32	1609.52	1604	12	4.36E-02	19.1	2.13E+00
8	0	1091.86	14.	5.	1.20	2239.81	2236	7	6.93E-03	42.2	1.69E+00
12	0	1764.20	35.	7.	.70	3671.21	3664	13	1.73E-02	21.0	1.19E+00

LINES NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI	/GM	ABNDIFF	FAILED
1	RA-226	186.21	1600.00Y	1.000L	0	4.803E -7	12.29%	ABN
2	TH-232	238.63	1.00E+10Y	1.000E	0	2.133E -8	25.03%	ABN
4	NI-65	366.27	2.52H	4.010E	5	3.971E -1	10.74%	DCY,ABN
6	CS-134	795.85	753.10D	1.002E	0	1.299E -7	39.62%	ABN
12	RA-226	1764.49	1600.00Y	1.000E	0	4.972E -7	12.29%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(ND PC VERSION DEC 88)

PAGE 4

TOTAL LINES IN SPECTRUM	12
UNIDENTIFIED PEAKS	4
IDENTIFIED IN SUMMARY REPORT	8 66.67%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GM	1-SIGMA ERROR	%ERR
CR-51	AP	27.70D	1.050	3.084E -7	1.278E -7	41.42
CO-58	AP	70.80D	1.019	8.736E -8	1.934E -8	22.14
CO-60	AP	1925.00D	1.001	5.271E -7	3.458E -8	6.56

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GM	1-SIGMA ERROR	%ERR
I-131	HFP	8.04D	1.184	6.654E -8	2.163E -8	32.50

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GM	1-SIGMA ERROR	%ERR
RH-105	FP	35.36H	2.508	3.772E -7	1.562E -7	41.42
CS-137	FP	30.17Y	1.000	9.998E -8	2.328E -8	23.29

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GM	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	1.000	2.191E -6	2.338E -7	10.67
U-235	NP	7.04E+08Y	1.000	2.917E -8	1.648E -8	56.51

MINIMUM DETECTABLE ACTIVITY REPORT (ND PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

NUCLIDE	BKG	ENERGY	MINIMUM UCI /GM
BE-7	54.	477.59	2.7784E-07
ANIL-511	155.	511.00	HALF LIFE TOO SHORT
NA-22	17.	1274.54	3.6322E-08
NA-24	22.	1368.53	3.8219E-07
CL-38	4.	2167.51	0.0000E+00
AR-41	12.	1293.64	HALF LIFE TOO SHORT
SC-46	52.	1120.51	5.7704E-08
MN-54	51.	834.83	4.4395E-08
MN-56	45.	846.75	HALF LIFE TOO SHORT
FE-59	26.	1099.22	7.2231E-08
CO-57	92.	122.06	2.3093E-08
NI-65	11.	1481.84	HALF LIFE TOO SHORT
CU-64	14.	1345.90	9.1015E-05
ZN-65	37.	1115.52	9.4583E-08
ZN-69M	43.	438.63	2.6463E-07
AS-76	44.	559.10	2.1977E-07
SE-75	73.	264.65	4.0588E-08
BR-82	56.	554.32	1.1392E-07
BR-84	48.	881.50	HALF LIFE TOO SHORT
KR-85	83.	513.99	8.5801E-06
KR-85M	102.	151.18	HALF LIFE TOO SHORT
KR-87	57.	402.58	HALF LIFE TOO SHORT
KR-88	39.	196.32	HALF LIFE TOO SHORT
RB-88	12.	1836.01	HALF LIFE TOO SHORT
RB-89	39.	1031.88	HALF LIFE TOO SHORT
SR-85	83.	513.99	3.7937E-08
SR-85M	83.	231.69	HALF LIFE TOO SHORT
SR-91	26.	1024.30	3.5406E-06
SR-92	22.	1383.94	HALF LIFE TOO SHORT
Y-88	12.	1836.01	4.0576E-08
Y-91	24.	1204.90	1.3937E-05
Y-91MD	62.	555.57	1.0878E-06
Y-92	39.	934.46	HALF LIFE TOO SHORT
Y-93	81.	266.90	9.2111E-06
ZR-95	35.	756.72	6.1128E-08
ZR-97	36.	743.36	2.4326E-07
NB-94	30.	702.63	2.8314E-08
NB-95	50.	765.79	4.1696E-08
NB-97D	24.	1024.50	2.2875E-05
MO-90	86.	257.34	HALF LIFE TOO SHORT
MO-99	26.	739.58	3.5615E-07
TC-99MD	108.	140.51	3.8950E-08
RU-103	49.	497.08	3.2178E-08
RU-105	34.	724.50	HALF LIFE TOO SHORT
RU-106	50.	621.84	3.3595E-07
AG-110M	41.	657.75	3.3008E-08
CD-109	76.	88.03	6.5519E-07
SN-113	70.	391.39	4.3350E-08
SB-122	42.	563.93	6.5691E-08
SB-124	109.	602.71	4.9544E-08

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

PAGE 2

NUCLIDE	BKG	ENERGY	MINIMUM UCI /GM
SB-125	88.	427.89	1.1321E-07
TE-123M	79.	158.99	2.2269E-08
TE-132	72.	228.16	3.6189E-08
I-132	36.	667.69	HALF LIFE TOO SHORT
I-133	37.	529.87	1.3927E-07
I-134	43.	847.03	HALF LIFE TOO SHORT
I-135	12.	1260.41	1.4421E-05
XE-131M	113.	163.93	1.2590E-06
XE-133	60.	80.99	8.9260E-08
XE-133M	80.	233.22	4.0799E-07
XE-135	71.	249.79	8.9599E-07
XE-135M	41.	526.56	HALF LIFE TOO SHORT
XE-138	66.	258.31	HALF LIFE TOO SHORT
CS-134	141.	604.70	5.5471E-08
CS-134M	116.	127.42	HALF LIFE TOO SHORT
CS-136	33.	818.50	3.8710E-08
CS-138	11.	1435.86	HALF LIFE TOO SHORT
BA-133	74.	356.00	4.5337E-08
BA-139	88.	165.85	HALF LIFE TOO SHORT
BA-140	39.	537.32	1.1613E-07
BA-141	90.	190.22	HALF LIFE TOO SHORT
LA-140	14.	1596.49	9.1487E-08
CE-139	88.	165.85	2.4389E-08
CE-141	78.	145.44	4.0565E-08
CE-143	67.	293.26	1.5418E-07
CE-144	114.	133.54	2.0995E-07
ND-147	73.	91.11	9.0916E-08
EU-152	57.	344.27	8.8826E-08
EU-154	17.	1274.45	1.0214E-07
HF-181	60.	482.03	3.7349E-08
W-187	48.	479.53	4.4638E-07
HG-203	69.	279.19	3.2009E-08
RA-226	78.	609.31	8.7263E-08
TH-232	32.	2614.66	0.0000E+00
U-238	108.	131.20	1.0686E-07
NP-239	104.	106.13	1.7391E-07
AM-241	70.	59.54	2.0476E-07

 ***** 23-FEB-94 08:43:48 *****

CST SAMPLE SPLIT WITH FERMI2 AND STATE OF MICHIGAN

SPECTRAL FILE NAME: L940401.FEV
 SAMPLE DATE: 21-FEB-94 09:27:00
 SAMPLE IDENTIFICATION: 94-040
 TYPE OF SAMPLE: LIQUID
 SAMPLE QUANTITY: 500.7500 UNITS: GM
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 23-FEB-94 08:04:51 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 2000. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 2000. SEC * SHAPE PARAMETER : 5.0 %
 ELAPSED LIVE TIME: 2000. SEC * NBR ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHNL: .4697016 * HALF LIFE RATIO: 8.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	185.78	34.	111.	1.19	310.74	306	9	1.70E-02	56.5	
2	0	238.17	18.	112.	.76	422.29	420	10	8.89E-03	****	
3	0	319.96	44.	83.	1.02	596.41	593	9	2.21E-02	41.4	
4	0	364.85	64.	75.	1.95	692.00	686	12	3.18E-02	32.5	
5	0	661.53	77.	63.	1.00	1323.62	1318	12	3.84E-02	23.3	
6	0	795.82	87.	39.	1.32	1609.52	1604	12	4.36E-02	19.1	
7	0	810.32	66.	39.	1.30	1640.39	1634	14	3.31E-02	22.1	
8	0	1091.86	14.	5.	1.20	2239.81	2236	7	6.93E-03	42.2	
9	0	1172.96	291.	23.	1.65	2412.46	2402	18	1.45E-01	7.2	
10	0	1332.44	284.	16.	1.96	2751.99	2743	16	1.42E-01	6.6	
11	0	1460.63	118.	0.	1.79	3024.92	3015	18	5.90E-02	10.7	
12	0	1764.20	35.	7.	.70	3671.21	3664	13	1.73E-02	21.0	

PEAK SEARCH COMPLETED (REV 15.8 - ND PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND

* AFTER ENERGY INDICATES CORRECTED PEAK

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	185.78	34.	111.	1.19	310.74	306	9	1.70E-02	56.5	
		238.17 KEV PEAK DELETED									
3	0	319.96	44.	83.	1.02	596.41	593	9	2.21E-02	41.4	
4	0	364.85	64.	75.	1.95	692.00	686	12	3.18E-02	32.5	
5	0	661.53	77.	63.	1.00	1323.62	1318	12	3.84E-02	23.3	
6	0	795.82	87.	39.	1.32	1609.52	1604	12	4.36E-02	19.1	

7	0	810.32	66.	39.	1.30	1640.39	1634	14	3.32E-02	42.1
8	0	1091.86	14.	5.	1.20	2239.81	2236	7	6.93E-03	42.2
9	0	1172.96	291.	23.	1.65	2412.46	2402	18	1.45E-01	7.2
10	0	1332.44*	273.	16.	1.96	2751.99	2743	16	1.36E-01	7.4
11	0	1460.63*	22.	0.	1.79	3024.92	3015	18	1.10E-02	88.0

1764.20 KEV PEAK DELETED

UNIDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
6	0	795.82	87.	39.	1.32	1609.52	1604	12	4.36E-02	19.1	2.13E+00
8	0	1091.86	14.	5.	1.20	2239.81	2236	7	6.93E-03	42.2	1.69E+00

LINES NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI	/GM	ABNDIFF	FAILED
1	RA-226	186.21	1600.00Y	1.000E	0	4.803E -7	2.11%	AEN
4	NI-65	366.27	2.52H	4.010E	5	3.971E -1	10.74%	DCY,ABN
6	CS-134	795.85	753.10D	1.002E	0	1.299E -7	39.62%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(ND PC VERSION DEC 88)

PAGE 2

TOTAL LINES IN SPECTRUM	10	
UNIDENTIFIED PEAKS	2	
IDENTIFIED IN SUMMARY REPORT	8	80.00%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GM	1-SIGMA ERROR	%ERR
CR-51	AP	27.70D	1.050	3.084E -7	1.278E -7	41.42
CO-58	AP	70.80D	1.019	8.736E -8	1.934E -8	22.14
CO-60	AP	1925.00D	1.001	5.060E -7	3.727E -8	7.37

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GM	1-SIGMA ERROR	%ERR
I-131	HFP	8.04D	1.184	6.654E -8	2.163E -8	32.50

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GM	1-SIGMA ERROR	%ERR
RH-105	FP	35.36H	2.508	3.772E -7	1.562E -7	41.42
CS-137	FP	30.17Y	1.000	9.998E -8	2.328E -8	23.29

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GM	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	1.000	4.083E -7	3.591E -7	87.95
U-235	NP	7.04E+08Y	1.000	2.917E -8	1.648E -8	56.51

MINIMUM DETECTABLE ACTIVITY REPORT (ND PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

NUCLIDE	BKG	ENERGY	MINIMUM UCI /GM
BE-7	54.	477.59	2.7784E-07
ANIL-511	155.	511.00	HALF LIFE TOO SHORT
NA-22	17.	1274.54	3.6322E-08
NA-24	22.	1368.53	3.8219E-07
CL-38	4.	2167.51	0.0000E+00
AR-41	12.	1293.64	HALF LIFE TOO SHORT
SC-46	52.	1120.51	5.7704E-08
MN-54	51.	834.83	4.4395E-08
MN-56	45.	846.75	HALF LIFE TOO SHORT
FE-59	26.	1099.22	7.2231E-08
CO-57	92.	122.06	2.3093E-08
NI-65	11.	1481.84	HALF LIFE TOO SHORT
CU-64	14.	1345.90	9.1015E-05
ZN-65	37.	1115.52	9.4583E-08
ZN-69M	43.	438.63	2.6463E-07
AS-76	44.	559.10	2.1977E-07
SE-75	73.	264.65	4.0588E-08
BR-82	56.	554.32	1.1392E-07
BR-84	48.	881.50	HALF LIFE TOO SHORT
KR-85	83.	513.99	8.5801E-06
KR-85M	102.	151.18	HALF LIFE TOO SHORT
KR-87	57.	402.58	HALF LIFE TOO SHORT
KR-88	89.	196.32	HALF LIFE TOO SHORT
RB-88	12.	1836.01	HALF LIFE TOO SHORT
RB-89	39.	1031.88	HALF LIFE TOO SHORT
SR-85	83.	513.99	3.7937E-08
SR-85M	83.	231.69	HALF LIFE TOO SHORT
SR-91	26.	1024.30	3.5406E-06
SR-92	22.	1383.94	HALF LIFE TOO SHORT
Y-88	12.	1836.01	4.0576E-08
Y-91	24.	1204.90	1.3937E-05
Y-91MD	62.	555.57	1.0878E-06
Y-92	39.	934.46	HALF LIFE TOO SHORT
Y-93	81.	266.90	9.2111E-06
ZR-95	35.	756.72	6.1128E-08
ZR-97	36.	743.36	2.4326E-07
NB-94	30.	702.63	2.8314E-08
NB-95	50.	765.79	4.1696E-08
NB-97D	24.	1024.50	2.2875E-05
MO-90	86.	257.34	HALF LIFE TOO SHORT
MO-99	26.	739.58	3.5615E-07
TC-99MD	108.	140.51	3.8950E-08
RU-103	49.	497.08	3.2178E-08
RU-105	34.	724.50	HALF LIFE TOO SHORT
RU-106	50.	621.84	3.3595E-07
AG-110M	41.	657.75	3.3008E-08
CD-109	76.	88.03	6.5519E-07
SN-113	70.	391.69	4.3350E-08
SB-122	42.	563.93	6.5691E-08
SB-124	109.	602.71	4.9544E-08

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

NUCLIDE	BKG	ENERGY	MINIMUM UCI /GM
SB-125	88.	427.89	1.1321E-07
TE-123M	79.	158.99	2.2269E-08
TE-132	72.	228.16	3.6189E-08
I-132	36.	667.69	HALF LIFE TOO SHORT
I-133	37.	529.87	1.3927E-07
I-134	43.	847.03	HALF LIFE TOO SHORT
I-135	12.	1260.41	1.4421E-05
XE-131M	113.	163.93	1.2590E-06
XE-133	60.	80.99	8.9260E-08
XE-133M	80.	233.22	4.0799E-07
XE-135	71.	249.79	8.9599E-07
XE-135M	41.	526.56	HALF LIFE TOO SHORT
XE-138	66.	258.31	HALF LIFE TOO SHORT
CS-134	141.	604.70	5.5471E-08
CS-134M	116.	127.42	HALF LIFE TOO SHORT
CS-136	33.	818.50	3.8710E-08
CS-138	11.	1435.86	HALF LIFE TOO SHORT
BA-133	74.	356.00	4.5337E-08
BA-139	88.	165.85	HALF LIFE TOO SHORT
BA-140	39.	537.32	1.1613E-07
BA-141	90.	190.22	HALF LIFE TOO SHORT
LA-140	14.	1596.49	9.1487E-08
CE-139	88.	165.85	2.4389E-08
CE-141	78.	145.44	4.0565E-08
CE-143	67.	293.26	1.5418E-07
CE-144	114.	133.54	2.0995E-07
ND-147	73.	91.11	9.0916E-08
EU-152	57.	344.27	8.8826E-08
EU-154	17.	1274.45	1.0214E-07
HF-181	60.	482.03	3.7349E-08
W-187	48.	479.53	4.4638E-07
HG-203	69.	279.19	3.2009E-08
RA-226	78.	609.31	8.7263E-08
TH-232	32.	2614.66	0.0000E+00
U-238	108.	131.20	1.0686E-07
NP-239	104.	106.13	1.7391E-07
AM-241	70.	59.54	2.0476E-07

23-FEB-94 08:47:32

CST SAMPLE SPLIT WITH FERMI2 AND STATE OF MICHIGAN

SPECTRAL FILE NAME: L940401.FEV

SAMPLE DATE: 21-FEB-94 09:27:00

SAMPLE IDENTIFICATION: 94-040

TYPE OF SAMPLE: LIQUID

SAMPLE QUANTITY: 500.7500 UNITS: GM

SAMPLE GEOMETRY: LMAR500

EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 23-FEB-94 08:04:51 * FWHM(1332) 1.836
 PRESET TIME(LIVE): 2000. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 2000. SEC * SHAPE PARAMETER: 5.0 %
 ELAPSED LIVE TIME: 2000. SEC * NBR ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHNL: 14697016 * HALF LIFE RATIO: 8.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	185.78	34.	111.	1.19	310.74	306	9	1.70E-02	56.5	
2	0	238.17 <i>As-212</i>	18.	112.	.76	422.29	420	10	8.89E-03	****	
3	0	319.96 <i>Cr-51</i>	44.	83.	1.02	596.41	593	9	2.21E-02	41.4	
4	0	364.85 <i>E-131</i>	64.	75.	1.95	692.00	686	12	3.18E-02	32.5	
5	0	661.53 <i>Cs-137</i>	77.	63.	1.00	1323.62	1318	12	3.34E-02	23.3	
6	0	795.82 <i>Es-137</i>	87.	39.	1.32	1609.52	1604	12	4.36E-02	19.1	
7	0	810.32 <i>Co-57</i>	66.	39.	1.30	1640.39	1634	14	3.31E-02	22.1	
8	0	1091.86	14.	5.	1.20	2239.81	2236	7	6.93E-03	42.2	
9	0	1172.96 <i>Co-60</i>	201.	23.	1.65	2412.46	2405	18	1.45E-01	7.2	
10	0	1332.44 <i>Co-60</i>	284.	16.	1.96	2751.99	2743	16	1.42E-01	6.6	
11	0	1460.63 <i>K-40</i>	118.	0.	1.79	3024.92	3015	18	5.90E-02	10.7	
12	0	1764.20 <i>Ra-226</i>	35.	7.	.70	3671.21	3664	13	1.73E-02	21.0	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 2000. CORRECTED LIVE TIME: 2000.

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR
1	0	185.78	34.	111.	1.19	310.74	306	9	1.70E-02	56.5
2	0	238.17	18.	112.	.76	422.29	420	10	8.89E-03	****
3	0	319.96	44.	83.	1.02	596.41	593	9	2.21E-02	41.4
4	0	364.85	64.	75.	1.95	692.00	686	12	3.18E-02	32.5
5	0	661.53	77.	63.	1.00	1323.62	1318	12	3.34E-02	23.3
6	0	795.82	87.	39.	1.32	1609.52	1604	12	4.36E-02	19.1
7	0	810.32	66.	39.	1.30	1640.39	1634	14	3.31E-02	22.1
8	0	1091.86	14.	5.	1.20	2239.81	2236	7	6.93E-03	42.2

7	0	1172.70	271.	23.	1.05	2412.40	2402	18	1.40E-01	7.2
10	0	1332.44	284.	16.	1.96	2751.99	2743	16	1.42E-01	6.6
11	0	1460.63	118.	0.	1.79	3024.92	3015	18	5.90E-02	10.7
12	0	1764.20	35.	7.	.70	3671.21	3664	13	1.73E-02	21.0

PILE-UP CORRECTION COMPLETED

ELAPSED LIVE TIME: 2000. (PILE-UP CORRECTED)

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
CR-51	AP	320.03	44.	83.	9.83*	4.127E+00	3.084E -7	1.278E -7
CO-58	AP	810.76	66.	39.	99.40*	2.099E+00	8.736E -8	1.934E -8
CO-60	AP	1173.22	291.	23.	100.00	1.600E+00	4.909E -7	3.522E -8
		1332.49	284.	16.	100.00*	1.457E+00	5.271E -7	3.458E -8
NI-65	AP	366.27	64.	75.	4.61	3.758E+00	3.971E -1	1.291E -1
		1115.52	0.	0.	14.80	0.000E+00	.000E 0	.000E 0
		1481.84	0.	0.	23.50*	0.000E+00	.000E 0	.000E 0

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
I-131	HFP	284.30	0.	0.	6.05	0.000E+00	.000E 0	.000E 0
		364.48	64.	75.	81.20*	3.758E+00	6.654E -8	2.163E -8
		636.97	0.	0.	7.26	0.000E+00	.000E 0	.000E 0
		722.89	0.	0.	1.80	0.000E+00	.000E 0	.000E 0

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
RH-105	FP	306.10	0.	0.	5.13	0.000E+00	.000E 0	.000E 0
		318.90	44.	83.	19.20*	4.127E+00	3.772E -7	1.562E -7
CS-134	FP	563.23	0.	0.	8.38	0.000E+00	.000E 0	.000E 0
		569.32	0.	0.	15.43	0.000E+00	.000E 0	.000E 0
		604.70	0.	0.	97.60*	0.000E+00	.000E 0	.000E 0
		795.85	87.	39.	85.40	2.127E+00	1.299E -7	2.486E -8
		801.93	0.	0.	8.73	0.000E+00	.000E 0	.000E 0
CS-137	FP	661.65	77.	63.	85.12*	2.436E+00	5.998E -8	2.321E -8

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
K-40	NP	1460.81	118.	0.	10.67*	1.362E+00	2.191E -6	2.530E -6
RA-226	NP	186.21	34.	111.	3.28	5.814E+00	4.803E -7	2.714E -7
		241.98	0.	0.	7.49	0.000E+00	.000E 0	.000E 0
		295.21	0.	0.	19.20	0.000E+00	.000E 0	.000E 0
		351.72	0.	0.	37.20	0.000E+00	.000E 0	.000E 0
		609.31	0.	0.	46.30*	0.000E+00	.000E 0	.000E 0
		1120.29	0.	0.	15.10	0.000E+00	.000E 0	.000E 0
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	35.	7.	15.80	1.186E+00	4.972E -7	1.044E -7
		2204.22	0.	0.	4.98	0.000E+00	.000E 0	.000E 0
TH-232	NP	238.63	18.	112.	44.60	5.045E+00	2.133E -8	2.576E -8
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0	.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	0.	0.	35.86*	0.000E+00	.000E 0	.000E 0

ELAPSED LIVE TIME: 2000. (PILE-UP CORRECTED)

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
U-235	NP	143.76	0.	0.	10.50	0.000E+00	.000E 0	.000E 0
		185.72	34.	111.	54.00*	5.814E+00	2.917E -8	1.648E -8

ELAPSED LIVE TIME 2000. (PILE-UP CORRECTED)

UNIDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
2	0	238.17	18.	112.	.76	422.29	420	10	8.89E-03	****	5.05E+00
6	0	795.82	87.	39.	1.32	1609.52	1604	12	4.36E-02	19.1	2.13E+00
8	0	1091.86	14.	5.	1.20	2239.81	2236	7	6.93E-03	42.2	1.69E+00
12	0	1764.20	35.	7.	.70	3671.21	3664	13	1.73E-02	21.0	1.19E+00

LINES NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /GM	ABNDIFF	FAILED
1	RA-226	186.21	1600.00Y	1.000E 0	4.803E -7	12.29%	ABN
2	TH-232	238.63	1.00E+10Y	1.000E 0	2.133E -8	25.03%	ABN
4	NI-65	366.27	2.52H	4.010E 5	3.971E -1	10.74%	DCY, ABN
6	CS-134	795.85	753.10D	1.002E 0	1.299E -7	39.62%	ABN
12	RA-226	1764.49	1600.00Y	1.000E 0	4.972E -7	12.29%	ABN

TOTAL LINES IN SPECTRUM 12
 UNIDENTIFIED PEAKS 4
 IDENTIFIED IN SUMMARY REPORT 8 66.67%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UC1 /GM	1-SIGMA ERROR	%ERR
CR-51	AP	27.70D	1.050	3.084E -7	1.278E -7	41.42
CO-58	AP	70.80D	1.019	8.736E -8	1.934E -8	22.14
CO-60	AP	1925.00D	1.001	5.271E -7	3.458E -8	6.56

HALOGEN FISSION PRODUCT

NUCLIDE	SEHR	HLIFE	DECAY	UC1 /GM	1-SIGMA ERROR	%ERR
I-131	HFP	8.04D	1.184	6.654E -8	2.163E -8	32.50

FISSION PRODUCT

NUCLIDE	SEHR	HLIFE	DECAY	UC1 /GM	1-SIGMA ERROR	%ERR
RH-105	FP	35.36H	2.508	3.772E -7	1.562E -7	41.42
CS-137	FP	30.17Y	1.000	9.998E -8	2.328E -8	23.29

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UC1 /GM	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	1.000	2.191E -6	2.338E -7	10.67
U-235	NP	7.04E+08Y	1.000	2.917E -8	1.648E -8	56.51

 23-FEB-94 09:16:50 *****

CST SAMPLE SPLIT WITH FERMI2 AND STATE OF MICHIGAN

SPECTRAL FILE NAME: L940402.FEV
 SAMPLE DATE: 21-FEB-94 09:27:00
 SAMPLE IDENTIFICATION: 94-040
 TYPE OF SAMPLE: LIQUID
 SAMPLE QUANTITY: 500.7500 UNITS: GR
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 23-FEB-94 08:04:51 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3601. SEC * SHAPE PARAMETER 5.0 %
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10.

DETECTOR: ORTEC * L3000-MASTER.LIB
 CALIB DATE: 23-FEB-94 07:16:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHNL: 1.69731 * HALF LIFE RATIO: 8.00
 OFFSET: 57.632400 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	238.62 Pb-212	68.	112.	.68	423.25	421	7	1.39E-02	29.9	
2	0	319.95 Cr-51	95.	127.	1.03	596.39	594	8	2.65E-02	23.3	
3	0	364.26 I-131	133.	118.	1.76	690.74	684	13	3.68E-02	20.9	
4	0	427.64 Sn-115	60.	81.	1.56	825.66	822	8	1.66E-02	31.3	
5	0	510.98 Au-198	228.	115.	2.93	1003.10	996	15	6.32E-02	13.8	
6	0	604.27 Cs-137	172.	136.	1.31	1201.71	1196	12	4.78E-02	16.4	
7	0	661.73 Cs-137	184.	75.	1.50	1324.05	1319	13	5.10E-02	13.3	
8	0	793.75 Cs-137	189.	61.	1.46	1609.38	1600	16	5.25E-02	12.3	
9	0	810.45 Ce-140	92.	91.	1.60	1640.67	1634	13	2.55E-02	24.6	
10	0	880.24 W-238	32.	27.	1.61	1789.25	1787	7	8.98E-03	34.4	
11	0	1173.01 Ce-140	478.	63.	1.61	2412.36	2403	18	1.33E-01	6.1	
12	0	1332.32 Ce-140	478.	9.	2.02	2751.73	2741	18	1.33E-01	5.0	
13	0	1460.36 U-238	194.	12.	1.65	3025.41	3017	16	5.38E-02	8.7	
14	0	1764.07 U-238	69.	10.	1.10	3670.93	3663	14	1.92E-02	13.9	
15	0	2203.86 U-238	38.	4.	1.36	4607.26	4599	16	1.06E-02	20.0	
16	0	2614.07 Th-232	48.	3.	3.48	5480.60	5474	16	1.33E-02	19.1	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR
1	0	238.62	68.	112.	.68	423.25	421	7	1.89E-02	29.9
2	0	319.95	95.	127.	1.03	596.39	594	8	2.65E-02	23.3
3	0	364.26	133.	118.	1.76	690.74	684	13	3.68E-02	20.9
4	0	427.64	60.	81.	1.56	825.66	822	8	1.66E-02	31.3

5	0	510.70	120.	113.	1.70	1000.10	1170	10	0.32E-02	10.0
6	0	604.27	172.	136.	1.31	1201.71	1196	12	4.78E-02	16.4
7	0	661.73	184.	75.	1.50	1324.05	1319	13	5.10E-02	13.3
8	0	795.75	189.	61.	1.46	1609.38	1600	16	5.25E-02	12.3
9	0	810.45	92.	91.	1.60	1640.67	1634	13	2.55E-02	24.6
10	0	880.24	32.	27.	1.61	1789.25	1787	7	8.98E-03	34.4
11	0	1173.01	478.	63.	1.61	2412.56	2403	18	1.33E-01	6.1
12	0	1332.32	478.	9.	2.02	2751.73	2741	18	1.33E-01	5.0
13	0	1460.86	194.	12.	1.65	3025.41	3017	16	5.38E-02	8.7
14	0	1764.07	69.	10.	1.10	3670.93	3663	14	1.92E-02	13.9
15	0	2203.86	38.	4.	1.36	4607.26	4599	16	1.06E-02	20.0
16	0	2614.07	48.	3.	3.48	5480.60	5474	16	1.33E-02	19.1

PILE-UP CORRECTION COMPLETED

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
ANIL-511	AP	511.00	228.	113.	96.73*	2.943E+00	6.855E 0	9.478E -1
CR-51	AP	320.08	95.	127.	9.83*	4.127E+00	3.704E -7	8.627E -8
CO-58	AP	810.76	92.	91.	99.40*	2.099E+00	6.735E -8	1.655E -8
CO-60	AP	1173.22	478.	63.	100.00	1.600E+00	4.482E -7	2.725E -8
		1332.49	478.	9.	100.00*	1.457E+00	4.922E -7	2.454E -8

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
BR-84	HFP	802.20	0.	0.	6.10	0.000E+00	.000E 0	.000E 0
		881.50	32.	27.	42.00*	1.975E+00	3.201E 19	1.100E 19
		1015.90	0.	0.	6.20	0.000E+00	.000E 0	.000E 0
		1897.30	0.	0.	14.90	0.000E+00	.000E 0	.000E 0
		2484.10	0.	0.	6.30	0.000E+00	.000E 0	.000E 0
I-131	HFP	284.30	0.	0.	6.05	0.000E+00	.000E 0	.000E 0
		364.48	133	113.	81.20*	3.763E+00	7.705E -8	1.611E -8
		636.97	0.	0.	1.20	0.000E+00	.000E 0	.000E 0
		722.89	0.	0.	1.30	0.000E+00	.000E 0	.000E 0

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
RH-105	FP	306.10	0.	0.	5.13	0.000E+00	.000E 0	.000E 0
		318.90	95.	127.	19.20*	4.127E+00	4.548E -7	1.059E -7
SB-125	FP	176.33	0.	0.	6.89	0.000E+00	.000E 0	.000E 0
		427.89	60.	81.	29.33*	3.351E+00	9.127E -8	2.854E -8
		463.38	0.	0.	10.55	0.000E+00	.000E 0	.000E 0
		600.56	0.	0.	17.00	0.000E+00	.000E 0	.000E 0
		635.90	0.	0.	11.32	0.000E+00	.000E 0	.000E 0
CS-134	FP	563.23	0.	0.	7.30	0.000E+00	.000E 0	.000E 0
		569.32	0.	0.	15.43	0.000E+00	.000E 0	.000E 0
		604.70	172.	136.	97.60*	2.603E+00	1.018E -7	1.666E -8
		795.85	189.	61.	35.40	2.127E+00	1.561E -7	1.918E -8
		801.93	0.	0.	5.73	0.000E+00	.000E 0	.000E 0
CS-137	FP	661.65	184.	75.	65.12*	2.433E+00	1.329E -7	1.767E -8

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
K-40	NP	1460.81	194.	12.	10.67*	1.362E+00	2.000E -6	1.745E -7

ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGD	%ABN	%EFF	UCI / GM	1-SIGMA ERROR
RA-226	NP	186.21	0.	0.	3.28	0.000E+00	.000E 0	.000E 0
		241.98	0.	0.	7.49	0.000E+00	.000E 0	.000E 0
		295.21	0.	0.	19.20	0.000E+00	.000E 0	.000E 0
		351.92	0.	0.	37.20	0.000E+00	.000E 0	.000E 0
		609.31	0.	0.	46.30*	0.000E+00	.000E 0	.000E 0
		1120.29	0.	0.	15.10	0.000E+00	.000E 0	.000E 0
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	69.	10.	15.80	1.106E+00	5.517E -7	7.648E -8
		2204.22	38.	4.	4.98	1.007E+00	1.130E -6	2.277E -7
TH-232	NP	238.63	68.	112.	44.60	5.039E+00	4.536E -8	1.355E -8
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0	.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	48.	3.	35.86*	8.883E-01	2.250E -7	4.265E -8
U-238	NP	131.20	0.	0.	20.40*	0.000E+00	.000E 0	.000E 0
		152.70	0.	0.	6.80	0.000E+00	.000E 0	.000E 0
		569.50	0.	0.	11.00	0.000E+00	.000E 0	.000E 0
		880.51	32.	27.	12.24	1.975E+00	2.004E -7	6.885E -8
		883.24	0.	0.	12.00	0.000E+00	.000E 0	.000E 0
		926.00	0.	0.	11.20	0.000E+00	.000E 0	.000E 0
		946.00	0.	0.	12.00	0.000E+00	.000E 0	.000E 0

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

UNIDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1	0	238.62	68.	112.	.68	423.25	421	7	1.89E-02	29.9	5.04E+00
4	0	427.64	60.	81.	1.56	825.66	822	8	1.66E-02	31.3	3.35E+00
5	0	510.98	228.	115.	2.98	1003.10	996	15	6.32E-02	13.8	2.94E+00
10	0	880.24	32.	27.	1.61	1789.25	1787	7	8.98E-03	34.4	1.78E+00
14	0	1764.07	69.	10.	1.10	3670.93	3663	14	1.92E-02	13.9	1.19E+00
15	0	2203.86	38.	4.	1.36	4607.26	4599	16	1.06E-02	20.0	1.01E+00
16	0	2614.07	48.	3.	3.48	5480.60	5474	16	1.33E-02	19.1	8.88E-01

LINES NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /GM	ABNDIFF	FAILED
1	TH-232	238.63	1.00E+10Y	1.000E 0	4.536E -8	45.15%	ABN
4	SB-125	427.89	2.77Y	1.001E 0	9.127E -8	38.75%	ABN
5	ANIL-511	511.00	109.70M	5.720E 7	6.855E 0	100.00%	DCY
10	BR-84	881.50	31.80M	5.482E 26	3.201E 19	55.26%	DCY, ABN
10	U-235	880.51	1.00E+10Y	1.000E 0	2.004E -7	14.29%	ABN
14	RA-226	1764.49	1600.00Y	1.000E 0	5.517E -7	13.33%	ABN
15	RA-226	2204.29	1600.00Y	1.000E 0	1.138E -6	13.36%	ABN
16	TH-232	2614.66	1.00E+10Y	1.000E 0	2.250E -7	45.15%	ABN

NUCLIDE IDENTIFICATION SYSTEM (NO PC VERSION DEC 88)
SUMMARY OF NUCLIDE ACTIVITY

PAGE 4

TOTAL LINES IN SPECTRUM 16
UNIDENTIFIED PEAKS 7
IDENTIFIED IN SUMMARY REPORT 9 56.25%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GM	1-SIGMA ERROR	%ERR
CR-51	AP	27.70D	1.050	3.704E -7	3.627E -8	23.29
CO-58	AP	70.80D	1.019	6.735E -8	1.655E -8	24.58
CO-60	AP	1925.00D	1.001	4.222E -7	2.454E -8	4.99

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GM	1-SIGMA ERROR	%ERR
I-131	HFP	8.04D	1.184	7.705E -8	1.611E -8	20.91

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GM	1-SIGMA ERROR	%ERR
RH-105	FP	35.36H	2.517	4.548E -7	1.059E -7	23.27
CS-134	FP	753.10D	1.002	1.018E -7	1.666E -8	16.36
CS-137	FP	30.17Y	1.000	1.329E -7	1.767E -8	13.30

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GM	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	1.000	2.000E -6	1.745E -7	8.73

Fermi 2 Water issues

CST_224.WKS

Date of analysis:

FEB 24, 1994

Volume(gal)= 532980
(1)= 2.018E+06

Flow Rates: (gpm)
Dilution= 15500
CST dchg= 400

Isotope	Eff Conc uCi/ml (10CFR20)	Result uCi/ml	Conc./EC	Activity (mCi)
Cr-51	5.000E-04	2.755E-07	5.510E-04	5.558E-01
Mn-54	3.000E-05	0.000E+00	0.000E+00	0.000E+00
Co-58	2.000E-05	6.473E-08	3.237E-03	1.306E-01
Co-60	3.000E-06	4.263E-07	1.421E-01	8.601E-01
I-131	1.000E-06	3.023E-08	3.023E-02	6.099E-02
Cs-134	9.000E-07	1.467E-07	1.630E-01	2.960E-01
Cs-137	1.000E-06	1.680E-07	1.680E-01	3.389E-01
Sr-89	8.000E-06	5.800E-07	7.250E-02	1.170E+00
H-3	1.000E-03	4.800E-04	4.800E-01	9.684E+02
Totals		4.817E-04	1.060E+00	9.718E+02
(w/Dilution)		1.212E-05	2.666E-02	

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*****	*****	*****	*****	*****	*****

C A L C U L A T E S T H E D O S E D U E T O

N U C L E A R P O W E R P L A N T

L I Q U I D

R A D I O A C T I V E E F F L U E N T S

U. S. NUCLEAR REGULATORY COMMISSION

P C D O S E

LIQUID DOSE CALCULATIONS

from

NUCLEAR POWER PLANT EFFLUENTS

Rev. 35 01/31/92

24-Feb-94

FILENAME ????????.WK1
24-Feb

PLANT NAME
I N D I V I D U A L M A X I M U M

Feb-94
04:21 PM

Dilution
ENTER PLANT SPECIFIC DATA

FRESH WATER
Flow Rate = 1.55E+04 g/min
Average Flow During Report Period

Individual Average Consumption(kg/y)

Pathways	Adult	Teen	Child
Water	730	510	510
SportFish	21	16	6.9
SportInvt	5	3.8	1.7

Radioactive Release
WHEN COMPLETED ==> Press ALT E

Flow Rate = 4.00E+02 g/min
Flow Time = 2.30E+01 hr
Report Period = 1.20E+01 mth

Transit Times (hrs)
Drinking Water = 0.01
Fish/Invertebrates = 0.01

Comments:

FILENAME ????????.WK1
24-Feb

PLANT NAME
I N D I V I D U A L M A X I M U M

Feb-94
04:21 PM

ENTER RADIOACTIVITY RELEASED FOR EACH RADIONUCLIDE

Nuclide uCi/ml

WHEN COMPLETED =====> Press ALT J

Cr-51	2.76E-07
Co-58	6.47E-08
Co-60	4.26E-07
I-131	3.02E-08
Cs-134	1.47E-07
Cs-137	1.68E-07
Sr-89	5.80E-07
H-3	4.80E-04

WHEN COMPLETED =====> Press ALT J

ADDITIONAL DILUTION FACTORS

Food Consumption Products:

1. Potable Water Near Field	=====>	Dw	=	7.70E+01
2. Sport Fish	=====>	Dsf	=	5.00E+00
3. Sport Invert	=====>	Dsi	=	5.00E+00
4. Commercial Fish	=====>	Dcf	=	5.00E+00
5. Commercial Invert	=====>	Dci	=	5.00E+00

FILENAME ????????WK1
24-Feb

PLANT NAME
I N D I V I D U A L M A X I M U M

Feb-94
04:21 PM

ADULT TOTAL DOSE RECEIVED PER ORGAN

Nuclide	Bone	Liver	T.Body	Thyroid	Kidney	Lung	GI-L11
Cr-51			1.42E-07	8.46E-08	3.12E-08	1.88E-07	3.56E-05
Co-58		1.37E-06	3.07E-06				2.78E-05
Co-60		2.59E-05	5.72E-05				4.87E-04
I-131	6.60E-07	9.45E-07	5.41E-07	3.10E-04	1.62E-06		2.49E-07
Cs-134	5.82E-03	1.38E-02	1.13E-02		4.48E-03	1.49E-03	2.42E-04
Cs-137	8.54E-03	1.17E-02	7.65E-03		3.96E-03	1.32E-03	2.26E-04
Sr-89	2.85E-03		8.18E-05				4.57E-04
H-3		4.84E-05	4.84E-05	4.84E-05	4.84E-05	4.84E-05	4.84E-05

TOTALS	1.72E-02	2.56E-02	1.92E-02	3.58E-04	8.50E-03	2.85E-03	1.53E-03
	Bone	Liver	T.Body	Thyroid	Kidney	Lung	GI-L11

FILENAME ????????WK1
24-Feb

PLANT NAME
I N D I V I D U A L M A X I M U M

Feb-94
04:21 PM

TEEN TOTAL DOSE RECEIVED PER ORGAN

mrem/ 12.00 mth

Nuclide	Bone	Liver	T.Body	Thyroid	Kidney	Lung	Gi-L11
Cr-51			1.46E-07	8.09E-08	3.19E-08	2.08E-07	2.45E-05
Co-58		1.36E-06	3.13E-06				1.87E-05
Co-60		2.59E-05	5.83E-05				3.37E-04
I-131	7.00E-07	9.80E-07	5.27E-07	2.86E-04	1.69E-06		1.94E-07
Cs-134	5.96E-03	1.40E-02	6.51E-03		4.46E-03	1.70E-03	1.75E-04
Cs-137	9.14E-03	1.22E-02	4.24E-03		4.14E-03	1.61E-03	1.73E-04
Sr-89	3.09E-03		8.85E-05				3.68E-04
H-3		3.51E-05	3.51E-05	3.51E-05	3.51E-05	3.51E-05	3.51E-05

TOTALS	1.82E-02	2.63E-02	1.09E-02	3.21E-04	8.64E-03	3.35E-03	1.13E-03
	Bone	Liver	T.Body	Thyroid	Kidney	Lung	Gi-L11

FILENAME ???????.WK1
24-Feb

PLANT NAME
I N D I V I D U A L M A X I M U M

Feb-94
04:21 PM

CHILD TOTAL DOSE RECEIVED PER ORGAN

Nuclide	Bone	Liver	T.Body	Thyroid	Kidney	Lung	Gi-L11
Cr-51			1.60E-07	8.88E-08	2.43E-08	1.62E-07	8.48E-06
Co-58		1.13E-06	3.47E-06				6.62E-06
Co-60		2.20E-05	6.47E-05				1.22E-04
I-131	1.02E-06	1.03E-06	5.85E-07	3.40E-04	1.69E-06		9.16E-08
Cs-134	7.23E-03	1.19E-02	2.50E-03		3.68E-03	1.32E-03	6.39E-05
Cs-137	1.16E-02	1.11E-02	1.63E-03		3.61E-03	1.30E-03	6.93E-05
Sr-89	4.26E-03		1.22E-04				1.65E-04
H-3		5.40E-05	5.40E-05	5.40E-05	5.40E-05	5.40E-05	5.40E-05

TOTALS	2.31E-02	2.30E-02	4.38E-03	3.94E-04	7.34E-03	2.67E-03	4.89E-04
	Bone	Liver	T.Body	Thyroid	Kidney	Lung	Gi-L11

FILENAME ????????.WK1
24-Feb

PLANT NAME
I N D I V I D U A L M A X I M U M

Feb-94
04:21 PM

TOTAL DOSE SUMMARY REPORT
mrem/1.20E+01 mth

Group	Organ	Total
Adult	Bone	1.72E-02
Adult	Liver	2.56E-02
Adult	Tot Body	1.92E-02
Adult	Thyroid	3.58E-04
Adult	Kidney	8.50E-03
Adult	Lung	2.85E-03
Adult	Gi-Lli	1.53E-03
Teen	Bone	1.82E-02
Teen	Liver	2.63E-02
Teen	Tot Body	1.09E-02
Teen	Thyroid	3.21E-04
Teen	Kidney	8.64E-03
Teen	Lung	3.35E-03
Teen	Gi-Lli	1.13E-03
Child	Bone	2.31E-02
Child	Liver	2.30E-02
Child	Tot Body	4.38E-03
Child	Thyroid	3.94E-04
Child	Kidney	7.34E-03
Child	Lung	2.67E-03
Child	Gi-Lli	4.89E-04

mrem/1.20E+01 mth

ORGAN WITH MAXIMUM DOSE

Group	Organ	Total
Teen	Liver	2.63E-02

Feb-94

24-Feb

INDIVIDUAL MAXIMUM

04:21 PM

6.00E+03	Bioaccumulation		Bioaccumulation		Bioaccumulation		
Half Life---	SALT WATER---		FRESH WATER---		FRESH WATER---		
(hrs)	Fish	Invert	Fish	Invert	Fish	Invert	Nuclide
6.65E+02	4.00E+02	2.00E+03	2.00E+02	2.00E+03	2.00E+02	2.00E+03	Cr-51
1.70E+03	1.00E+02	1.00E+03	5.00E+01	2.00E+02	5.00E+01	2.00E+02	Co-58
4.62E+04	1.00E+02	1.00E+03	5.00E+01	2.00E+02	5.00E+01	2.00E+02	Co-60
1.93E+02	1.00E+01	5.00E+01	1.50E+01	5.00E+00	1.50E+01	5.00E+00	I-131
1.81E+04	4.00E+01	2.50E+01	2.00E+03	1.00E+03	2.00E+03	1.00E+03	Cs-134
2.64E+05	4.00E+01	2.50E+01	2.00E+03	1.00E+03	2.00E+03	1.00E+03	Cs-137
1.21E+03	2.00E+00	2.00E+01	3.00E+01	1.00E+02	3.00E+01	1.00E+02	Sr-89
1.08E+05	9.00E-01	9.30E-01	9.00E-01	9.00E-01	9.00E-01	9.00E-01	H-3

[illegible]

FILENAME ????????.WK1
24-Feb

PLANT NAME
I N D I V I D U A L M A X I M U M

Feb-94
04:21 PM

Teen Dose Factors (mrem/pCi)

Nuclide	Bone	Liver	T.Body	Thyroid	Kidney	Lung	GI-L11
Cr-51			3.60E-09	2.00E-09	7.89E-10	5.14E-09	6.05E-07
Co-58		9.72E-07	2.24E-06				1.34E-05
Co-60		2.81E-06	6.33E-06				3.66E-05
I-131	5.85E-06	8.19E-06	4.40E-06	2.39E-03	1.41E-05		1.62E-06
Cs-134	8.37E-05	1.97E-04	9.14E-05		6.26E-05	2.39E-05	2.45E-06
Cs-137	1.12E-04	1.49E-04	5.19E-05		5.07E-05	1.97E-05	2.12E-06
Sr-89	4.40E-04		1.26E-05				5.24E-05
H-3		1.06E-07	1.06E-07	1.06E-07	1.06E-07	1.06E-07	1.06E-07

 ***** 24-FEB-94 15:03:33 *****

FERMI 2 CST PRE DISCHARGE SAMPLE.

STRAL FILE NAME: L940421.FEV
 FILE DATE: 24-FEB-94 12:52:00
 SAMPLE IDENTIFICATION: L940421.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 584.1000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 24-FEB-94 13:59:12 * FWHM(1732) 1.886
 RECOR TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3601. SEC * SHAPE PARAMETER: 5.0 3
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10.
 *

DETECTOR: ORTEC * LIBRARY: MASTER.LIE
 ANAL DATE: 23-FEB-94 07:25:01 * ENERGY TOLERANCE: 1.500 KEY
 E/G/ENL: .4697716 * HALF LIFE RATIO: 8.00
 OFFSET: 32.8232300 KEY * ABUNDANCE LIMIT: 70.000
 *

ENERGY WINDOW 40.29 TO 2838.03

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	ERR	FIT
1	0	74.66	73.	244.	.72	74.16	70	10	2.02E-02	41.0	
2	0	92.45	70.	210.	.82	112.05	107	10	1.94E-02	41.0	
3	0	288.56	55.	77.	1.29	529.56	527	7	1.53E-02	31.7	
4	0	319.98	87.	177.	1.33	596.45	590	12	2.41E-02	33.5	
5	0	364.68	71.	142.	.96	691.63	687	11	1.99E-02	35.7	
6	0	427.46	123.	150.	1.74	825.28	818	17	3.41E-02	26.1	
7	0	510.92	205.	161.	2.34	1002.98	997	16	5.69E-02	15.6	
8	0	569.56	42.	82.	1.16	1127.83	1124	10	1.16E-02	43.8	
9	0	604.69	290.	149.	1.13	1202.61	1196	14	8.05E-02	11.5	
10	0	661.67	271.	85.	1.47	1323.93	1315	18	7.53E-02	10.0	
11	0	795.95	238.	51.	1.49	1609.31	1602	16	6.60E-02	9.7	
12	0	810.60	105.	77.	1.53	1641.00	1634	14	2.92E-02	20.0	
13	0	1173.43	566.	54.	1.59	2413.45	2404	17	1.57E-01	5.3	
14	0	1332.69	507.	21.	1.95	2752.53	2744	15	1.41E-01	4.8	
15	0	1460.85	236.	18.	1.65	3025.38	3016	17	6.57E-02	8.1	
16	0	1764.87	42.	9.	1.38	3672.64	3666	13	1.18E-02	24.0	
17	0	2615.42	50.	17.	2.56	5483.48	5478	11	1.40E-02	20.3	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PULSE-FILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	ERR
1	0	74.66	73.	244.	.72	74.16	70	10	2.02E-02	41.0
2	0	92.45	70.	210.	.82	112.05	107	10	1.94E-02	41.0
3	0	288.56	55.	77.	1.29	529.56	527	7	1.53E-02	31.7

5	0	364.68	71.	142.	.96	691.63	687	11	1.99E-02	35.7
6	0	427.46	123.	150.	1.74	825.28	818	17	3.41E-02	26.1
7	0	510.92	205.	161.	2.34	1002.98	997	16	5.69E-02	15.6
8	0	569.56	42.	82.	1.16	1127.83	1124	10	1.16E-02	43.8
9	0	604.69	290.	149.	1.13	1202.61	1196	14	8.05E-02	11.5
10	0	661.67	271.	85.	1.47	1323.93	1315	18	7.53E-02	10.0
11	0	795.95	238.	51.	1.49	1609.81	1602	16	6.60E-02	9.7
12	0	810.60	105.	77.	1.56	1641.00	1634	14	2.92E-02	20.0
13	0	1173.43	566.	54.	1.59	2413.45	2404	17	1.57E-01	5.5
14	0	1332.69	507.	21.	1.95	2752.53	2744	15	1.41E-01	4.8
15	0	1460.85	236.	18.	1.65	3025.38	3016	17	6.57E-02	8.1
16	0	1764.37	42.	9.	1.38	3672.64	3666	13	1.18E-02	24.0
17	0	2615.42	50.	17.	2.56	5483.48	5478	11	1.40E-02	20.3

FILE-UP CORRECTION COMPLETED

NUCLIDE IDENTIFICATION SYSTEM (ND PC VERSION DEC 88)
 NUCLIDE LINE ACTIVITY REPORT
 ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

PAGE 1

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
ANIL-511	AP	511.00	205.	161.	96.73*	2.943E+00	1.496E -7	2.337E -8
CR-51	AP	320.08	87.	177.	9.83*	4.127E+00	2.755E -7	9.244E -8
CO-58	AP	810.76	105.	77.	99.40*	2.099E+00	6.473E -8	1.292E -8
CO-60	AP	1173.22	166.	54.	100.00	1.600E+00	4.550E -7	2.494E -8
		1332.49	507.	21.	100.00*	1.457E+00	4.474E -7	2.158E -8

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
131	HFP	234.70	0.	0.	6.05	0.000E+00	0.000E 0	0.000E 0
		364.48	73.	142.	81.20*	3.760E+00	3.023E -8	1.080E -8
		636.97	0.	0.	7.26	0.000E+00	0.000E 0	0.000E 0
		722.89	0.	0.	1.80	0.000E+00	0.000E 0	0.000E 0

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
105	FP	306.10	0.	0.	5.13	0.000E+00	0.000E -8	0.000E 0
		318.90	87.	177.	19.20*	4.127E+00	1.445E -7	4.847E -8
125	FP	176.33	0.	0.	6.89	0.000E+00	0.000E 0	0.000E 0
		427.89	113.	150.	29.33*	3.352E+00	1.606E -7	4.200E -8
		463.38	0.	0.	10.35	0.000E+00	0.000E 0	0.000E 0
		600.56	0.	0.	17.80	0.000E+00	0.000E 0	0.000E 0
		635.90	0.	0.	11.32	0.000E+00	0.000E 0	0.000E 0
134	FP	563.23	0.	0.	8.32	0.000E+00	0.000E 0	0.000E 0
		569.32	42.	82.	13.43	2.713E+00	1.384E -7	2.722E -8
		607.70	136.	149.	97.60*	2.602E+00	1.467E -7	1.689E -8
		795.85	138.	51.	85.40	2.127E+00	1.681E -7	1.620E -8
		861.93	0.	0.	8.73	0.000E+00	0.000E 0	0.000E 0
137	FP	661.65	171.	85.	85.12*	2.436E+00	1.600E -7	1.687E -8
147	FP	91.11	70.	210.	28.00*	4.568E+00	7.055E -8	2.894E -8
		531.02	0.	0.	13.10	0.000E+00	0.000E 0	0.000E 0

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
40	NP	1460.81	236.	18.	10.67*	1.362E+00	2.091E -6	1.684E -7
226	NP	186.21	0.	0.	3.28	0.000E+00	0.000E 0	0.000E 0
		241.98	0.	0.	7.49	0.000E+00	0.000E 0	0.000E 0
		273.21	0.	0.	19.20	0.000E+00	0.000E 0	0.000E 0
		351.92	0.	0.	37.20	0.000E+00	0.000E 0	0.000E 0
		609.31	0.	0.	46.30*	0.000E+00	0.000E 0	0.000E 0
		1120.29	0.	0.	15.10	0.000E+00	0.000E 0	0.000E 0
		1238.11	0.	0.	5.94	0.000E+00	0.000E 0	0.000E 0
		1764.49	42.	9.	15.80	1.185E+00	2.915E -7	6.993E -8
		2204.22	0.	0.	4.95	0.000E+00	0.000E 0	0.000E 0

NUCLIDE IDENTIFICATION SYSTEM (ND PC VERSION DEC 88)
 NUCLIDE LINE ACTIVITY REPORT
 ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

PAGE 2

TURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
TH-232	NP	238.63	0.	0.	44.60	0.000E+00	.000E 0	.000E 0
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0	.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		711.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
U-238	NP	2614.66	0.	17.	35.86*	8.87E-01	2.037E -7	4.133E -8
		131.20	0.	0.	20.40*	0.000E+00	.000E 0	.000E 0
		152.70	0.	0.	6.80	0.000E+00	.000E 0	.000E 0
		669.50	42.	82.	11.00	2.715E+00	1.800E -7	7.885E -8
		880.51	0.	0.	12.24	0.000E+00	.000E 0	.000E 0
		883.24	0.	0.	12.00	0.000E+00	.000E 0	.000E 0
		926.00	0.	0.	11.20	0.000E+00	.000E 0	.000E 0
		946.00	0.	0.	12.00	0.000E+00	.000E 0	.000E 0

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

UNIDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1 0	74.66	73.	244.	.72	74.16	70	10	2.02E-02	41.0	2.93E+00
2 0	92.45	70.	210	.82	112.05	107	10	1.94E-02	41.0	4.57E+00
3 0	288.56	55.	72.	1.29	529.56	527	7	1.53E-02	31.7	4.44E+00
6 0	427.46	123.	150.	1.74	825.28	818	17	3.41E-02	26.1	3.35E+00
16 0	1764.87	42.	9.	1.38	3672.64	3666	13	1.18E-02	24.0	1.19E+00
17 0	2615.42	50.	17.	2.56	5483.48	5478	11	1.40E-02	20.3	8.88E-01

LINES NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /gram	ABNDIFF	FAILED
2	ND-147	91.11	10.98D	1.003E 0	7.055E -8	68.13%	ABN
6	SB-125	427.39	2.77Y	1.000E 0	1.606E -7	38.15%	ABN
8	U-238	569.50	1.00E+10Y	1.000E 0	1.800E -7	12.84%	ABN
16	RA-226	1764.49	1600.00Y	1.000E 0	2.215E -7	10.17%	ABN
17	TH-232	2614.66	1.00E+10Y	1.000E 0	2.037E -7	20.12%	ABN

TOTAL LINES IN SPECTRUM 17
IDENTIFIED PEAKS 6
IDENTIFIED IN SUMMARY REPORT 11 64.71%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	1.619	1.496E -7	2.337E -8	15.62
CR-51	AP	27.70D	1.001	2.755E -7	9.244E -8	33.55
CO-58	AP	70.80D	1.001	6.473E -8	1.272E -8	19.96
CO-60	AP	1925.00D	1.000	4.474E -7	1.158E -8	4.82

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
I-131	HFP	8.04D	1.005	3.023E -8	1.030E -8	35.72

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
RH-105	FP	35.36H	1.026	1.445E -7	4.847E -8	33.55
IS-134	FP	753.10D	1.000	1.467E -7	1.689E -8	11.51
CS-137	FP	30.17Y	1.000	1.680E -7	1.687E -8	10.04

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	1.000	2.091E -6	1.634E -7	8.05

MINIMUM DETECTABLE ACTIVITY REPORT (ND PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

NUCLIDE	BK	ENERGY	MINIMUM UCI /gram
7	112.	477.59	1.8594E-07
NA-22	35.	1274.54	2.4788E-08
NA-24	33.	1368.53	2.7078E-08
CL-38	8.	2167.51	0.0000E+00
AR-41	24.	1293.64	3.4180E-08
SC-46	61.	1120.51	2.9303E-08
IN-54	95.	834.13	2.8737E-08
IN-56	53.	846.75	3.1133E-08
FE-59	42.	1099.22	4.2452E-08
CO-57	150.	122.06	1.3976E-08
NI-65	7.	1481.84	1.5363E-08
CU-64	24.	1345.90	4.7074E-06
ZN-65	68.	1115.62	6.0742E-08
IN-69M	97.	438.63	1.9004E-08
AS-76	87.	559.10	4.4266E-08
SE-75	123.	264.15	2.4819E-08
BR-82	85.	554.22	2.7292E-08
BF-84	76.	831.50	3.4881E-07
KR-85	144.	513.79	3.3808E-06
KR-85M	167.	151.18	2.1062E-08
KR-87	101.	402.83	6.5961E-08
KR-88	149.	196.32	6.6614E-08
RB-88	16.	1836.01	2.0687E-06
89	55.	1031.88	1.4436E-06
85	144.	513.79	2.3321E-08
SR-85M	158.	231.69	3.9189E-08
SR-91	68.	1024.61	9.7740E-08
SR-92	17.	1383.94	2.8496E-08
Y-88	16.	1836.01	1.2041E-08
Y-91	38.	1204.90	8.1665E-06
Y-91MD	88.	555.57	2.2121E-08
Y-92	81.	934.46	2.7337E-07
Y-93	134.	266.90	2.4645E-07
ZR-95	71.	756.72	4.0621E-08
ZR-97	41.	743.36	1.9035E-08
NB-94	59.	702.63	1.8912E-08
NB-95	74.	765.79	2.3268E-08
NB-97D	69.	1024.50	2.8439E-06
MO-90	131.	257.34	2.2601E-08
MO-99	62.	739.58	1.6225E-07
TC-99MD	180.	140.51	1.4835E-08
RU-103	67.	497.08	1.7331E-08
RU-105	42.	724.50	4.1165E-08
RU-106	84.	621.84	2.0665E-07
AG-110M	65.	657.75	1.9690E-08
CD-109	131.	88.03	4.0853E-07
SN-113	116.	391.69	2.6276E-08
SB-122	84.	563.93	2.7161E-08
SB-124	221.	602.71	3.2872E-08
125	197.	427.89	6.0571E-08

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66. PAGE 2

CLIDE	BKG	ENERGY	MINIMUM UCI /gram
TE-123M	182.	158.99	1.5922E-08
TE-132	142.	228.16	1.6154E-08
I-132	50.	667.69	2.4667E-08
I-133	105.	529.87	2.4431E-08
I-134	55.	847.03	6.4365E-08
I-135	21.	1260.41	7.5976E-08
XE-131M	166.	163.93	6.5023E-07
XE-133	105.	80.99	4.3748E-08
XE-135M	175.	253.22	1.5747E-07
XE-135	129.	249.79	1.7878E-08
XE-135M	65.	526.54	6.3660E-07
XE-138	134.	258.31	2.1352E-06
CE-134M	160.	127.42	1.3159E-07
CE-136	77.	818.50	2.5480E-08
CE-138	21.	1433.56	1.4538E-07
BA-133	121.	356.00	2.7602E-08
BA-139	177.	165.35	1.4631E-07
BA-140	73.	537.32	6.8261E-08
BA-141	154.	130.22	4.8233E-07
BA-140	21.	1596.47	2.4311E-08
CE-139	177.	165.35	1.6317E-08
CE-141	166.	145.34	2.7065E-08
CE-143	93.	293.26	3.3185E-08
CE-144	162.	133.54	1.1865E-07
CE-147	132.	91.11	5.1643E-08
CE-147	99.	344.27	5.5740E-08
EU-144	35.	1274.45	6.9776E-08
HF-191	88.	482.03	2.0884E-08
W-191	102.	477.53	3.2211E-08
IC-203	115.	279.19	1.9133E-08
GA-216	84.	609.31	4.3130E-08
TH-232	73.	2614.66	0.0000E+00
I-235	195.	135.72	2.6024E-08
U-233	151.	131.20	6.0181E-08
NP-239	170.	106.13	6.0522E-08
AM-241	87.	59.54	1.0872E-07

 ***** 24-FEB-94 15:05:43 *****

FORM 2 CST PRE DISCHARGE SAMPLE.

CENTRAL FILE NAME: L940421.FEV
 SAMPLE DATE: 24-FEB-94 12:52:00
 SAMPLE IDENTIFICATION: L940421.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 584.1000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

 *
 ACQUIRE DATE: 24-FEB-94 11:39:12 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 300. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3001. SEC * SHAPE PARAMETER: 5.0 %
 ELAPSED LIVE TIME: 3000. SEC * NBR ITERATIONS: 10.
 *

 *
 DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26.0 * ENERGY TOLERANCE: 500 KEV
 KEV/CHNL: .4697016 * HALF LIFE RATIO: 5.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 10.000
 *

ENERGY WINDOW 40.29 TO 2858.08

PK	IT	ENERGY	AREA	BGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	74.66	73.	244.	.72	74.16	70	10	5.02E-02	41.0	
2	0	92.45	70.	210.	.82	112.05	107	10	1.94E-02	41.0	
3	0	288.56	55.	72.	1.29	529.56	527	7	1.53E-02	31.7	
4	0	319.98	87.	177.	1.33	596.45	590	12	2.41E-02	33.5	
5	0	364.68	71.	142.	.96	691.63	637	11	1.99E-02	35.7	
6	0	427.46	123.	150.	1.74	825.28	818	17	3.41E-02	26.1	
7	0	510.92	205.	161.	2.34	1002.98	997	16	5.69E-02	15.6	
8	0	569.56	42.	82.	1.16	1127.83	1124	10	1.16E-02	43.8	
9	0	604.69	290.	149.	1.13	1202.61	1196	14	8.05E-02	11.5	
10	0	661.67	271.	85.	1.47	1323.93	1315	18	7.83E-02	10.0	
11	0	795.95	233.	51.	1.49	1609.81	1602	16	6.60E-02	9.7	
12	0	810.60	105.	77.	1.56	1641.00	1634	14	2.92E-02	20.0	
13	0	1173.43	566.	54.	1.59	2413.45	2404	17	1.57E-01	5.3	
14	0	1332.69	507.	21.	1.95	2752.53	2744	15	1.41E-01	4.8	
15	0	1460.85	236.	18.	1.65	3025.38	3016	17	5.57E-02	8.1	
16	0	1764.87	42.	9.	1.38	3672.64	3666	13	1.18E-02	24.0	
17	0	2615.42	50.	17.	2.56	5483.48	5478	11	1.40E-02	20.3	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND

* AFTER ENERGY INDICATES CORRECTED PEAK

PK	IT	ENERGY	AREA	BGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	74.66	6.	244.	.72	74.16	70	10	1.58E-03	****	

3	0	288.56	55.	72.	1.29	529.56	527	7	1.53E-02	31.7
4	0	319.98	87.	177.	1.33	596.45	590	12	2.41E-02	33.5
5	0	364.68	71.	142.	.96	691.63	687	11	1.99E-02	35.7
6	0	427.46	123.	150.	1.74	825.28	818	17	3.41E-02	26.1
7	0	510.92*	12.	161.	2.34	1002.98	997	16	3.34E-03	****
8	0	569.56	42.	82.	1.16	1127.83	1124	10	1.16E-02	43.8
9	0	604.69	290.	149.	1.13	1202.61	1196	14	8.05E-02	11.5
10	0	661.67	271.	85.	1.47	1323.93	1315	18	7.53E-02	10.0
11	0	795.95	238.	51.	1.49	1609.81	1602	16	6.60E-02	9.7
12	0	810.60	105.	77.	1.56	1641.00	1634	14	2.92E-02	20.0
13	0	1173.43	566.	54.	1.59	2413.45	2404	17	1.57E-01	5.5
14	0	1332.67*	483.	21.	1.95	2752.53	2744	15	1.34E-01	5.5
15	0	1460.85*	33.	13.	1.63	3025.38	3016	17	9.31E-03	75.1

1764.87 KEV PEAK DELETED

2615.42 KEV PEAK DELETED

UNIDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
0	74.66	6.	244.	.72	74.16	70	10	1.58E-03	****	2.93E+00
2	92.45	70.	210.	.82	112.05	107	10	1.94E-02	41.0	4.57E+00
3	288.56	55.	72.	1.29	529.56	527	7	1.53E-02	31.7	4.44E+00
6	427.46	123.	150.	1.74	825.28	818	17	3.41E-02	26.1	3.35E+00

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /gram	ABNDIFF	FAILED
2	ND-147	91.11	10.98D	1.003E	0	7.055E	ABN
6	SB-123	427.89	2.77Y	1.000E	0	1.600E	ABN
8	G-23	569.50	1.00E+10Y	1.000E	0	1.800E	ADN

TOTAL LINES IN SPECTRUM 15
IDENTIFIED PEAKS 4
IDENTIFIED IN SUMMARY REPORT 11 73.33%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	1.619	8.797E -9	3.328E -8	378.32
CR-51	AP	27.70D	1.001	2.755E -7	9.244E -8	33.55
CO-58	AP	70.80D	1.001	6.473E -8	1.292E -8	19.26
CO-60	AP	1925.00D	1.000	4.263E -7	2.364E -8	7.54

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
I-131	HFP	8.04D	1.005	3.023E -8	1.080E -8	31.72

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
CS-131	FP	35.36H	1.026	1.445E -7	4.347E -8	30.35
CS-134	FP	753.10D	1.000	1.467E -7	1.609E -8	11.51
CS-137	FP	30.17Y	1.000	1.680E -7	1.637E -8	10.04

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	1.000	2.963E -7	1.224E -7	75.07

 ***** 25-FEB-94 01:10:55 *****

19pp

FERMI CST AT 4 HOURS INTO DISCHARGE. FIRST DISCHARGE SAMPLE.

STRAL FILE NAME: L940461.FEV
 SAMPLE DATE: 24-FEB-94 23:27:00
 SAMPLE IDENTIFICATION: L940461.FEV
 TYPE OF SAMPLE: CST DISCHARGE
 SAMPLE QUANTITY: 527.4000 UNITS: gram
 SAMPLE GEOMETRY LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DA 25-FEB-94 00:08:24 * FWHM(1332) 1.880
 PRESET FLUO LIVE 3600 SEC * SENSITIVITY: 1.000
 ELAPSED REAL TIME 3601 SEC * SHAPE PARAMETER 5.00
 ELAPSED CORR TIME 3600 SEC * NBR ITERATIONS 10

DETECTOR UNIT 0 * LIBRARY MASTER LIT
 CALIB DAT 23-FEB-94 07:26:01 * ENERGY TOLERANCE 1500 KEV
 KEV/CHNL 4697016 * HALF LIFE RATIO 3.00
 DR SET 72 232300 KEV * ABUNDANCE LHM 70.000

ENERGY WINDOW 40.29 20 2355.05

PK	ID	CHN	KEY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FL
1	0	320	14	106.	133.	1.03	596.79	592	11	2.95E-02	23.9	
2	0	364	28	46.	102.	1.58	690.76	688	8	1.28E-02	41.5	
3	0	427	31	62.	153.	1.09	826.02	819	13	1.73E-02	43.8	
4	0	511	22	285.	98.	2.51	1003.61	995	20	7.93E-02	11.5	
5	0	569	47	66.	36.	1.98	1127.62	1120	3	1.83E-02	24.1	
6	0	604	54	256.	153.	1.52	1202.29	1196	12	7.11E-02	12.0	
7	0	661	63	268.	72.	1.23	1323.82	1319	10	7.43E-02	3.4	
8	0	735	53	156.	81.	1.72	1608.92	1606	11	4.35E-02	14.9	
9	0	810	37	95.	37.	1.37	1641.57	1637	9	2.64E-02	16.8	
10	0	1173	20	532.	47.	1.63	2411.97	2406	15	1.48E-01	5.3	
11	0	1333	61	308.	27.	2.05	2752.46	2743	18	1.41E-01	5.3	
12	0	1460	99	213.	31.	1.51	3025.68	3020	15	5.92E-02	10.0	
13	0	1764	62	57.	9.	2.06	3672.11	3665	13	1.03E-02	23.7	
14	0	2626	94	40.	12.	2.46	5482.46	5476	16	1.12E-02	22.8	

PEAK SEARCH COMPLETED (REV 15.2 - NO PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600 CORRECTED LIVE TIME: 3600

ID	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR
1	0	320.14	106.	133.	1.03	596.79	592	11	2.95E-02
2	0	364.28	46.	102.	1.58	690.76	688	8	1.28E-02
3	0	427.31	62.	153.	1.09	826.02	819	13	1.73E-02
4	0	511.22	285.	98.	2.51	1003.61	995	20	7.93E-02
5	0	569.47	66.	36.	1.98	1127.62	1124	3	1.83E-02
6	0	604.54	256.	153.	1.52	1202.29	1196	12	7.11E-02

8	0	795.53	156.	81.	1.72	1608.92	1606	11	4.35E-02	14.9
9	0	810.87	95.	37.	1.37	1641.57	1637	9	2.64E-02	16.8
10	0	1173.20	532.	49.	1.63	2412.97	2406	15	1.48E-01	5.3
11	0	1332.61	508.	27.	2.05	2752.36	2743	18	1.41E-01	5.3
12	0	1460.99	213.	31.	1.51	3025.69	3020	15	5.92E-02	10.0
13	0	1764.62	37.	9.	2.06	3672.11	3665	13	1.03E-02	23.7
14	0	2614.94	40.	12.	2.46	5482.46	5474	16	1.12E-02	22.8

PILE-UP CORRECTION COMPLETED

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
ANIL-511	AP	511.00	285.	98.	96.73*	2.942E+00	2.228E -7	2.569E -8
CR-51	AP	320.08	106.	133.	9.83*	4.126E+00	3.726E -7	8.889E -8
CO-54	AP	810.76	95.	37.	99.40*	2.098E+00	6.478E -8	1.087E -8
CO-60	AP	1173.22	532.	47.	100.00	1.600E+00	4.730E -7	2.504E -8
		1332.49	508.	27.	100.00*	1.457E+00	4.760E -7	2.653E -8

HAZARDOUS FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
HA-131	FP	284.30	3.	0.	6.05	0.000E+00	.000E 0	.000E 0
		364.48	46.	102.	81.20*	3.763E+00	2.150E -8	8.927E -9
		636.97	0.	0.	7.26	0.000E+00	.000E 0	.000E 0
		722.89	0.	0.	1.80	0.000E+00	.000E 0	.000E 0

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
HA-105	FP	304.10	0.	0.	3.13	0.000E+00	.000E 0	.000E 0
		318.90	106.	133.	19.20*	4.126E+00	1.950E -7	4.653E -8
CR-125	FP	176.33	0.	0.	6.89	0.000E+00	.000E 0	.000E 0
		477.89	62.	153.	29.33*	3.350E+00	2.012E -8	3.950E -8
		483.38	0.	0.	10.35	0.000E+00	.000E 0	.000E 0
		606.56	0.	0.	17.80	0.000E+00	.000E 0	.000E 0
		635.90	0.	0.	11.32	0.000E+00	.000E 0	.000E 0
HA-131	FP	563.23	0.	0.	8.38	0.000E+00	.000E 0	.000E 0
		567.32	56.	36.	13.43	2.719E+00	2.240E -7	5.408E -8
		604.70	256.	153.	97.60*	2.607E+00	1.435E -7	1.718E -8
		725.85	156.	81.	85.40	2.128E+00	1.228E -7	1.832E -8
		801.93	0.	0.	8.73	0.000E+00	.000E 0	.000E 0
CR-137	FP	661.65	268.	72.	85.12*	2.436E+00	1.838E -7	1.549E -8

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
K-40	NP	1460.81	213.	31.	10.67*	1.362E+00	2.087E -6	7.090E -7
RA-226	NP	186.21	0.	0.	3.28	0.000E+00	.000E 0	.000E 0
		241.98	0.	0.	7.49	0.000E+00	.000E 0	.000E 0
		295.21	0.	0.	19.20	0.000E+00	.000E 0	.000E 0
		351.92	0.	0.	37.20	0.000E+00	.000E 0	.000E 0
		609.31	0.	0.	46.30*	0.000E+00	.000E 0	.000E 0
		1120.29	0.	0.	15.10	0.000E+00	.000E 0	.000E 0
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	37.	2.	13.80	1.185E+00	2.831E -7	6.679E -8
		2204.22	0.	0.	4.98	0.000E+00	.000E 0	.000E 0

NUCLEAR PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
TH-232	NP	238.63	0.	0.	44.60	0.000E+00	.000E 0	.000E 0
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0	.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	10	12.	35.86*	8.381E-01	1.000E -7	4.097E -8
U-238	NP	131.20	0.	0.	20.40*	0.000E+00	.000E 0	.000E 0
		182.70	0.	0.	6.80	0.000E+00	.000E 0	.000E 0
		569.50	0.	36.	11.00	2.719E+00	2.142E -7	7.586E -8
		880.31	0.	0.	12.24	0.000E+00	.000E 0	.000E 0
		883.24	0.	0.	12.00	0.000E+00	.000E 0	.000E 0
		926.00	0.	0.	11.20	0.000E+00	.000E 0	.000E 0
		946.00	0.	0.	12.00	0.000E+00	.000E 0	.000E 0

IDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
3	0 427.81	62.	153.	1.09	826.02	819	13	1.73E-02	43.8	3.35E+00
13	0 1764.62	37.	9.	2.06	3672.11	3665	13	1.03E-02	23.7	1.19E+00
14	0 2614.94	40.	12.	2.46	5482.46	5474	16	1.12E-02	22.8	8.88E-01

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /gram	ABNDIFF	FAILED
8	Bi-212	427.89	2.77Y	1.000E 0	9.012E -8	38.75%	ABN
9	U-230	569.50	1.00E+10Y	1.000E 0	3.142E -7	12.34%	ABN
11	Bi-226	1764.49	1600.00Y	1.000E 0	2.831E -7	10.17%	ABN
14	Th-232	2614.66	1.00E+10Y	1.000E 0	1.800E -7	20.12%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(NO PG VERSION DEC 88)

PAGE 4

TOTAL LINES IN SPECTRUM 14
IDENTIFIED PEAKS 3
IDENTIFIED IN SUMMARY REPORT 11 78.57%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
AMIL-511	AP	109.70M	1.561	2.228E -7	1.567E -8	11.53
CR-51	AP	27.70D	1.001	3.726E -7	6.889E -8	23.86
CO-58	AP	70.00D	1.000	6.478E -8	1.087E -8	16.78
CO-60	AP	1925.00D	1.000	4.960E -7	2.653E -8	5.35

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
I-131	HFP	8.04D	1.001	2.150E -8	4.727E -9	41.52

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
RH-105	FP	35.36H	1.001	1.950E -7	1.653E -8	23.36
CS-134	FP	753.10D	1.000	1.435E -7	1.718E -8	11.98
CS-137	FP	30.17Y	1.000	1.338E -7	1.549E -8	8.43

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	NP	1.23E+09Y	1.000	2.007E -6	1.090E -7	10.01

MINIMUM DETECTABLE ACTIVITY REPORT (NO PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

IDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	75.	477.59	1.6850E-07
NA-22	26.	1274.54	2.3661E-08
NA-24	45.	1368.33	3.4864E-08
CL-38	8.	2167.51	0.0000E+00
AR-41	27.	1293.64	3.8705E-08
SC-46	73.	1120.51	3.5501E-08
MN-54	95.	834.33	3.1826E-08
MN-56	72.	846.75	3.9157E-08
FE-59	43.	1099.22	4.7569E-08
CO-57	171.	122.6	1.6527E-08
NI-65	18.	1481.64	1.3033E-07
CU-64	29.	1345.90	5.7007E-06
ZN-68	57.	1115.52	6.1590E-08
ZN-69M	102.	438.53	2.1477E-08
AS-76	31.	559.10	4.7184E-08
SE-78	133.	264.65	2.8582E-08
BR-82	79.	554.72	2.9085E-08
BR-84	64.	381.50	3.1241E-07
KR-85	126.	513.99	5.5744E-06
KR-85M	154.	151.18	2.2068E-08
KR-87	98.	402.38	6.8266E-08
KR-88	137.	196.32	6.9093E-08
RR-88	20.	1836.01	2.0437E-06
89	58.	1031.88	1.2655E-06
85	126.	513.99	2.4159E-03
SR-85M	133.	231.69	3.7524E-08
SR-91	51.	1024.50	9.3086E-08
SR-92	30.	1383.94	4.0901E-08
Y-88	20.	1836.01	2.7291E-08
Y-91	42.	1204.90	9.5082E-06
Y-91MD	34.	555.57	2.3768E-08
Y-92	73.	934.46	2.8203E-07
Y-93	117.	266.90	2.5336E-07
ZR-95	77.	756.72	4.6849E-08
ZR-97	54.	743.36	2.4098E-08
NB-94	59.	702.63	2.0945E-08
NB-95	75.	765.79	2.5941E-08
NB-97D	49.	1024.50	2.6437E-06
MO-90	135.	257.34	2.5112E-08
MO-99	67.	739.58	1.8661E-07
TC-99MD	148.	140.51	1.4883E-08
RU-103	87.	497.08	2.1870E-08
RU-105	55.	724.50	5.1390E-08
RU-106	67.	621.34	2.0440E-07
AG-110M	75.	657.75	2.3424E-08
CD-109	132.	88.03	4.5417E-07
SN-113	117.	391.69	2.9225E-08
122	103.	563.93	3.3275E-08
124	244.	602.71	3.8252E-08
125	164.	427.89	8.1417E-08

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66. PAGE 2

MINCLIDE	BKG	ENERGY	MINIMUM UCI /gram
123M	149.	158.99	1.5955E-08
132	147.	228.16	1.8188E-08
I-132	73.	667.69	3.2061E-08
I-133	84.	529.87	2.4123E-08
I-134	71.	847.03	7.5033E-08
I-135	36.	1260.41	1.0906E-07
XE-131M	159.	163.93	7.0463E-07
XE-133	116.	80.97	5.0898E-08
XE-133M	134.	233.22	1.5241E-07
XE-135	151.	249.79	2.1265E-08
XE-135M	74.	526.56	5.7903E-07
XE-138	116.	258.31	1.6554E-06
CS-134M	177.	127.42	1.4978E-07
CS-136	65.	818.50	2.5921E-08
CS-138	30.	1435.86	1.6986E-07
BA-133	113.	356.00	2.9542E-08
BA-139	151.	165.55	1.4508E-07
BA-140	78.	537.31	7.8129E-08
GA-141	134.	190.22	3.9937E-07
LA-140	14.	1596.49	2.1947E-08
CE-139	151.	165.85	1.6691E-08
CE-141	152.	145.44	2.8681E-08
CE-143	115.	293.26	4.0786E-07
CE-144	165.	133.54	1.3262E-07
CE-147	110.	91.11	5.2199E-08
CE-149	91.	344.27	5.9186E-08
CU-144	26.	1274.45	6.6605E-08
HF-131	76.	482.03	2.1493E-08
W-140	71.	479.53	7.5750E-08
AG-135	118.	279.19	2.1463E-08
RA-136	116.	609.31	5.6133E-08
TH-132	52.	2614.66	0.0000E+00
U-235	189.	185.72	2.8375E-08
U-238	157.	131.20	6.7962E-08
NP-239	169.	106.13	6.6752E-08
AM-241	103.	59.54	1.3101E-07

 ***** 25-FEB-94 01:13:40 *****

FERMI CST AT 4 HOURS INTO DISCHARGE. FIRST DISCHARGE SAMPLE.

*Background
Subtracted*

CENTRAL FILE NAME: L940461.FEV
 SAMPLE DATE: 24-FEB-94 23:27:00
 SAMPLE IDENTIFICATION: L940461.FEV
 TYPE OF SAMPLE: CST DISCHARGE
 SAMPLE QUANTITY: 527.4000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: L-MAR500.EFF

ACQUIRE DATE: 25-FEB-94 00:08:24 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 30.0 SEC * SENSITIVITY: 3.000
 ELAPSED REAL TIME: 30.01 SEC * SHAPE PARAMETER 5.0 %
 ELAPSED LIVE TIME: 30.0 SEC * NBR ITERATIONS: 10

DETECTOR: ORTEC * LIBRARY MASTER.LIB
 CALIB DATE: 23-FEB-94 0 26:01 * ENERGY TOL RANGE 1.000 KEV
 CHANNEL: 4697016 * HALF LIFE RATIO 2.00
 OFFSET: 39.8232300 eV * ABUNDANCE LIMIT 10.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	B/GND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	320.14	106.	133.	1.03	596.79	592	11	2.75E-02	23.9	
2	0	364.28	46.	102.	1.58	690.76	686	8	1.28E-02	41.5	
3	0	427.31	62.	153.	1.09	826.02	819	13	1.73E-02	43.8	
4	0	511.22	285.	98.	2.51	1003.61	995	20	7.93E-02	11.5	
5	0	569.47	66.	36.	1.98	1127.62	1124	3	1.83E-02	24.1	
6	0	604.54	256.	153.	1.52	1202.29	1196	12	7.11E-02	12.0	
7	0	661.62	268.	72.	1.23	1323.82	1319	10	7.43E-02	8.4	
8	0	795.53	156.	81.	1.72	1608.92	1606	11	4.35E-02	14.9	
9	0	810.87	95.	37.	1.37	1641.57	1637	9	2.64E-02	16.8	
10	0	1173.20	532.	19.	1.63	2412.97	2406	15	1.48E-01	5.3	
11	0	1332.61	508.	27.	2.05	2752.36	2743	18	1.41E-01	5.3	
12	0	1460.99	213.	31.	1.51	3025.69	3020	15	5.92E-02	10.0	
13	0	1764.62	37.	9.	2.06	3672.11	3665	13	1.03E-02	23.7	
14	0	2614.94	40.	12.	2.46	5482.46	5474	16	1.12E-02	22.8	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 90)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND
 * AFTER ENERGY INDICATES CORRECTED PEAK

PK	IT	ENERGY	AREA	B/GND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	320.14	106.	133.	1.03	596.79	592	11	2.75E-02	23.9	
2	0	364.28	46.	102.	1.58	690.76	686	8	1.28E-02	41.5	
3	0	427.31	62.	153.	1.09	826.02	819	13	1.73E-02	43.8	
4	0	511.22	285.	98.	2.51	1003.61	995	20	7.93E-02	11.5	

6	0	604.54	256.	153.	1.52	1202.29	1196	12	7.11E-02	12.0
7	0	661.62	268.	72.	1.23	1323.82	1319	10	7.43E-02	8.4
8	0	795.53	156.	81.	1.72	1608.92	1606	11	4.35E-02	14.9
9	0	810.87	95.	37.	1.37	1641.57	1637	9	2.64E-02	16.8
10	0	1173.20	532.	49.	1.63	2412.97	2406	15	1.48E-01	5.3
11	0	1332.61*	484.	27.	2.05	2752.36	2743	18	1.34E-01	6.1
12	0	1460.99*	10.	31.	1.51	3025.69	3020	15	2.82E-03	****

1764.62 KEV PEAK DELETED

2614.94 KEV PEAK DELETED

UNIDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
0		427.81	62.	153.	1.09	826.02	819	13	1.73E-02	43.8	3.35E+00

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFC	DECAY	UCI /gram	ABNDIFF	FAILED
0	CR-125	427.89	2.77%	1.000E 0	9.012E -8	38.75%	ABN
1	J-233	562.50	1.00E+10Y	1.000E 0	3.142E -7	12.84%	ABN

TOTAL LINES IN SPECTRUM 12
IDENTIFIED PEAKS 1
IDENTIFIED IN SUMMARY REPORT 11 91.67%

ACTIVATION PRODUCT

NUCLIDE	SEHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	102.70H	1.541	7.238E -8	3.607E -8	49.83
CR-51	AP	27.70D	1.001	3.726E -7	8.889E -8	23.86
CO-54	AP	70.80D	1.000	6.473E -8	1.087E -8	16.78
CO-60	AP	1925.00D	1.000	4.726E -7	2.860E -8	3.05

WLOWER FISSION PRODUCT

NUCLIDE	SEHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
I-131	HFP	8.04D	1.004	2.150E -8	2.227E -8	41.52

FISSION PRODUCT

NUCLIDE	SEHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
PH-105	FP	35.36H	1.024	1.950E -7	4.653E -8	23.86
CS-134	FP	753.10D	1.000	1.435E -7	7.710E -8	11.98
CS-137	FP	30.17Y	1.000	1.838E -7	1.549E -8	8.43

WAL PRODUCT

NUCLIDE	SEHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
C-40	NP	1.28E+09Y	1.000	9.957E -8	2.635E -7	264.01

THE DETROIT EDISON COMPANY

ENRICO FERMI II

NRC
SPLIT

CST Disch

1.24E-6 sec/gram

Discharge Start
Time

1921 on 2-24-94

~ 4 hrs into
Discharge

GAMMA SPECTROSCOPY ANALYSIS REPORT

CHS ATTACHMENT # AUX Ø7

FOR INFORMATION ONLY

PERFORMED BY:

CW HAWES 2-25-94

SIGNATURE/DATE

REVIEWED BY:

A. Bogue 2/25/94

SIGNATURE/DATE

 Detroit Edison Fermi-2 Power Plant 25-FEB-1994 00:59:57.26

Chemistry Department Gamma Spectroscopy Report

***** Sample Parameters *****

Title: CST @ 4 Hrs INTO DISCH
 Sample collection start date: 24-FEB-1994 23:27:00.00 ✓
 Sample collection end date : 24-FEB-1994 23:27:00.00 ✓
 Type of sample : liquid
 Sample quantity : 1.00000E+03 grams ✓
 Sample geometry : MILL Operator: CWT

***** Acquisition Parameters *****

Detector number : DET1 Acquire date : 25-FEB-1994 00:09:39.95 ✓
 Preset live time : 0 00:50:00.00 ✓ Elapsed live time : 0 00:50:00.00
 Elapsed real time : 0 00:50:00.17 Percent dead time : 0.00 % ✓

***** Calibration Parameters *****

Detector number : DET1 Yearly cal date : 14-APR-1993 15:01:38.8
 Kev/channel : 4.99974E-01 Zero offset: -3.68064E-01
 Daily cal date : 24-FEB-1994 01:20:03.17

***** Peak Search Parameters *****

Start channel : 100 End channel : 4096
 Height sensitivity : 5.00000 Shape sensitivity : 10.00000
 Maximum number of iterations to resolve multiplets : 5

***** Nuclide Identification Parameters *****

Energy tolerance : 1.25000 Half-life ratio : 10.00000
 Abundance limit : 80.00000 Library : HOT_CLNT.nlb ✓
 Efficiency file : EFFD1_MILL Efficiencies at : Peak energy

Post-NID Peak Search Report

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	320.79	25	40	1.10	642.31	638	10	54.3		CR-51
0	604.52	100	42	1.58	1209.70	1201	15	17.2		CS-134
0	636.07	23	3	3.30	1272.78	1266	13	26.5		I 131 ^{99.99%}
0	661.81	75	9	1.86	1324.25	1319	13	14.4		CS-137
0	795.83	46	22	1.55	1592.24	1589	9	23.2		CS-134
0	811.01	30	21	1.56	1622.59	1617	15	38.4		CO-58
0	1173.04	137	4	1.62	2346.42	2338	17	9.2		CO-60
0	1332.58	120	0	1.84	2665.37	2659	15	9.1		CO-60

Rejected Report

Slide	Half-life	Ratio	Energy	%Abund	Activity	1-Sigma %Error	Rejected by
56	6.10D	0.01	158.38*	98.80	---	Not found	Abun.
			269.50	36.50	---	Not found	---
			480.44	36.50	---	Not found	---
			749.95	49.50	---	Not found	---
			811.85	86.00	9.451E-08	38.43	
			1561.80	14.00	---	Not found	---
			% Abundances Found =		26.77		
SB-125	2.77Y	0.00	176.33	6.89	---	Not found	Abun.
			380.44	1.50	---	Not found	---
			427.89*	29.33	---	Not found	---
			463.38	10.35	---	Not found	---
			600.56	17.80	---	Not found	---
			606.64	5.02	---	Not found	---
			635.90	11.32	4.162E-07	26.49	
			671.41	1.81	---	Not found	---
			% Abundances Found =		13.47	(Abn. Limit = 68.40%)	
I-131	8.04D	0.01	80.18	2.62	---	Not found	Abun.
			284.30	6.05	---	Not found	---
			364.48*	81.20	---	Not found	---
			636.97	7.26	6.515E-07	26.49	
			722.89	1.80	---	Not found	---
			% Abundances Found =		7.34		
32	2.30H	0.49	505.90	5.03	---	Not found	Abun.
			522.65	16.10	---	Not found	---
			535.50	0.52	---	Not found	---
			630.22	13.70	---	Not found	---
			650.60	2.66	---	Not found	---
			667.69*	98.70	---	Not found	---
			669.80	4.90	---	Not found	---
			671.60	5.20	---	Not found	---
			727.00	3.20	---	Not found	---
			772.61	76.20	---	Not found	---
			812.20	5.60	2.023E-06	38.43	
			954.55	18.10	---	Not found	---
			1136.03	2.96	---	Not found	---
			1398.57	7.10	---	Not found	---
			% Abundances Found =		2.15	(Abn. Limit = 67.00%)	

Flag: "*" = Keyline

Interference Report
Sample ID : CST @ 4 Hrs INTO

Page : 2
Acquisition date : 25-FEB-1994 00:09:39

No interference correction performed

Brief Report

Nuclide	Activity uCi/gram	1-Sigma Error
CR-51	2.630E-07	1.427E-07
CO-58	8.137E-08	3.127E-08
CO-60	5.096E-07	4.652E-08
CS-134	2.021E-07	3.471E-08
CS-137	1.888E-07	2.712E-08

Total Activity : 1.245E-06

Minimum Detectable Activity Report

Slide	Bckgnd Sum	Energy (keV)	MDA (uCi/gram)
24	2.	1368.53	4.2577E-08
FE-59	8.	1099.22	9.7864E-08
CU-64	4.	1345.90	1.7651E-05
ZN-65	13.	1115.52	1.3963E-07

 ***** 25-FEB-94 10:22:32 *****

18pp

FERMI 2 CST SAMPLE. 12 HOURS INTO DISCHARGE. 2ND CST SAMPLE.

CENTRAL FILE NAME: L940501.FEV
 FILE DATE: 25-FEB-94 07:30:00
 SAMPLE IDENTIFICATION: L940501.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 501.1000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 25-FEB-94 07:18:52 * FWHM(1332) 1.886
 PRESET TIME(LIVE) 3600. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3602. SEC * SHAPE PARAMETER: 5.0 %
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:00:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHNL: 4697016 * HALF LIFE RATIO: 8.00
 OFFSET: 39.8232300 * ABUNDANCE LIMIT: 40.000

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FILE
1	0	75.00	53.	133.	.64	74.89	72	6	1.48E-02	38.4	
2	0	238.19	66.	158.	1.34	422.32	418	9	1.82E-02	39.3	
3	0	320.17	89.	115.	1.24	596.86	592	10	2.47E-02	27.2	
4	0	364.91	74.	155.	1.24	692.11	686	13	2.04E-02	38.2	
5	0	427.94	72.	59.	1.32	826.31	823	7	2.00E-02	21.6	
6	0	511.07	215.	189.	2.85	1003.30	995	22	5.98E-02	17.9	
7	0	604.63	290.	123.	1.25	1202.49	1196	12	3.05E-02	10.1	
8	0	661.60	234.	68.	1.45	1323.76	1317	13	6.49E-02	9.9	
9	0	795.74	218.	60.	1.91	1609.35	1603	14	6.06E-02	10.5	
10	0	810.68	91.	53.	.92	1641.16	1636	11	2.54E-02	19.3	
11	0	1173.22	470.	42.	1.59	2413.01	2406	13	1.31E-01	5.3	
12	0	1332.41	478.	16.	1.90	2751.94	2744	16	1.33E-01	5.2	
13	0	1460.90	204.	26.	2.27	3025.48	3019	15	5.67E-02	9.2	
14	0	1509.18	21.	0.	1.82	3128.29	3125	9	5.83E-03	26.6	
15	0	1764.63	48.	0.	1.76	3672.13	3665	15	1.33E-02	21.3	
16	0	2203.74	15.	6.	1.26	4606.99	4599	13	4.18E-03	57.2	
17	10	2613.78	21.	0.	2.44	5479.99	5473	20	5.71E-03	33.7	1.10E+00
18	10	2615.77	37.	0.	2.44	5484.22	5473	20	1.02E-02	19.3	

PEAK SEARCH COMPLETED (REV 15.8 - ND PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR
1	0	75.00	53.	133.	.64	74.89	72	6	1.48E-02	38.4
2	0	238.19	66.	158.	1.34	422.32	418	9	1.82E-02	39.3

4	0	364.91	74.	155.	1.24	692.11	686	13	2.04E-02	38.2
5	0	427.94	72.	59.	1.32	826.31	823	7	2.00E-02	21.6
6	0	511.07	215.	189.	2.85	1003.30	995	22	5.98E-02	17.9
7	0	604.63	290.	123.	1.25	1202.49	1196	12	8.05E-02	10.1
8	0	661.60	234.	68.	1.45	1323.78	1317	13	6.49E-02	9.9
9	0	795.74	218.	60.	1.91	1609.35	1603	14	6.06E-02	10.5
10	0	810.68	91.	53.	.92	1641.16	1636	11	2.54E-02	19.3
11	0	1173.22	470.	42.	1.59	2413.01	2406	13	1.31E-01	5.3
12	0	1332.41	478.	16.	1.90	2751.94	2744	16	1.33E-01	5.2
13	0	160.90	204.	26.	2.27	3025.48	3019	15	5.67E-02	9.2
14	0	9.18	21.	0.	1.82	3128.29	3125	9	5.83E-03	26.6
15	0	34.63	48.	0.	1.76	3672.13	3665	15	1.33E-02	21.3
16		203.74	15.	6.	1.26	4696.99	4599	13	4.18E-03	57.2
17	10	2613.78	21.	0.	2.44	5472.99	5473	20	5.71E-03	33.7
18	10	2615.77	37.	0.	2.44	5484.22	5473	20	1.02E-02	19.3

FILE-UP CORRECTION COMPLETED

ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
ANIL-511	AP	511.00	215.	189.	96.73*	2.943E+00	2.711E -7	4.862E -8
CR-51	AP	320.08	89.	115.	9.83*	4.125E+00	3.296E -7	8.959E -8
CO-58	AP	810.76	91.	53.	99.40*	2.093E+00	6.567E -8	1.267E -8
CO-60	AP	1173.22	470.	42.	100.00	1.600E+00	4.406E -7	2.347E -8
		1332.49	478.	16.	100.00*	1.457E+00	4.915E -7	2.564E -8
NI-65	AP	366.27	74.	155.	4.61	3.758E+00	1.198E -6	4.577E -7
		1115.52	0.	0.	14.30	0.000E+00	.000E 0	.000E 0
		1481.84	0.	0.	23.50*	0.000E+00	.000E 0	.000E 0

PLUGGER FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
U-131	HFP	284.30	0.	0.	6.05	0.000E+00	.000E 0	.000E 0
		364.48	74.	155.	81.20*	3.758E+00	3.641E -8	1.391E -8
		636.97	0.	0.	7.26	0.000E+00	.000E 0	.000E 0
		772.89	0.	0.	1.80	0.000E+00	.000E 0	.000E 0

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
U-105	FP	306.10	0.	0.	5.13	0.000E+00	.000E 0	.000E 0
		318.90	89.	115.	19.20*	4.125E+00	1.762E -7	4.788E -8
U-125	FP	176.33	0.	0.	6.89	0.000E+00	.000E 0	.000E 0
		427.89	72.	59.	29.33*	3.349E+00	1.096E -7	2.369E -8
		663.36	0.	0.	10.35	0.000E+00	.000E 0	.000E 0
		600.56	0.	0.	17.80	0.000E+00	.000E 0	.000E 0
		635.90	0.	0.	11.32	0.000E+00	.000E 0	.000E 0
U-134	FP	563.23	0.	0.	8.38	0.000E+00	.000E 0	.000E 0
		569.32	0.	0.	15.43	0.000E+00	.000E 0	.000E 0
		604.70	290.	123.	97.60*	2.602E+00	1.710E -7	1.733E -8
		795.85	218.	60.	35.40	2.127E+00	1.800E -7	1.886E -8
		801.93	0.	0.	8.73	0.000E+00	.000E 0	.000E 0
U-137	FP	661.65	234.	68.	85.12*	2.436E+00	1.690E -7	1.670E -8

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
K-40	NP	1460.81	204.	26.	10.67*	1.362E+00	2.106E -6	1.947E -7
RA-226	NP	186.21	0.	0.	3.28	0.000E+00	.000E 0	.000E 0
		241.98	0.	0.	7.49	0.000E+00	.000E 0	.000E 0
		295.21	0.	0.	19.20	0.000E+00	.000E 0	.000E 0
		351.92	0.	0.	37.20	0.000E+00	.000E 0	.000E 0
		609.31	0.	0.	46.30*	0.000E+00	.000E 0	.000E 0
		1120.29	0.	0.	15.10	0.000E+00	.000E 0	.000E 0
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	48.	0.	15.80	1.185E+00	3.839E -7	3.167E -8
		2204.22	15.	6.	4.98	1.007E+00	4.491E -7	2.567E -7

ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

URAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
TH-232	NP	238.63	66.	158.	44.60	5.045E+00	4.361E -8	1.715E -8
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.30	0.000E+00	.000E 0	.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	21.	0.	35.86*	8.884E -01	9.672E -8	3.258E -8

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

UNIDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1 0	75.00	53.	133.	.64	74.89	72	6	1.48E-02	38.4	2.96E+00
2 0	238.19	66.	158.	1.34	422.32	418	9	1.32E-02	39.3	5.05E+00
5 0	427.94	72.	59.	1.32	826.31	823	7	2.00E-02	21.6	3.35E+00
14 0	1509.18	21.	0.	1.82	3128.29	3125	9	5.83E-03	26.6	1.33E+00
15 0	1764.63	48.	0.	1.76	3672.13	3665	13	1.53E-02	21.3	1.19E+00
16 0	2203.74	15.	6.	1.26	4606.99	4599	13	4.18E-03	57.2	1.01E+00
17 10	2613.78	21.	0.	2.44	5479.99	5473	20	5.71E-03	33.7	8.88E-01
18 10	2615.77	37	0.	2.44	5484.22	5473	20	1.02E-02	19.3	8.88E-01

LINE3 NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	PLPG	DELAY	UCI /gram	ACND OFF	FAILED
2	TH-232	238.63	1.00E+10Y	1.000E 0	4.361E -8	45.15%	ASN
4	NI-63	366.27	2.37N	1.384E 0	1.198E -6	10.74%	ASN
5	SB-125	427.69	2.7Y	1.000E 0	1.096E -8	38.75%	ASN
15	RA-226	1764.49	14.3 30Y	1.000E 0	3.839E -7	13.38%	ASN
16	RA-226	2204.22	16.0 30Y	1.000E 0	4.491E -7	13.38%	ASN
17	TH-232	2613.66	1.05E+10Y	1.000E 0	9.672E -8	45.15%	ASN

TOTAL LINES IN SPECTRUM 18
IDENTIFIED PEAKS 8
IDENTIFIED IN SUMMARY REPORT 10 55.56%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-111	AP	109.70M	2.321	2.711E -7	4.862E -8	17.93
CR-51	AP	27.70D	1.002	3.296E -7	8.959E -8	27.18
CO-58	AP	70.80D	1.001	6.567E -8	1.267E -8	19.29
CO-60	AP	1925.00D	1.000	4.915E -7	2.564E -8	5.22

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
I-131	HP	8.04D	1.003	3.641E -8	1.391E -8	33.19

1-SIGMA PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
CR-105	FP	35.36H	1.046	1.762E -7	4.788E -8	27.18
CS-134	FP	753.10D	1.000	1.710E -7	1.733E -8	10.13
CS-137	FP	30.17Y	1.000	1.690E -7	1.670E -8	9.89

NUCLEAR PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
CO-60	HP	1.28E+09Y	1.000	2.106E -6	1.947E -7	9.24

MINIMUM DETECTABLE ACTIVITY REPORT (NO PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

SLIDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	89.	477.59	1.9331E-07
NA-22	29.	1274.54	2.6301E-08
NA-24	22.	1368.53	2.7025E-08
CL-38	6.	2167.51	0.0000E+00
AR-41	21.	1293.64	5.5045E-08
SC-46	67.	1120.51	3.5809E-08
MN-54	80.	834.33	3.0742E-08
MN-56	59.	846.75	5.0474E-08
FE-59	36.	1099.22	4.5843E-08
CO-57	143.	122.06	1.5908E-08
NI-63	13.	1481.84	1.5883E-07
CU-64	15.	1345.90	4.5882E-06
ZN-66	49.	1115.52	6.0110E-08
ZN-67M	85.	438.63	2.1838E-08
AS-76	91.	559.10	5.4218E-08
SE-72	105.	264.65	2.6735E-08
BR-72	64.	554.32	2.8604E-08
BR-74	60.	881.50	1.3854E-06
KR-83	154.	513.99	6.4862E-06
KR-85M	159.	151.18	2.8084E-08
KR-87	95.	402.58	1.3057E-07
KR-88	146.	196.32	9.8777E-08
QR-88	17.	1836.01	2.7436E-05
SR-89	47.	1031.88	HALF LIFE TOO SHORT
RS	154.	513.99	2.8124E-08
SR-89M	133.	231.69	7.8830E-08
SR-91	42.	1024.30	9.6510E-08
SR-92	18.	1385.94	4.4456E-08
Y-86	17.	1856.01	2.6490E-08
Y-91	32.	1204.90	8.7399E-06
Y-91MD	70.	555.57	2.4788E-08
Y-92	48.	934.46	2.9998E-07
Y-93	106.	266.90	2.7417E-07
ZR-95	63.	756.72	4.4623E-08
ZR-97	73.	743.36	3.0881E-08
NB-94	61.	702.63	2.2415E-08
NB-95	65.	765.79	2.5441E-08
NB-97D	42.	1024.50	2.6976E-06
MO-90	133.	257.34	3.0099E-08
MO-99	58.	739.58	1.8491E-07
TC-99MD	186.	140.51	1.7768E-08
RU-103	89.	497.08	2.3300E-08
RU-105	46.	724.50	5.8956E-08
RU-106	72.	621.84	2.2303E-07
AG-110M	68.	657.75	2.3478E-08
CD-109	124.	88.03	4.6333E-07
SN-113	100.	391.69	2.8445E-08
1122	91.	563.93	3.3317E-08
1124	244.	602.71	4.0281E-08
1125	149.	427.89	8.1680E-08

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66. PAGE 2.

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
123M	162.	158.99	1.7514E-08
132	143.	228.16	1.9069E-08
I-132	47.	667.69	3.7997E-08
I-133	69.	529.87	2.3890E-08
I-134	60.	847.03	1.7661E-07
I-135	26.	1260.41	1.0975E-07
XE-131M	156.	163.93	7.3660E-07
XE-133	128.	80.99	5.6622E-08
XE-133M	136.	233.22	1.6402E-07
XE-135	98.	249.79	1.9640E-08
XE-135M	81.	526.56	HALF LIFE TOO SHORT
XE-138	129.	258.31	HALF LIFE TOO SHORT
CS-134M	169.	127.42	2.0154E-07
CS-136	52.	818.50	2.4462E-08
CS-138	19.	1435.86	6.0791E-07
BA-133	92.	356.00	2.8055E-08
BA-139	154.	165.85	2.6693E-07
BA-140	76.	537.32	8.1375E-08
BA-141	155.	190.22	5.8529E-06
LA-141	24.	1596.49	3.0836E-08
CE-139	154.	165.85	1.7745E-08
CE-141	151.	145.44	3.0117E-08
CE-143	100.	293.26	4.0986E-08
CE-144	157.	133.54	1.3617E-07
147	143.	91.11	6.2825E-08
152	82.	344.27	5.9132E-08
PO-154	29.	1274.45	7.4036E-08
HF-181	91.	482.03	2.4772E-08
W-187	36.	479.53	2.0662E-08
HG-203	111.	279.19	2.1924E-08
RA-226	86.	609.31	5.0369E-08
TH-232	51.	2614.66	0.0000E+00
U-235	200.	185.72	3.0721E-08
U-238	153.	131.20	7.0612E-08
NP-239	176.	106.13	7.2691E-08
AM-241	111.	59.54	1.4314E-07

 ***** 25-FEB-94 10:25:38 *****

FERMI 2 CST SAMPLE. 12 HOURS INTO DISCHARGE. 2ND CST SAMPLE.

CENTRAL FILE NAME: L940501.FEV
 FILE DATE: 25-FEB-94 07:30:00
 SAMPLE IDENTIFICATION: L940501.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 501.1000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 25-FEB-94 09:18:52 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3601. SEC * SHAPE PARAMETER: 5.0 %
 ELAPSED LIVE TIME: 3600. SEC * NBE ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHNL: .4697016 * HALF LIFE RATIO: 8.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 10.000

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FILE
1	0	75.00	53	133	.64	74.89	72	6	1.48E-02	33.4	
2	0	238.19	66	158	1.34	422.32	418	9	1.82E-02	39.3	
3	0	320.17	89	115	1.24	596.86	592	10	2.47E-02	27.2	
4	0	364.91	74	155	1.24	692.11	686	13	2.04E-02	38.2	
5	0	427.94	72	59	1.32	826.31	823	7	2.00E-02	21.6	
6	0	511.07	215	189	2.85	1003.30	995	22	5.98E-02	17.9	
7	0	604.63	290	123	1.25	1202.49	1196	12	8.05E-02	10.1	
8	0	661.60	234	68	1.45	1323.78	1317	13	6.49E-02	9.9	
9	0	795.74	218	60	1.91	1604.35	1603	14	3.06E-02	10.5	
10	0	810.68	91	53	.92	1641.16	1636	11	2.54E-02	19.3	
11	0	1173.22	470	42	1.59	2413.01	2406	13	1.31E-01	5.3	
12	0	1332.41	478	16	1.90	2751.94	2744	16	1.33E-01	5.2	
13	0	1460.90	204	26	2.27	3025.48	3019	15	5.67E-02	9.2	
14	0	1509.18	21	0	1.82	3128.29	3125	9	5.83E-03	26.6	
15	0	1764.63	48	0	1.76	3672.13	3665	15	1.33E-02	21.3	
16	0	2203.74	15	6	1.26	4606.99	4599	13	4.18E-03	57.2	
17	10	2613.78	21	0	2.44	5479.99	5473	20	5.71E-03	33.7	1.16E+00
18	10	2615.77	37	0	2.44	5484.22	5473	20	1.02E-02	19.3	

PEAK SEARCH COMPLETED (REV. 15.3 - ND PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND

* AFTER ENERGY INDICATES CORRECTED PEAK

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FILE
----	----	--------	------	-------	------	---------	------	----	---------	------	------

238.19 KEV PEAK DELETED

3	0	320.17	89.	115.	1.24	596.86	592	10	2.47E-02	27.2
4	0	364.91	74.	155.	1.24	692.11	686	13	2.04E-02	38.2
5	0	427.94	72.	59.	1.32	826.31	823	7	2.00E-02	21.6
6	0	511.07*	18.	189.	2.85	1003.30	995	22	5.03E-03	****
7	0	604.63	290.	123.	1.25	1202.49	1196	12	8.05E-02	10.1
8	0	661.60*	178.	68.	1.45	1323.78	1317	13	4.95E-02	15.7
9	0	795.74	218.	60.	1.91	1609.35	1603	14	6.06E-02	10.5
10	0	810.68	91.	53.	.92	1641.16	1636	11	2.54E-02	19.3
11	0	1173.22	470.	42.	1.59	2413.01	2406	13	1.31E-01	5.3
12	0	1332.41*	431.	16.	1.90	2751.94	2744	16	1.20E-01	6.4

1460.90 KEV PEAK DELETED

14	0	1509.18	21.	0.	1.82	3128.29	3125	9	5.83E-03	26.6
15	0	1764.63*	1.	0.	1.76	3672.13	3665	15	5.93E-04	****
16	0	2203.74	15.	6.	1.26	4606.99	4599	3	4.18E-03	57.2

2613.78 KEV PEAK DELETED

2615.77 KEV PEAK DELETED

UNIDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
5	0	75.00	53.	133.	.64	74.89	72	6	1.48E-02	38.4	2.96E+00
5	0	427.94	72.	59.	1.32	826.31	823	7	2.00E-02	21.6	3.35E+00
14	0	1509.18	21.	0.	1.82	3128.29	3125	9	5.83E-03	26.6	1.33E+00
15	0	1764.63	1.	0.	1.76	3672.13	3665	15	3.93E-04	****	1.19E+00
16	0	2203.74	15.	6.	1.26	4606.99	4599	13	4.18E-03	57.2	1.01E+00

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLIFE	DECAY	BCI /gram	ABNDIFF	FAILED
5	I-65	366.27	2.52H	1.884E-6	1.198E-6	10.74%	ABN
7	SB-125	827.89	2.77Y	1.090E-7	1.096E-7	38.71%	ABN
14	RA-226	1764.49	1600.00Y	1.000E-8	1.132E-8	13.30%	ABN
16	RA-226	2204.22	1600.00Y	1.000E-8	4.491E-7	13.30%	ABN

TOTAL LINES IN SPECTRUM 14
UNIDENTIFIED PEAKS 5
IDENTIFIED IN SUMMARY REPORT 9 64.29%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	2.391	2.281E -8	5.955E -8	261.10
CR-51	AP	27.70D	1.002	3.296E -7	8.959E -8	27.18
CO-58	AP	70.30D	1.001	6.567E -8	1.267E -8	19.22
CO-60	AP	1925.00D	1.000	4.437E -7	2.835E -8	6.37

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
I-131	HFP	8.04D	1.008	3.641E -8	1.391E -8	38.12

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
RH-105	FP	35.36H	1.046	1.762E -7	4.788E -8	27.13
CS-134	FP	753.10D	1.000	1.710E -7	1.733E -8	10.13
CS-137	FP	30.17Y	1.000	1.289E -7	2.019E -8	15.67

THE DETROIT EDISON COMPANY

ENRICO FERMI II

FOR INFORMATION ONLY

GAMMA SPECTROSCOPY ANALYSIS REPORT

CHS ATTACHMENT # AUX07

CST 12 Hr Sample NRC SPLIT
(0730)

= 1.23E-6

PERFORMED BY: 2-25-91

2-24-91
SIGNATURE/DATE

REVIEWED BY:

SIGNATURE/DATE

 * Detroit Edison Fermi-2 Power Plant 25-FEB-1994 09:06:09.13 *

Chemistry Department Gamma Spectroscopy Report

***** Sample Parameters *****
 File: CST

Sample collection start date: 25-FEB-1994 07:30:00.00
 Sample collection end date : 25-FEB-1994 07:30:00.00
 Type of sample : liquid
 Sample quantity : 9.99900E+02 grams
 Sample geometry : MILL Operator: KAS

***** Acquisition Parameters *****
 Detector number : DET1 Acquire date : 25-FEB-1994 08:15:47.78
 Preset live time : 0 00:50:00.00 Elapsed live time : 0 00:50:00.00
 Elapsed real time : 0 00:50:00.17 Percent dead time : 0.00 %

***** Calibration Parameters *****
 Detector number : DET1 Yearly cal date : 14-APR-1993 15:01:38.
 Kev/channel : 4.99924E-01 Zero offset: -3.52838E-01
 Daily cal date : 25-FEB-1994 01:12:21.13

***** Peak Search Parameters *****
 Start channel : 100 End channel : 4096
 Height sensitivity : 5.00000 Shape sensitivity : 10.00000
 Maximum number of iterations to resolve multiplets : 5

***** Nuclide Identification Parameters *****
 Energy tolerance : 1.25000 Half-life ratio : 10.00000
 Abundance limit : 80.00000 Library : HQT_CLNT.nlb
 Efficiency file : EFFD1_MILL Efficiencies at : Peak energy

Post-NID Peak Search Report

It	Energy	Area	Bknd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	320.54	35	44	0.74	641.84	637	10	39.3		CR-51
0	364.81	25	35	0.78	730.38	726	12	51.4		I-131
0	511.86	40	10	5.21	1024.46	1019	15	24.2		Am-241
0	568.94	28	11	3.53	1138.62	1133	11	29.5		CS-134
0	604.98	95	43	1.40	1210.69	1203	16	18.7		CS-134
0	635.60	13	8	0.90	1271.92	1267	8	46.8		SB-25
0	661.90	56	25	1.24	1324.52	1319	13	22.9		CS-137
0	802.14	14	5	1.48	1604.94	1603	8	38.0		CS-134
0	956.57	12	11	1.31	1913.75	1908	11	60.8		
0	1173.12	118	7	2.09	2346.70	2338	16	10.6		CO-60
0	1332.62	116	0	2.14	2665.58	2659	14	9.3		CO-60

Selected Report

enclide	Half-life	Ratio	Energy	%Abund	Activity	1-Sigma %Error	Rejected by
22	2.60Y	0.00	511.00	179.80	3.703E-08	24.18	Abun.
			1274.54*	99.94	---	Not found	---
% Abundances Found = 64.27							

SB-125	2.77Y	0.00	176.33	6.89	---	Not found	---	Abun.
			380.44	1.50	---	Not found	---	
			427.89*	29.33	---	Not found	---	
			463.38	10.35	---	Not found	---	
			600.56	17.80	---	Not found	---	
			606.64	5.02	---	Not found	---	
			635.90	11.32	2.369E-07	46.79		
			671.41	1.81	---	Not found	---	
% Abundances Found = 13.47 (Abn. Limit = 68.40%)								

CS-134	2.06Y	0.00	127.42	12.90	---	Not found	---	Abun.
			475.35	1.46	---	Not found	---	
			563.23	8.38	---	Not found	---	
			569.32	15.43	3.399E-07	29.46		
			604.70*	97.60	<u>1.916E-07</u>	<u>18.65</u>		
			795.85	85.40	---	Not found	---	
			801.93	8.73	4.137E-07	37.97		
			1038.57	1.00	---	Not found	---	
			1167.94	1.80	---	Not found	---	
			1365.15	3.04	---	Not found	---	
			1400.00	0.00	---	Not found	---	
			1596.00	0.00	---	Not found	---	
% Abundances Found = 51.65 (Abn. Limit = 75.00%)								

Flag: "*" = Keyline

Brief Report

Nuclide	Activity uCi/gram	1-Sigma Error
CR-51	3.767E-07	1.481E-07
CO-60	4.927E-07	4.575E-08
I-131	3.765E-08	1.936E-08
CS-137	1.414E-07	3.244E-08

Total Activity : 1.048E-06

+ 1.92E-7 (CS 137)

1.23E-6

Minimum Detectable Activity Report

Slide	Bckgnd Sum	Energy (keV)	MDA (uCi/gram)
4	1.	1368.53	3.0525E-08
CU-58	22.	810.76	6.5592E-08
FE-59	11.	1099.22	1.1207E-07
CU-64	2.	1345.90	1.3686E-05
ZN-65	10.	1115.52	1.2469E-07
CS-134	103.	604.70	1.0045E-07

 ***** 25-FEB-94 13:22:39 *****

FERMI 2 CST SAMPLE 16 HOURS INTO DISCHARGE. 3RD CST SAMPLE

CTRAL FILE NAME: L940511.FEV
 FILE DATE: 25-FEB-94 11:30:00
 SAMPLE IDENTIFICATION: L940511.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 500.1000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 25-FEB-94 12:01:11 * FWHM(1332) 1.886
 RESET TIME(LIVE): 3600 SEC * SENSITIVITY: 3.000
 ELAPSED REAL TIME: 3601. SEC * SHAPE PARAMETER 3.0 %
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:00 * ENERGY TOLERANCE: 1.500 KEV
 GAIN/CHNL: 1.4697016 * HALF LIFE RATIO: 3.00
 OFFSET: 37.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.20 TO 2858.03

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	74.77	52.	120.	.96	74.41	73	6	1.44E-02	38.6	
2	0	92.71	52.	101.	.61	112.60	111	5	1.45E-02	32.6	
3	0	320.28	85.	151.	1.10	597.10	594	10	2.37E-02	29.5	
4	0	364.02	116.	104.	1.09	690.22	683	13	3.22E-02	21.1	
5	0	428.59	98.	110.	.72	827.69	822	12	2.72E-02	24.4	
6	0	510.98	291.	124.	2.19	1003.11	995	19	8.07E-02	11.9	
7	0	565.35	32.	29.	1.01	1118.85	1117	5	8.98E-03	32.8	
8	0	569.17	88.	64.	1.22	1126.99	1123	10	2.43E-02	20.7	
9	0	604.61	263.	154.	1.31	1202.43	1197	13	7.31E-02	12.3	
10	0	661.71	259.	102.	1.53	1324.00	1316	17	7.19E-02	11.4	
11	0	795.98	236.	46.	1.59	1609.37	1605	13	6.54E-02	9.2	
12	0	811.20	82.	82.	1.29	1642.27	1637	11	2.28E-02	24.8	
13	0	1173.27	482.	45.	1.87	2413.13	2407	17	1.34E-01	5.7	
14	0	1332.49	426.	28.	1.89	2752.10	2742	18	1.18E-01	5.7	
15	0	1460.71	215.	13.	1.74	3025.08	3015	18	5.97E-02	8.9	
16	0	1764.79	50.	3.	2.12	3672.47	3665	18	1.33E-02	19.5	
17	0	2614.92	55.	3.	2.15	5482.41	5473	18	1.54E-02	19.8	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR
1	0	74.77	52.	120.	.96	74.41	73	6	1.44E-02	38.6
2	0	92.71	52.	101.	.61	112.60	111	5	1.45E-02	32.6
3	0	320.28	85.	151.	1.10	597.10	594	10	2.37E-02	29.5

5	0	428.59	98.	110.	.72	827.69	822	12	2.72E-02	24.4
6	0	510.98	291.	124.	2.19	1003.11	995	19	8.07E-02	11.9
7	0	565.35	32.	29.	1.01	1118.85	1117	5	8.98E-03	32.8
8	0	569.17	88.	64.	1.22	1126.99	1123	10	2.43E-02	20.7
9	0	604.61	263.	154.	1.31	1202.43	1197	13	7.31E-02	12.3
10	0	661.71	259.	102.	1.53	1324.00	1316	17	7.19E-02	11.4
11	0	795.98	236.	46.	1.59	1609.87	1605	13	6.54E-02	9.2
12	0	811.20	82.	32.	1.29	1642.27	1637	11	2.28E-02	24.8
13	0	1173.27	482.	43.	1.87	2413.13	2407	17	1.34E-01	5.7
14	0	1332.49	426.	28.	1.89	2752.10	2742	18	1.18E-01	5.7
15	0	1460.71	215.	13.	1.74	3025.08	3015	18	5.97E-02	8.9
16	0	1764.79	30.	3.	2.12	3672.47	3665	18	1.38E-02	12.3
17	0	2614.92	55.	5.	2.15	5482.41	5473	18	1.54E-02	12.3

PILE-UP CORRECTION COMPLETED

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
ANIL-511	AP	511.00	291.	124.	96.73*	2.943E+00	2.242E -7	2.677E -8
CR-51	AP	320.08	85.	151.	9.83*	4.124E+00	3.167E -7	9.348E -8
CO-58	AP	810.76	82.	82.	99.40*	2.097E+00	5.900E -8	1.465E -8
CO-60	AP	1173.22	482.	43.	100.00	1.600E+00	4.519E -7	2.535E -8
		1332.49	426.	28.	100.00*	1.457E+00	4.390E -7	2.515E -8

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
I-131	HFP	284.30	0.	0.	0.05	0.000E+00	0.000E 0	0.000E 0
		364.48	116.	104.	81.20*	3.764E+00	5.714E -8	1.208E -8
		636.97	0.	0.	7.26	0.000E+00	0.000E 0	0.000E 0
		722.89	0.	0.	1.80	0.000E+00	0.000E 0	0.000E 0

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
OH-105	FP	306.10	0.	0.	0.13	0.000E+00	0.000E 0	0.000E 0
		318.90	85.	151.	19.20*	4.124E+00	1.652E -7	4.877E -8
122	FP	563.93	32.	29.	70.60*	2.733E+00	2.541E -8	8.345E -9
		692.80	0.	0.	3.70	0.000E+00	0.000E 0	0.000E 0
125	FP	176.33	0.	0.	6.39	0.000E+00	0.000E 0	0.000E 0
		427.89	98.	110.	29.33*	3.345E+00	1.496E -7	3.647E -8
		463.35	0.	0.	10.35	0.000E+00	0.000E 0	0.000E 0
		600.56	0.	0.	17.80	0.000E+00	0.000E 0	0.000E 0
		655.90	0.	0.	11.32	0.000E+00	0.000E 0	0.000E 0
134	FP	563.23	0.	0.	8.58	0.000E+00	0.000E 0	0.000E 0
		569.32	88.	64.	10.43	2.720E+00	3.132E -7	6.469E -8
		604.70	263.	154.	97.00*	2.602E+00	1.556E -7	1.916E -8
		795.85	236.	46.	85.40	2.127E+00	1.947E -7	1.796E -8
		801.93	0.	0.	8.73	0.000E+00	0.000E 0	0.000E 0
137	FP	661.65	259.	102.	85.12*	2.436E+00	1.376E -7	2.132E -8

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
K-40	NP	1460.81	215.	13.	10.67*	1.362E+00	2.221E -6	1.936E -7
RA-226	NP	186.21	0.	0.	3.28	0.000E+00	0.000E 0	0.000E 0
		241.98	0.	0.	7.49	0.000E+00	0.000E 0	0.000E 0
		295.21	0.	0.	19.20	0.000E+00	0.000E 0	0.000E 0
		351.92	0.	0.	37.20	0.000E+00	0.000E 0	0.000E 0
		609.31	0.	0.	46.30*	0.000E+00	0.000E 0	0.000E 0
		1120.29	0.	0.	15.10	0.000E+00	0.000E 0	0.000E 0
		1238.11	0.	0.	5.94	0.000E+00	0.000E 0	0.000E 0
		1764.49	50.	3.	15.30	1.185E+00	3.974E -7	7.751E -8
		2204.22	0.	0.	4.98	0.000E+00	0.000E 0	0.000E 0

NUCLIDE PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
TH-232	NP	238.63	0.	0.	44.60	0.000E+00	.000E 0	.000E 0
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0	.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
J-238	NP	2614.66	35	5.	35.86*	3.881E-01	2.615E -7	5.180E -8
		131.20	0.	0.	20.40*	0.000E+00	.000E 0	.000E 0
		132.70	0.	0.	6.80	0.000E+00	.000E 0	.000E 0
		569.50	88	64.	11.00	2.720E+00	4.393E -7	7.074E -8
		880.51	0.	0.	12.24	0.000E+00	.000E 0	.000E 0
		883.24	0.	0.	12.00	0.000E+00	.000E 0	.000E 0
		926.00	0.	0.	11.20	0.000E+00	.000E 0	.000E 0
		946.00	0.	0.	12.00	0.000E+00	.000E 0	.000E 0

UNKNOWN LINE REPORT

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

IDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1	0 74.77	52.	120.	.96	74.41	73	6	1.44E-02	38.6	2.94E+00
2	0 92.71	52.	101.	.61	112.60	111	5	1.45E-02	32.6	4.59E+00
3	0 428.59	98.	110.	.72	827.69	822	12	2.72E-02	24.4	3.35E+00
16	0 1764.72	50.	3.	2.12	3672.47	3665	13	1.38E-02	19.5	1.12E+00
17	0 2614.92	55.	5.	2.15	5482.41	5473	13	1.54E-02	19.8	8.88E-01

LINE NOT MEETING SUMMARY CRITERIA

NUCLIDE	ENERGY	HLFC	DECAY	UOI /gram	ABNDIFF	FAILED
18 B-125	427.89	2.77Y	1.000E 0	1.496E -7	38.75%	ABN
19 J-238	569.50	1.00E+10Y	1.000E 0	4.393E -7	12.84%	ABN
16 A-226	1764.49	1600.00Y	1.000E 0	3.974E -7	10.17%	ABN
17 H-232	2614.66	1.00E+10Y	1.000E 0	2.615E -7	20.12%	ABN

TOTAL LINES IN SPECTRUM 17
UNIDENTIFIED PEAKS 5
IDENTIFIED IN SUMMARY REPORT 12 70.59%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	1.463	2.242E -7	2.377E -8	11.94
CR-51	AP	27.70D	1.001	3.167E -7	9.348E -8	29.51
CO-58	AP	70.80D	1.000	5.900E -8	1.465E -8	24.83
CO-60	AP	1925.00D	1.000	4.390E -7	2.515E -8	5.73

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
I-131	HFP	8.04D	1.004	5.714E -8	1.008E -8	21.13

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
RH-105	FP	35.36H	1.020	1.652E -7	4.377E -8	29.51
SB-122	FP	2.70D	1.011	2.541E -8	8.345E -9	32.84
CS-134	FP	753.10D	1.000	1.556E -7	1.916E -8	12.32
CS-137	FP	30.17Y	1.000	1.876E -7	2.132E -8	11.37

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	1.000	2.221E -6	1.986E -7	8.94

MINIMUM DETECTABLE ACTIVITY REPORT (NO RC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

ISIDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	87.	477.59	1.9137E-07
NA-22	15.	1274.54	1.8953E-08
NA-24	22.	1368.33	2.5506E-08
CL-38	5.	2167.51	0.0000E+00
AR-41	31.	1293.64	4.1001E-08
SC-46	81.	1120.51	3.9434E-08
MN-54	81.	834.83	3.0992E-08
MN-56	65.	846.75	3.7481E-08
FE-59	50.	1099.22	5.4090E-08
CO-57	160.	122.06	1.6859E-08
NI-65	14.	1481.84	1.1567E-07
CU-64	23.	1345.90	5.5303E-06
ZN-65	61.	1115.52	6.7192E-08
ZN-69M	92.	438.63	2.1327E-08
AS-76	86.	559.10	5.1043E-08
SE-75	120.	764.65	2.8630E-08
BR-82	60.	554.32	2.6641E-08
BR-84	70.	681.50	2.7577E-07
KR-85	143.	513.99	6.2627E-06
KR-85M	171.	151.18	2.3885E-08
KR-87	85.	402.58	6.1105E-08
KR-88	137.	196.32	6.9899E-08
BR-88	19.	1836.01	1.4112E-06
89	46.	1031.88	7.5128E-07
85	143.	513.99	2.7140E-08
SR-85M	157.	231.67	3.6172E-08
SR-91	75.	1024.30	1.1758E-07
SR-92	20.	1383.94	3.3718E-08
Y-88	19.	1836.01	2.8051E-08
Y-91	28.	1204.90	8.1865E-06
Y-91MD	73.	555.57	2.3078E-08
Y-92	80.	934.46	3.0115E-07
Y-93	102.	266.90	2.4657E-07
ZR-95	62.	756.72	4.4330E-08
ZR-97	54.	743.36	2.5236E-08
NB-94	65.	702.63	2.3184E-08
NB-95	64.	765.79	2.5268E-08
NB-97D	68.	1024.50	3.2615E-06
MO-90	105.	257.34	2.2874E-08
MO-99	42.	739.58	1.5554E-07
TC-99MD	148.	140.51	1.5667E-08
RU-103	83.	497.08	2.2525E-08
RU-105	45.	724.50	4.7735E-08
RU-106	58.	621.84	2.0055E-07
AG-110M	66.	657.75	2.3173E-08
CD-109	125.	88.03	4.6609E-07
SN-113	109.	391.69	2.9747E-08
124	242.	602.71	4.0171E-08
125	173.	427.89	8.8135E-08
123M	162.	158.99	1.7544E-08

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

PAGE 2

ISOTOPE	BKG	ENERGY	MINIMUM UCI /gram
I-132	149.	228.16	1.9282E-08
I-132	60.	667.69	2.9120E-08
I-133	81.	529.87	2.4840E-08
I-134	56.	847.03	6.1423E-08
I-135	18.	1260.41	7.9887E-08
XE-131M	155.	163.93	7.3338E-07
XE-133	100.	80.99	4.9791E-08
XE-133M	144.	233.22	1.6625E-07
XE-135	137.	242.79	2.1086E-08
XF-135M	70.	526.56	3.7453E-07
XE-138	99.	258.51	9.7704E-07
CS-134M	170.	127.42	1.4863E-07
CS-136	71.	818.50	2.8560E-08
CS-138	23.	1435.86	1.2588E-07
BA-133	126.	356.00	3.2897E-08
BA-139	151.	165.85	1.3857E-07
BA-140	79.	537.32	8.9883E-08
BA-141	176.	190.22	3.2799E-07
LA-140	13.	1596.49	2.2238E-08
CE-139	151.	165.35	1.7602E-08
CE-141	175.	145.44	3.2449E-08
CE-143	119.	293.26	4.3598E-08
CE-144	187.	133.54	1.4889E-07
NO-147	109.	91.11	5.4773E-08
I-152	91.	344.27	6.2416E-08
I-154	15.	1274.45	5.3352E-08
Ir-181	94.	482.03	2.5205E-08
W-187	86.	479.53	8.8497E-08
HG-203	118.	279.12	2.2632E-08
Bi-226	113.	609.31	5.8427E-08
Th-232	59.	2614.46	0.0000E+00
U-235	169.	185.72	2.8297E-08
U-238	171.	131.20	7.4799E-08
NP-239	139.	106.13	6.3709E-08
AM-241	90.	59.54	1.2915E-07

 ***** 25-FEB-94 13:25:53 *****

FERMI 2 CST SAMPLE 16 HOURS INTODISCHARGE. 3RD CST SAMPLE

STRAL FILE NAME: L940511.FEV
 SAMPLE DATE: 25-FEB-94 11:30:00
 SAMPLE IDENTIFICATION: L940511.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 500.1000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 25-FEB-94 12:01:11 * FWHM(1332) 1.386
 PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3601. SEC * SHAPE PARAMETER: 5.0 %
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY:MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
 KEY/CHNL: 4697016 * HALF LIFE RATIO: 1.00
 OFFSET: 39 3232300 KEV * ABUNDANCE LIMIT: 70.002

ENERGY WINDOW 40.22 TO 2853.03

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	74.77	52.	120.	.96	74.41	73	6	1.44E-02	38.6	
2	0	92.71	52.	101.	.61	112.60	111	5	1.45E-02	32.6	
3	0	320.28	85.	151.	1.10	597.10	594	10	2.37E-02	29.5	
4	0	364.02	116.	104.	1.09	690.22	683	13	3.22E-02	21.1	
5	0	428.59	98.	110.	.72	827.69	822	12	2.72E-02	24.4	
6	0	510.98	291.	124.	2.19	1003.11	995	19	8.07E-02	11.9	
7	0	565.35	32.	29.	1.01	1118.85	1117	3	3.98E-03	32.8	
8	0	569.17	88.	64.	1.22	1126.99	1123	10	2.43E-02	20.7	
9	0	604.61	263.	154.	1.31	1202.43	1197	13	7.31E-02	12.3	
10	0	661.71	259.	102.	1.53	1324.00	1316	17	7.19E-02	11.4	
11	0	795.98	236.	46.	1.59	1609.87	1605	13	6.54E-02	9.2	
12	0	811.20	82.	82.	1.29	1642.27	1637	11	2.28E-02	24.8	
13	0	1173.27	482.	43.	1.87	2413.13	2407	17	1.34E-01	5.7	
14	0	1332.49	426.	28.	1.89	2752.10	2742	18	1.18E-01	5.7	
15	0	1460.71	215.	13.	1.74	3025.08	3015	18	5.97E-02	8.9	
16	0	1764.79	50.	3.	2.12	3672.47	3665	18	1.38E-02	19.5	
17	0	2614.92	55.	5.	2.15	5482.41	5473	18	1.54E-02	19.8	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND
 * AFTER ENERGY INDICATES CORRECTED PEAK

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	74.77	52.	120.	.96	74.41	73	6	1.44E-02	38.6	

3	0	320.28	85.	151.	1.10	597.10	594	10	2.37E-02	29.5
4	0	364.02	116.	104.	1.09	690.22	683	13	3.22E-02	21.1
5	0	428.59	98.	110.	.72	827.69	822	12	2.72E-02	24.4
6	0	510.98*	93.	124.	2.19	1003.11	995	19	2.59E-02	47.4
7	0	565.35	32.	29.	1.01	1118.85	1117	5	8.98E-03	32.8
8	0	569.17	88.	64.	1.22	1126.99	1123	10	2.43E-02	20.7
9	0	604.61	263.	154.	1.31	1202.43	1197	13	7.31E-02	12.3
10	0	661.71*	204.	102.	1.53	1324.00	1316	17	5.65E-02	16.4
11	0	795.98	236.	46.	1.59	1609.87	1605	13	6.54E-02	9.2
12	0	811.20	82.	82.	1.29	1642.27	1637	11	2.28E-02	24.8
13	0	1173.27	482.	43.	1.87	2413.13	2407	17	1.34E-01	5.7
14	0	1332.49*	380.	28.	1.89	2752.10	2742	18	1.05E-01	7.1
1460.71 KEV PEAK DELETED										
16	0	1764.72*	3.	3.	2.12	3672.47	3665	18	8.33E-04	****
2614.92 KEV PEAK DELETED										

UNIDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
0	0	74.77	52.	120.	.96	74.41	73	6	1.44E-02	38.6	2.94E+00
2	0	92.71	21.	101.	.61	112.60	111	5	5.81E-03	****	4.59E+00
5	0	428.59	98.	110.	.72	827.69	822	12	2.72E-02	24.4	3.35E+00
16	0	1764.72	3.	3.	2.12	3672.47	3665	18	8.33E-04	****	1.19E+00

LINEs NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /gram	ABNDIFF	FAILED
5	SB-125	427.89	2.77Y	1.000E 0	1.496E -7	38.75%	ABN
5	U-238	569.50	1.00E+10Y	1.000E 0	4.393E -7	12.34%	ABN
16	RA-226	1764.49	1600.00Y	1.000E 0	2.405E -8	10.17%	ABN

TOTAL LINES IN SPECTRUM 15
IDENTIFIED PEAKS 4
IDENTIFIED IN SUMMARY REPORT 11 73.33%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	1.463	7.190E -8	3.408E -8	47.39
CR-51	AP	27.70D	1.001	3.167E -7	9.348E -8	29.51
CO-58	AP	70.80D	1.000	5.900E -8	1.465E -8	24.83
CO-60	AP	1925.00D	1.000	3.911E -7	2.791E -8	7.14

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
I-131	HFP	8.04D	1.004	5.714E -8	1.208E -8	21.13

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
RH-105	FP	35.36H	1.020	1.652E -7	4.877E -8	29.51
SB-122	FP	2.70D	1.011	2.541E -8	8.345E -9	32.84
CS-134	FP	753.10D	1.000	1.556E -7	1.916E -8	12.32
CS-137	FP	30.17Y	1.000	1.474E -7	2.416E -8	16.39

THE DETROIT EDISON COMPANY

ENRICO FERMI II

Copy
FOR INFORMATION ONLY

GAMMA SPECTROSCOPY ANALYSIS REPORT

CHS ATTACHMENT # AUC7

CST 16 Hr NAL SPLIT

1630

= 1.39 E-6

PERFORMED BY:

2-25-74

SIGNATURE/DATE

REVIEWED BY:

2-25-74

SIGNATURE/DATE

Detroit Edison Fermi-2 Power Plant

25-FEB-1994 12:41:40.45

Chemistry Department Gamma Spectroscopy Report

Sample Parameters *****

File: cst
 Sample collection start date: 25-FEB-1994 11:30:00.00
 Sample collection end date : 25-FEB-1994 11:30:00.00
 Type of sample : liquid
 Sample quantity : 1.00020E+03 grams
 Sample geometry : MILL Operator: kas

Acquisition Parameters *****

Detector number : DET1 Acquire date : 25-FEB-1994 11:51:19.06
 Preset live time : 0 00:50:00.00 Elapsed live time : 0 00:50:00.00
 Elapsed real time : 0 00:50:00.17 Percent dead time : 0.00 %

Calibration Parameters *****

Detector number : DET1 Yearly cal date : 14-APR-1993 15:01:36.
 Kv/channel : 4.99924E-01 Zero offset: -3.52838E-01
 Daily cal date : 25-FEB-1994 01:12:21.13

Peak Search Parameters *****

Start channel : 100 End channel : 4096
 Weight sensitivity : 5.00000 Shape sensitivity : 10.00000
 Maximum number of iterations to resolve multiplets : 5

Nuclide Identification Parameters *****

Energy tolerance : 1.25000 Half-life ratio : 10.00000
 Abundance limit : 80.00000 Library : HOT_CLNT.nlb
 Efficiency file : EFFD1_MILL Efficiencies at : Peak energy

Post-NID Peak Search Report

#	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0	320.31	35	23	1.33	641.78	637	9	27.9		CR-51
0	604.76	94	24	1.31	1210.25	1203	14	15.2		CS-134
0	636.10	27	19	0.92	1272.93	1264	19	43.2		
0	667.36	77	19	1.82	1325.44	1317	18	18.2		CS-137
0	725.66	73	23	1.56	1591.99	1587	14	17.9		CS-134
0	811.07	72	5	1.22	1622.85	1618	9	21.6		CO-58
0	1177.40	122	6	2.11	2347.27	2336	20	10.1		CO-60
0	1332.46	119	11	2.15	2665.14	2656	21	11.5		CO-60

Rejected Report

		Half-Life				1-Sigma	
Slide	Half-life	Ratio	Energy	%Abund	Activity	%Error	Rejected by
356	6.10D	0.01	158.38*	98.80	---	Not found	---
			269.50	36.50	---	Not found	---
			480.44	36.50	---	Not found	---
			749.95	49.50	---	Not found	---
			811.85	86.00	9.816E-08	21.56	
			1561.80	14.00	---	Not found	---
			% Abundances Found =		26.77		
55-128	2.77Y	0.00	176.33	6.89	---	Not found	---
			380.44	1.50	---	Not found	---
			427.89*	29.33	---	Not found	---
			463.38	10.35	---	Not found	---
			600.56	17.80	---	Not found	---
			606.64	5.02	---	Not found	---
			635.90	11.32	4.922E-07	43.23	
			671.41	1.81	---	Not found	---
			% Abundances Found =		13.47	(Abn. Limit = 68.40%)	
I-131	8.04D	0.00	30.18	2.62	---	Not found	---
			284.30	6.05	---	Not found	---
			364.48*	81.20	---	Not found	---
			636.97	7.26	7.695E-07	43.23	
			722.89	1.80	---	Not found	---
			% Abundances Found =		7.34		
132	2.30H	0.34	505.90	5.03	---	Not found	---
			522.65	16.10	---	Not found	---
			535.50	0.52	---	Not found	---
			630.22	13.70	---	Not found	---
			650.60	2.66	---	Not found	---
			667.69*	98.70	---	Not found	---
			669.80	4.90	---	Not found	---
			671.60	5.20	---	Not found	---
			727.00	3.20	---	Not found	---
			772.61	76.20	---	Not found	---
			812.20	5.60	1.890E-06	21.56	
			954.55	18.10	---	Not found	---
			1136.03	2.96	---	Not found	---
			1398.57	7.10	---	Not found	---
			% Abundances Found =		2.15	(Abn. Limit = 67.00%)	

Flag: "*" = Kevline

Interference Report

Sample ID : cst

Page :°

Acquisition date : 25-FEB-1974 11:51:1

interference correction performed

ef Report

Nuclide	Activity uCi/gram	1-Sigma Error
CR-51	4.166E-07	1.160E-07
CO-58	8.465E-08	1.825E-08
CO-60	5.036E-07	5.776E-08
CS-134	1.890E-07	2.877E-08
CS-137	1.946E-07	3.543E-08

Total Activity : 1.388E-06

Minimum Detectable Activity Report

Slide	Bckgnd Sum	Energy (keV)	MDA (uCi/gram)
24	2.	1368.53	4.1874E-08
59	9.	1099.22	1.0614E-07
CU-64	1.	1345.90	1.1215E-05
ZN-65	11.	1115.52	1.2769E-07

PRE-RELEASE INFORMATION

4

Release Permit No. 94CST1

CERTIFIED TRUE COPY

INITIAL: Cap

DATE: Feb

NRC

1. Discharge Monitor reading:

115 cpm

2. Circulating Water Decant Monitor reading from Recorder D11-R806 on Panel H11-P842C540 in Main Control Room:

230 cpm

3. Circulating Water Decant (CWD) line % flow from Control Room Recorder N71-R802:

51.5 %

$$\begin{aligned} \text{Flow in gallons per minute} &= \frac{51.5 \text{ \% flow} \times 30,000 \text{ gpm maximum flow} \times 0.01}{1.55\text{E}+04 \text{ gpm}} \end{aligned}$$

4. Maximum tank discharge flow rate: 4.00E+02 gpm
(normally 50 gpm for Waste Sample Tank discharge)

5. Tank Volume to be released: 532,980 gal
(from 23.718.05, Att 1, Page 1 for Waste Sample Tank)

6. Tank Volume to be released in ml: Vol in gal x 3785 = 2.02E+09 ml

7. Calculation of dose equation multiplication factor (pre-release estimate):

$$\text{Multiplication Factor} = \frac{1.67\text{E}-02 \times \text{Tank volume (from part 5 above)}}{\text{CWD flow rate} \times 5}$$

$$\frac{1.15\text{E}-01}{1.55\text{E}+04 \text{ gpm} \times 5} = \frac{1.67\text{E}-2 \times 532,980 \text{ gal}}{1.55\text{E}+04 \text{ gpm} \times 5}$$

8. Discharge Monitor Sensitivity:

1.60E+07 cpm / (uCi/cc)

Performed by:

[Signature] 2-24-94
Signature / Date

Reviewed by:

[Signature] 2-24-94
Signature / Date

Reviewed by:

Signature / Date (CST only) [] NA

24

CALCULATION OF MPC FRACTION

CERTIFIED TRUE COPY

Release Permit No. 94CST1

INITIAL: _____

Type of Sample: CST

DATE: _____

Col. 1 Isotope	Col. 2 Conc. (uCi/ml)	Col. 3 MPC	Col. 4 MPC Fraction
1. Cr-51	2.89E-07	5.00E-03	5.78E-05
2. Mn-54	4.31E-08	3.00E-04	1.44E-04
3. Co-60	5.06E-07	3.00E-05	1.69E-02
4. Cs-134	1.64E-07	9.00E-06	1.82E-02
5. Cs-137	1.11E-07	1.00E-05	1.11E-02
6. I-131	7.30E-08	1.00E-05	7.30E-03
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
23.			
24.			
25.			
26.			
27.			
28.			
29.			
30.			
31.			
32.			
33.			
34.			
35.			
Total: 1.19E-06 uCi/ml		MPCF: 5.37E-02	

Performed by:

John V. [Signature] 2-24-94
Signature Date

Reviewed by:

Wanda [Signature] 2-24-94
Signature Date

Reviewed by:

Signature / Date (CST only) [] NA

CIRCULATING WATER DECANT MONITOR SETPOINT COMPARISON

Release Permit No. 94CST1

1. Estimated Circulating Water Decant Monitor alarm (high high) setpoint based on nuclide mix of batch to be released =

$$\frac{(\text{Cr-51 conc (att 2)} \times 0.098 \times 2.7\text{E}+8) + (\text{Total conc except Cr-51} \times 2.7\text{E}+8)}{\text{MPCF (Att 2)} \times 2} + \text{Circ Water Decant Monitor reading (Att 1)} =$$

$$\frac{(2.89\text{E}-07 \text{ uCi/cc} \times 0.098 \times 2.70\text{E}+08) + (8.97\text{E}-07 \text{ uCi/ml} \times 2.70\text{E}+08)}{5.37\text{E}-02 \times 2} + 230 \text{ cpm}$$

$$= 2.56\text{E}+03 \text{ cpm}$$

2. Installed Circulating Water Decant Monitor alarm (high high) setpoint

= 1700 cpm

3. Setpoint change required? _____ YES _____ X _____ NO

Performed by: [Signature] 2-24-94
Signature / Date

Reviewed by: [Signature] 2-24-94
Signature / Date

Reviewed by: _____ (CST only) [] NA
Signature / Date

CERTIFIED TRUE COPY

INITIAL: _____

DATE: _____

**CALCULATION OF DISCHARGE MONITOR RELEASE RATE AND SETPOINT -
CIRCULATING WATER NOT CONTAMINATED**

Release Permit No. 94CST1

BF = 0.1
H3MPCF = 0.13
H3F = 0.99

1. Maximum Allowable Release Rate =
$$\frac{\text{CWD flow rate (Att 1)} \times 0.5}{[(\text{MPCF (Att 2)} \times (1 + \text{BF})) + \text{H3MPCF}]} = \frac{1.55\text{E}+04 \text{ gpm} \times 0.5}{[(5.37\text{E}-02 \times (1 + 0.1)) + 1.3\text{E}-1]} = 4.09\text{E}+04 \text{ gpm}$$

2. Determination of "Estimated release rate" (for use in Part 3 and 4 below):

a) If maximum allowable release rate is greater than or equal to maximum release tank discharge flow rate, estimated release rate equals maximum release tank discharge flow rate (from Att 1, Part 4).

b) If maximum allowable release rate is less than maximum release tank discharge flow rate, estimated release rate equals maximum allowable release rate.

3. Total MPC fraction at discharge point =
$$\frac{\text{Estimated release rate} \times [\text{MPCF} \times (1 + \text{BF}) + \text{H3MPCF}]}{\text{CWD flow rate}}$$

=
$$\frac{4.00\text{E}+02 \text{ gpm} \times [5.37\text{E}-02 \times (1 + 0.1) + 1.3\text{E}-1]}{1.55\text{E}+04 \text{ gpm}} = 4.89\text{E}-03$$

4. Discharge Monitor Setpoint =
$$\frac{\text{Total conc (Att 2)} \times \text{Monitor Sensitivity (Att 1)} \times \text{CWD flow rate (Att 1 Part 3)} \times \text{H3F}}{\text{MPCF (Att 2)} \times \text{Estimated release rate (Att 4 Part 2)} \times (1 + \text{BF})} + \text{Discharge Monitor Background Reading (Att 1 Part 1)}$$

=
$$\frac{1.19\text{E}-06 \text{ uCl/cc} \times 1.60\text{E}+07 \text{ cpm/(uCl/cc)} \times 1.55\text{E}+04 \text{ gpm} \times 0.99}{5.37\text{E}-02 \times 4.00\text{E}+02 \text{ gpm} \times (1 + 0.1)} + 115 \text{ cpm}$$

= 1.24E+04 cpm

Performed by John VandeRby Date 2-24-94

Reviewed by Supra Lico Date 2-24-94

Reviewed by _____ Date _____ (CST only) [] NA

CERTIFIED TRUE COPY

INITIAL

DATE

PRE-RELEASE LIQUID EFFLUENT DOSE CALCULATION

Release Permit #
Multiplication factor94CST1
1.15E-01

Nuclide	uCi/yr	Bone Factor	Bone Dose	Liver Factor	Liver Dose	T body Factor	T body Dose	Thyroid Factor	Thyroid Dose	Kidney Factor	Kidney Dose	Lung Factor	Lung Dose	GI-LLI Factor	GI-LLI Dose
Cr-51	2.89E-07					1.29E+00	4.30E-08	7.70E-01	2.55E-08	2.84E-01	9.46E-09	1.71E+00	5.69E-08	3.24E+02	1.08E-05
Mn-54	4.31E-08			4.40E+03	2.19E-05	8.40E+02	4.17E-06			1.31E+03	6.51E-06			1.35E+04	6.70E-05
Co-60	5.06E-07			2.68E+02	1.56E-05	5.90E+02	3.44E-05							5.03E+03	2.93E-04
Cs-134	1.84E-07	2.88E+05	5.63E-03	7.00E+05	1.34E-02	8.80E+05	1.10E-02			2.30E+05	4.35E-03	7.62E+04	1.44E-03	1.24E+04	2.34E-04
Cs-137	1.11E-07	3.82E+05	4.89E-03	5.22E+05	8.68E-03	3.42E+05	4.37E-03			1.77E+05	2.26E-03	5.90E+04	7.55E-04	1.01E+04	1.29E-04
I-131	7.30E-08	1.7E+02	1.45E-06	2.46E+02	2.07E-06	1.41E+02	1.19E-06	8.08E+04	6.78E-04	4.21E+02	3.54E-06			6.49E+01	5.48E-07

CERTIFIED TRUE COPY

INITIAL: _____

DATE: _____

This release	Bone	Liver	T Body	Thyroid	Kidney	Lung	GI-LLI
Gamma organ dose (mRem)	1.05E-02	2.01E-02	1.54E-02	6.78E-04	6.62E-03	2.19E-03	7.35E-04
Pure beta organ dose (mRem)	7.04E-04	3.10E-04	1.99E-04	1.19E-04	1.19E-04	2.26E-04	2.84E-04
Total organ dose (mRem)	1.12E-02	2.04E-02	1.56E-02	7.97E-04	6.74E-03	2.42E-03	1.02E-03
Cumulative Ctr prior to release							
Gamma organ dose (mRem)							
Pure beta organ dose (mRem)							
Total organ dose (mRem)							
Cumulative Ctr after release							
	Total body dose limit 1.5 mRem/Ctr			Max dose to organ 6.0 mRem/Ctr			
Gamma organ dose (mRem)	1.05E-02	2.01E-02	1.54E-02	6.78E-04	6.62E-03	2.19E-03	7.35E-04
Pure beta organ dose (mRem)	7.04E-04	3.10E-04	1.99E-04	1.19E-04	1.19E-04	2.26E-04	2.84E-04
Total organ dose (mRem)	1.12E-02	2.04E-02	1.56E-02	7.97E-04	6.74E-03	2.42E-03	1.02E-03
Cumulative Year prior to release							
Gamma organ dose (mRem)							
Pure beta organ dose (mRem)							
Total organ dose (mRem)							
Cumulative Year after release							
	Total body dose limit 3.0 mRem/Year			Max dose to organ 10 mRem/Year			
Gamma organ dose (mRem)	1.05E-02	2.01E-02	1.54E-02	6.78E-04	6.62E-03	2.19E-03	7.35E-04
Pure beta organ dose (mRem)	7.04E-04	3.10E-04	1.99E-04	1.19E-04	1.19E-04	2.26E-04	2.84E-04
Total organ dose (mRem)	1.12E-02	2.04E-02	1.56E-02	7.97E-04	6.74E-03	2.42E-03	1.02E-03

Performed by [Signature] Date 2-24-94Reviewed by [Signature]Date 2-24-94

Reviewed by _____ Date _____ (CST only) [] NA []

LIQUID EFFLUENT RELEASE FROM CONDENSATE STORAGE TANK

PARAMETER	RESULTS	TOLERANCE
Total Activity Concentration Ratio (Sample 1/Sample 2)	0.68	0.6 - 1.67
Time Between Sample 1 and 2	4.7 hour(s)	>= 1 hour
Total MPC Fraction at Decant Line	4.89E-03	<1.0
Sample Composited (YES/NO)		YES
Pre-Release Cumulative Total Body Dose - Quarter (mrem)	1.56E-02 mrem	<= 1.5 mrem T. Body/Qtr
Pre-Release Cumulative Maximum Organ Dose - Quarter (mrem)	2.04E-02 mrem	<= 5.0 mrem Organ/Qtr
Pre-Release Cumulative Total Body Dose - Year (mrem)	1.56E-02 mrem	<= 3.0 mrem T. Body/Yr
Pre-Release Cumulative Maximum Organ Dose - Year (mrem)	2.04E-02 mrem	<= 10 mrem Organ/Yr
Background Reading	115 cpm	N/A
Source Check Reading (2 Minute Average)	cpm	> 2500 + Background
Test 2 Count Rate	cpm	70,000 to 80,000 cpm
High Voltage	Kilovolts	< 1.5 Kilovolts

Comments _____

Setpoint Installed by _____ Date _____

Setpoint Verified by _____ Date _____

ACCEPTANCE CRITERIA

- The results of information recorded in the above table is within the specified tolerances and required signatures are present

Performed by _____ Date _____

CERTIFIED TRUE COPY
INITIAL _____
DATE: _____

DETROIT EDISON FERMI-2 POWER PLANT

24-FEB-1994 13:58:17.89

RADIATION PROTECTION DEPARTMENT

GAMMA SPECTROSCOPY ANALYSIS REPORT

Sample ID Number: 203-E94

Acquisition Time: 24-FEB-1994 13:24:50.65

Storage file: 203-E94.cnf

REMARKS CST - 2nd Sample

CERTIFIED TRUE COPY	
INITIAL:	_____
DATE:	_____

PERFORMED BY:

[Signature]

SIGNATURE

REVIEWED BY:

[Signature] 2/24/94

SIGNATURE/DATE

Fermi 2 Radiation Protection Gamma Spectroscopy Report

***** Sample Parameters *****

Sample ID Number: 203-E94
 Sample collection start date: 24-FEB-1994 12:52:00.00
 Sample collection end date : 24-FEB-1994 12:52:00.00
 Type of sample : 1 Liter Marinell
 Sample quantity : 1.00170E+03 ml
 Sample geometry : MILL

Operator: BFB

***** Acquisition Parameters *****
 Detector number : DET1 Acquire date : 24-FEB-1994 13:24:50.65
 Preset live time : 0 00:33:20.00 Elapsed live time : 0 00:33:20.00
 Elapsed real time : 0 00:33:20.35 Percent dead time : 0.00 %

***** Calibration Parameters *****
 Detector number : DET1 Yearly cal date : 10-MAR-1993 14:54:45.27
 Kev/channel : 4.99927E-01 Zero offset: 7.03954E-01
 Daily cal date : 24-FEB-1994 08:27:39.11

***** Peak Search Parameters *****
 Start channel : 100 End channel : 4096
 Height sensitivity : 5.00000 Shape sensitivity : 10.00000
 Maximum number of iterations to resolve multiplets : 5

***** Nuclide Identification Parameters *****
 Energy tolerance : 1.25000 Half-life ratio : 10.00000
 Abundance limit : 75.00000 Library : dacmaster.nlb
 Efficiency file : EFFD1_m111 Efficiencies at : Peak energy

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	320.29	26	23	0.59	639.29	634	9	1.32E-02	41.4	
2	0	364.98	49	9	1.32	728.67	722	14	2.44E-02	27.5	
3	0	563.63	7	8	1.14	1126.08	1124	5	3.51E-03	68.1	
4	0	604.86	84	46	1.68	1208.56	1202	17	4.20E-02	21.6	
5	0	661.33	46	23	1.56	1321.51	1316	13	2.30E-02	27.0	
6	0	795.51	50	10	1.95	1589.95	1581	17	2.51E-02	19.6	
7	0	834.74	16	7	1.52	1668.44	1666	8	8.22E-03	38.0	
8	0	1172.74	131	10	2.93	2344.65	2333	19	6.57E-02	11.6	
9	0	1331.88	129	0	3.30	2663.06	2649	25	6.45E-02	8.8	

CERTIFIED TRUE COPY

INITIAL: _____

DATE: _____

 Edison Fermi 2 Peak Report, Generated 24-FEB-1994 13:58:23.01

 3-E94

0 00:32:50.65

Deposition Time = ^{RR 2/24/94} ~~17-NOV-1958~~ 00:00: (2)

ak Search Report

energy	Area	Bkgnd	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides
0 320.29	26	23	0.59	639.29	634	9	41.4		CR-51
0 364.98	49	9	1.32	728.67	722	14	27.5		I-131
0 563.63	7	8	1.14	1126.08	1124	5	68.1		CS-134
0 604.86	84	46	1.68	1208.56	1202	17	21.6		SB-122 - Attributed
0 661.33	46	23	1.56	1321.51	1316	13	27.0		CS-134 to CS
0 795.51	50	10	1.95	1589.95	1581	17	19.6		CS-137 No con
0 834.74	16	7	1.52	1668.44	1666	8	38.0		CS-134 peaks to
0 1172.74	131	10	2.93	2344.65	2333	19	11.6		MN-54 SB-D2-1
0 1331.88	129	0	3.30	2663.06	2649	25	8.8		CO-60 error

CERTIFIED TRUE COPY

INITIAL: _____

DATE: _____

Total number of lines in spectrum 9
Number of unidentified lines 0
Number of lines tentatively identified by NID 9 100.00%

Nuclide Type : activation

Nuclide	Hlife	Decay	Uncorrected uCi/ml	Decay Corr uCi/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
CR-51	27.70D	1.001	2.890E-07	2.893E-07	1.197E-07	41.36	
IN-54	312.70D	1.000	4.313E-08	4.314E-08	1.639E-08	38.00	
CO-60	5.27Y	1.000	5.055E-07	5.055E-07	0.445E-07	8.80	A
SB-122	2.70D	1.000	1.773E-08	1.788E-08	1.218E-08	68.12	CS-134
CS-134	2.06Y	1.000	1.637E-07	1.637E-07	0.353E-07	21.58	7m2-2494
Total Activity :			1.019E-06	1.019E-06			

Nuclide Type : fission

Nuclide	Hlife	Decay	Uncorrected uCi/ml	Decay Corr uCi/ml	Decay Corr 1-Sigma Error	1-Sigma %Error	Flags
I-131	8.04D	1.003	7.281E-08	7.302E-08	2.010E-08	27.52	
IS-137	30.17Y	1.000	1.111E-07	1.111E-07	0.300E-07	26.99	
Total Activity :			1.839E-07	1.841E-07			

Grand Total Activity : 1.203E-06 1.204E-06

Flags: "K" = Keyline not found
"E" = Manually edited

"M" = Manually accepted
"A" = Nuclide specific abn. limit

CERTIFIED TRUE COPY

DATE

Unidentified Energy Lines
Sample ID : 203-E94

Page : 3
Acquisition date : 24-FEB-1994 13:24:50

Done

Flags: "T" = Tentatively associated

CERTIFIED TRUE COPY

BY: _____

DATE: _____

Nuclide	Half-life	Ratio	Energy	%Abund	Activity	1-Sigma %Error	Rejected by
AS-76	26.32H	0.03	559.10*	44.70	---	Not found	---
			563.23	1.17	1.093E-06	68.12	Abun.
			571.30	0.14	---	Not found	---
			657.03	6.10	---	Not found	---
			665.31	0.39	---	Not found	---
			740.12	0.12	---	Not found	---
			771.76	0.12	---	Not found	---
			867.63	0.12	---	Not found	---
			1129.87	0.14	---	Not found	---
			1212.72	1.63	---	Not found	---
			1216.02	3.84	---	Not found	---
			1228.52	1.39	---	Not found	---
			1439.13	0.33	---	Not found	---
			1453.60	0.13	---	Not found	---
			1787.67	0.33	---	Not found	---
% Abundances Found =			1.93				

BR-84	31.80M	1.56	604.80	1.80	2.555E-05	21.58	Abun.
			736.50	1.31	---	Not found	---
			802.20	6.10	---	Not found	---
			881.50*	42.00	---	Not found	---
			1015.90	6.20	---	Not found	---
			1213.30	2.60	---	Not found	---
			1463.80	2.00	---	Not found	---
			1741.20	1.60	---	Not found	---
			1877.50	1.14	---	Not found	---
			1897.30	14.90	---	Not found	---
			2029.60	2.10	---	Not found	---
% Abundances Found =			2.20				

KR-88	2.84H	0.29	165.98	3.10	---	Not found	---
			196.32*	26.00	---	Not found	---
			362.23	2.25	---	Not found	---
			834.83	13.00	4.054E-07	38.00	Abun.
			985.78	1.31	---	Not found	---
			1141.33	1.28	---	Not found	---
			1179.51	1.00	---	Not found	---
			1250.67	1.12	---	Not found	---
			1369.50	1.48	---	Not found	---
			1518.39	2.15	---	Not found	---
			1529.77	10.90	---	Not found	---
			2029.84	4.53	---	Not found	---
			2035.41	3.74	---	Not found	---
% Abundances Found =			18.09				

ND-147	10.98D	0.00	91.10*	28.00	---	Not found	---
			319.41	1.96	1.453E-06	41.36	Abun.
			439.90	1.20	---	Not found	---
			531.02	13.10	---	Not found	---
% Abundances Found =			4.43				

AC-228	6.13Y	0.00	129.08	2.80	---	Not found	---
			Abun.				

Sample ID : 203-E94

Page _____ of _____

Minimum Detectable Activity Report

Isotope	Bkgnd Sum	Energy (keV)	MDA (uCi/ml)
BE-7	16.	477.59	3.1284E-07
BE-18	38.	511.00	3.6151E-08
EA-22	1.	1274.54	2.7701E-08
EA-24	2.	1368.53	3.8342E-08
EG-27	5.	1014.44	4.4143E-06
EL-38	2.	1642.42	3.3323E-07
EA-40	3.	1460.81	4.2863E-07
ER-41	2.	1293.64	4.8756E-08
EC-46	12.	889.25	5.3526E-08
EO-56	3.	1238.25	5.7516E-08
EN-56	1.	1810.69	1.7326E-07
AI-56	22.	158.38	1.6495E-08
EO-57	21.	122.06	1.8879E-08
EO-58	31.	810.76	7.3583E-08
EE-59	8.	1099.22	9.3110E-08
EU-64	2.	1345.90	1.2778E-05
EI-65	1.	1481.84	1.6889E-07
EN-65	6.	1115.52	9.0974E-08
EN-69M	16.	438.63	3.3707E-08
EE-75	23.	136.00	2.7801E-08
ES-76	10.	559.10	7.0527E-08
ER-82	8.	776.49	4.7056E-08
ER-83	15.	529.64	3.3916E-06
ER-84	12.	881.50	3.5388E-07
ER-85	0.	802.41	Half-Life too short
ER-85	13.	513.99	7.3340E-06
ER-85M	33.	151.18	2.8925E-08
ER-85	13.	513.99	3.1779E-08
ES-86	10.	1076.63	6.4785E-07
ER-87	20.	402.58	9.7743E-08
ER-87M	17.	388.40	4.1605E-08
ER-88	32.	196.32	1.0096E-07
ES-88	0.	1382.39	9.4902E-06
ER-88	0.	1836.01	1.4154E-08
ER-89	0.	220.90	Half-Life too short
ER-89	7.	1031.88	6.8058E-07
ER-90	0.	1118.69	Half-Life too short
ER-90	0.	831.69	Half-Life too short
ER-90M	11.	824.23	6.6281E-04
ER-90M	30.	202.51	2.6517E-08
ER-91	7.	1024.30	1.5679E-07
ER-91	3.	1204.90	1.2813E-05
ER-91M	15.	555.60	7.5677E-08
ER-92	0.	1383.94	1.5021E-08
ER-92	16.	934.46	5.2541E-07
ER-93	14.	590.28	4.1498E-06
ER-93	23.	266.90	3.5341E-07



Sample ID : 203-E94

Acquisition date : 24-FEB-1994 13:24:50

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/ml)
VB-94	12.	702.63	4.1214E-08
VB-95	5.	765.79	3.1523E-08
VB-95M	29.	235.69	9.5164E-08
ZR-95	5.	756.72	5.7876E-08
VB-97	16.	657.90	7.1961E-08
ZR-97	8.	743.36	3.8407E-08
MO-99	8.	739.58	2.9006E-07
TC-99M	18.	140.50	1.8171E-08
TC-101	19.	306.81	2.7057E-07
RU-103	13.	497.08	3.5176E-08
TC-104	17.	357.99	1.8082E-07
RH-105	37.	318.90	1.7483E-07
RU-105	8.	724.50	8.3781E-08
RU-106	11.	621.84	3.5460E-07
CD-109	17.	88.03	5.2105E-07
RG-110M	11.	937.48	1.5761E-07
SN-113	18.	391.69	4.4319E-08
SN-117M	24.	158.56	1.9634E-08
SB-124	66.	602.71	7.8254E-08
VB-125	37.	427.89	1.4689E-07
TE-125M	15.	109.28	5.2562E-06
TE-127	18.	417.90	3.2507E-06
TE-127M	22.	57.60	1.9325E-05
TE-127	31.	202.84	3.2101E-08
TE-129	21.	459.60	8.2163E-07
TE-129M	4.	695.88	8.0733E-07
TE-129M	31.	196.56	4.4859E-07
TE-130	13.	536.09	3.5656E-08
IA-131	25.	123.80	5.9558E-08
TE-131	25.	149.72	9.3163E-08
TE-131M	7.	773.67	9.7107E-08
TE-131M	22.	163.93	8.4604E-07
TE-132	12.	667.69	5.0039E-08
TE-132	26.	228.16	2.5028E-08
IA-133	14.	302.84	1.1350E-07
IA-133M	26.	276.09	1.4004E-07
TE-133	15.	529.87	4.2047E-08
TE-133M	15.	912.58	1.2748E-07
TE-133	22.	81.00	6.7296E-08
TE-133M	29.	233.22	2.3073E-07
TE-134	9.	884.09	1.3340E-07
TE-134	18.	210.47	1.7995E-07
IA-135M	22.	268.24	1.4503E-07
TE-135	3.	1260.41	1.5279E-07
TE-135	20.	249.79	2.4694E-08
TE-135M	11.	526.56	3.1529E-07
IS-136	11.	818.50	4.7225E-08
TE-136	0.	1313.02	Half-Life too short
TE-137	9.	455.49	1.8432E-04
IS-138	3.	1435.86	1.6777E-07
TE-138	21.	258.31	7.0713E-07

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/ml)
BA-139	1.	1420.50	1.6409E-05
CE-139	27.	165.85	2.2340E-08
CS-139	1.	1283.23	1.2055E-05
BA-140	11.	537.32	1.2221E-07
LA-140	1.	1596.49	3.5918E-08
BA-141	24.	190.22	2.3054E-07
CE-141	22.	145.44	3.2978E-08
LA-141	1.	1354.52	1.2711E-06
BA-142	26.	255.12	2.7219E-06
LA-142	12.	641.17	1.0390E-07
CE-143	21.	293.26	5.7126E-08
CE-144	19.	133.54	1.4089E-07
PR-144	0.	1489.15	2.6382E-05
ND-147	19.	91.10	6.9410E-08
PM-148M	18.	550.27	4.1193E-08
EU-152	14.	344.27	8.6077E-08
EU-154	8.	1004.76	2.7944E-07
EU-156	5.	646.29	3.8300E-07
HF-181	16.	482.03	4.0142E-08
TA-182	0.	1221.42	3.6086E-08
W-187	8.	685.81	1.2121E-07
RE-188	34.	155.03	1.3537E-07
HG-203	19.	279.19	2.8619E-08
BI-207	21.	569.67	4.4438E-08
TL-208	0.	583.14	Half-Life too short
PB-212	35.	238.63	6.1327E-08
BI-214	20.	609.31	5.1130E-07
PB-214	17.	351.92	2.3843E-07
RA-224	26.	240.98	5.8134E-07
RA-226	38.	186.21	6.8539E-07
AC-228	12.	338.32	1.8721E-07
TH-228	17.	84.37	1.6754E-06
PA-234	17.	131.20	7.6506E-08
TH-234	37.	63.29	1.5786E-06
J-235	23.	143.76	1.5568E-07
AP-239	20.	106.13	7.5038E-08
AM-241	28.	59.54	1.9117E-07

COPY

 ***** 24-FEB-94 16:00:21 *****

5

MONROE INTAKE/FERMI 2 SAMPLE.

STRAL FILE NAME: L940431.FEV
 FILE DATE: 24-FEB-94 06:30:00
 SAMPLE IDENTIFICATION: L940431.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 510.2000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 24-FEB-94 15:09:26 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 1.000
 ELAPSED REAL TIME: 768. SEC * SHAPE PARAMETER: 5.0 %
 ELAPSED LIVE TIME: 768. SEC * NBR ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY: MASTER.LI.
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
 EV CHNL: 4697016 * HALF LIFE RATIO: 5.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 10.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	1461.01	46.	8.	2.36	3025.72	3017	15	3.99E-02	12.7	

PEAK SEARCH COMPLETED (REV 15.8 - ND PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND
 * AFTER ENERGY INDICATES CORRECTED PEAK

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	1461.01*	3.	8.	2.36	3025.72	3017	15	3.55E-03	****	

D-5

UNIDENTIFIED PEAKS

NONE

LINE'S NOT MEETING SUMMARY CRITERIA

NONE

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(NO PC VERSION DEC 88)

PAGE 2

TOTAL LINES IN SPECTRUM 1
UNIDENTIFIED PEAKS 0
IDENTIFIED IN SUMMARY REPORT 1 100.00%

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	1.000	1.294E -7	4.613E -7	356.45

 ***** 24-FEB-94 15:57:43 *****

MONROE INTAKE/FERMI 2 SAMPLE.

CTRAL FILE NAME: L940431.FEV
 SAMPLE DATE: 24-FEB-94 06:30:00
 SAMPLE IDENTIFICATION: L940431.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 510.2000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 24-FEB-94 15:09:26 * FWHM(1332) 21.30
 DEDUCT TIME(LIVE): 3600. SEC * SENSITIVITY: 100
 ELAPSED REAL TIME: 68. SEC * SHAPE PARAMETER 3.33
 ELAPSED LIVE TIME: 768. SEC * NO. ITERATIONS: 10

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.00 KEV
 ID/CHNL: 14697016 * HALF LIFE RATIO: 1.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 10.00

ENERGY WINDOW 1461.00 TO 2858.03

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	1461.01	46.	8.	2.36	3025.72	3017	15	6.99E-02	19.7	

0 1461.01 46. 8. 2.36 3025.72 3017 15 6.99E-02 19.7

PEAK SEARCH COMPLETED (REV 15.8 - ND PC VERSION - NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 768. CORRECTED LIVE TIME: 768.

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR
1	0	1461.01	46.	8.	2.36	3025.72	3017	15	6.99E-02	19.7

PILE-UP CORRECTION COMPLETED

ELAPSED LIVE TIME: 768. (PILE-UP CORRECTED)

NUCLIDE PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	* 1-SIGMA ERROR
K-40	NP	1460.81	46.	8.	10.67*	1.362E+00	2.184E -6	4.302E -7

ELAPSED LIVE TIME

768. (PILE-UP CORRECTED)

UNIDENTIFIED PEAKS

NONE

LINEs NOT MEETING SUMMARY CRITERIA

NONE

TOTAL LINES IN SPECTRUM	1	
IDENTIFIED PEAKS	0	
IDENTIFIED IN SUMMARY REPORT	1	100.00%

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	1.000	2.184E -6	4.302E -7	19.70

MINIMUM DETECTABLE ACTIVITY REPORT (NO PC VERSION SEP. 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
7	14.	477.59	3.5421E-07
ANIL-511	50.	511.00	2.0887E-06
NA-22	6.	1274.54	5.5089E-08
NA-24	4.	1368.53	7.1472E-08
CL-38	2.	2167.51	0.0000E+00
AR-41	1.	1293.64	6.3909E-07
GC-46	12.	1120.51	6.9926E-08
CR-51	14.	320.00	2.9823E-07
IN-54	5.	834.83	3.5404E-08
IN-56	9.	846.75	5.1389E-07
FE-57	7.	1099.22	2.3457E-08
CO-58	29.	122.06	3.3005E-08
CO-60	11.	810.76	5.1367E-08
CO-60	12.	1332.49	8.0978E-08
NI-63	2.	1481.84	1.6904E-06
CU-64	10.	1345.90	2.4523E-05
ZN-65	4.	1115.52	7.9129E-08
ZN-65	18.	433.63	6.4031E-08
AS-76	11.	559.10	1.0285E-07
SE-71	13.	264.65	4.3378E-08
BR-82	16.	554.32	7.3593E-08
BR-84	10.	881.50	HALF LIFE TOO SHORT
KR-85	31.	513.99	1.3399E-05
85M	27.	151.18	1.4452E-07
87	21.	402.58	9.5040E-06
87	21.	196.32	8.3237E-07
RB-88	7.	1836.01	HALF LIFE TOO SHORT
RB-88	7.	1031.88	HALF LIFE TOO SHORT
SR-90	21.	513.99	5.8261E-08
SR-90M	17.	231.69	6.8352E-06
SR-91	6.	1024.30	2.6885E-07
SR-92	5.	1383.94	5.6144E-07
Y-88	7.	1836.01	7.8396E-08
Y-91	7.	1204.90	1.8879E-05
Y-91MD	17.	555.57	9.0034E-08
Y-92	3.	934.46	1.2206E-06
Y-93	17.	266.90	7.8694E-07
ZR-95	17.	756.72	1.0703E-07
ZR-97	8.	743.36	6.1316E-08
NB-94	7.	702.63	3.4958E-08
NB-95	9.	765.79	4.3816E-08
NB-97D	7.	1024.50	6.6055E-06
MO-90	16.	257.34	1.0573E-07
MO-99	6.	739.58	2.9299E-07
TC-99MD	24.	140.51	3.1443E-08
RU-103	13.	497.08	4.1193E-08
RU-105	9.	724.50	3.2859E-07
RU-106	4.	621.84	2.4214E-07
105	10.	318.90	1.5166E-07
110M	10.	657.75	4.1482E-08

SLIDE	BKG	ENERGY	MINIMUM UCI /gram
CS-109	22.	88.03	8.9886E-07
SN-113	10.	391.69	4.1479E-08
SB-122	3.	563.93	2.9839E-08
S3-124	23.	602.71	5.7114E-08
GB-125	12.	427.87	1.0674E-07
TE-123M	31.	158.99	3.5328E-08
TE-132	22.	228.16	3.6461E-08
I-131	24.	364.48	5.0853E-08
I-132	13.	667.67	5.4255E-07
I-133	9.	529.87	4.2246E-08
I-134	9.	347.05	HALF LIFE TOO SHORT
I-135	8.	1260.41	5.5121E-07
KE-131M	16.	163.23	1.1033E-06
KE-133	21.	80.99	1.0749E-07
KE-133M	17.	233.22	2.9068E-07
KE-135	17.	249.79	6.1518E-08
KE-135M	7.	526.56	HALF LIFE TOO SHORT
KE-138	19.	258.31	HALF LIFE TOO SHORT
CS-134	17.	604.70	4.9158E-08
CS-134M	23.	127.42	1.5990E-06
CS-136	7.	818.50	4.1709E-08
CS-137	25.	661.65	2.6042E-08
CS-138	2.	1435.86	HALF LIFE TOO SHORT
BA-133	19.	356.00	5.8700E-08
BA-139	14.	165.85	9.3463E-06
BA-140	14.	537.32	1.6315E-07
BA-141	20.	190.22	HALF LIFE TOO SHORT
LA-140	2.	1596.49	4.5800E-08
CE-139	14.	165.85	2.4666E-08
CE-141	22.	145.44	5.3229E-08
CE-143	16.	293.26	3.6427E-08
CE-144	32.	133.54	2.8321E-07
ND-147	13.	91.11	8.3701E-08
EU-152	13.	344.27	1.0840E-07
EU-154	6.	1274.45	1.5505E-07
HF-181	16.	482.03	4.8032E-08
W-187	13.	479.53	1.9577E-07
HG-203	10.	279.19	3.0418E-08
RA-226	19.	609.31	1.1003E-07
TH-232	14.	2614.66	0.0000E+00
U-235	24.	185.72	4.3095E-08
U-238	37.	131.20	1.5987E-07
NP-239	19.	106.13	1.1901E-07
AM-241	12.	59.54	2.1669E-07

 ***** 25-FEB-94 03:07:20 *****

PERMI 2/NRC SPLIT:MONROE WATER INTAKE,SAMPLE #1.

CONTROL FILE NAME: L940471.FEV
 SAMPLE DATE: 25-FEB-94 01:25:00
 SAMPLE IDENTIFICATION: L940471.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 498.9000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 25-FEB-94 01:43:00 * FWHM(1332) 1.836
 MEASUREMENT TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER: 5.000
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS 10

ANALYST: ONTEC * LIBRARY:MASTER.LIB
 ANALYSIS DATE: 25-FEB-94 07:26:00 * ENERGY TOLERANCE: 1.500 KEV
 CHANNEL: 14697016 * HALF LIFE RATIO: 3.00
 ENERGY: 39.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	CT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	238.97	94.	131.	1.10	423.98	420	12	2.61E-02	27.9	
2	0	351.58	58.	70.	1.11	663.74	659	12	1.60E-02	34.7	
3	0	511.00	204.	85.	1.90	1003.15	995	17	5.68E-02	15.0	
4	0	609.19	67.	50.	1.07	1212.19	1207	11	1.87E-02	24.4	
5	0	661.76	38.	54.	.72	1324.12	1318	13	1.06E-02	45.7	
6	0	1120.21	52.	26.	2.00	2300.16	2294	15	1.45E-02	28.2	
7	0	1172.99	36.	17.	2.15	2412.52	2408	11	9.86E-03	27.8	
8	0	1332.76	22.	23.	.72	2752.68	2744	16	5.98E-03	55.2	
9	0	1460.66	182.	25.	2.03	3024.98	3018	14	5.07E-02	9.0	
10	0	1764.61	34.	14.	1.27	3672.10	3666	14	9.35E-03	29.3	
11	0	2614.38	33.	9.	2.82	5482.32	5473	19	1.48E-02	21.3	

PEAK SEARCH COMPLETED (REV 15.8 - ND PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	CT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR
1	0	238.97	94.	131.	1.10	423.98	420	12	2.61E-02	27.9
2	0	351.58	58.	70.	1.11	663.74	659	12	1.60E-02	34.7
3	0	511.00	204.	85.	1.90	1003.15	995	17	5.68E-02	15.0
4	0	609.19	67.	50.	1.07	1212.19	1207	11	1.87E-02	24.4
5	0	661.76	38.	54.	.72	1324.12	1318	13	1.06E-02	45.7
6	0	1120.21	52.	26.	2.00	2300.16	2294	15	1.45E-02	28.2
7	0	1172.99	36.	17.	2.15	2412.52	2408	11	9.86E-03	27.8
8	0	1332.76	22.	23.	.72	2752.68	2744	16	5.98E-03	55.2
9	0	1460.66	182.	25.	2.03	3024.98	3018	14	5.07E-02	9.0

11 0 2614.88

53.

9. 2.82 5482.32 5473 19 1.48E-02 21.3

PILE-UP CORRECTION COMPLETED

NUCLIDE IDENTIFICATION SYSTEM (NO PC VERSION DEC 88)
 NUCLIDE LINE ACTIVITY REPORT
 ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

PAGE 1

FISSION GAS

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
XE-135	FG	249.79	0.	0.	89.90*	0.000E+00	.000E 0	.000E 0
		608.18	67.	50.	2.89	2.588E+00	1.449E -6	3.532E -7

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
NI-61	AP	511.00	204	85.	96.73*	2.943E+00	1.518E -7	2.275E -8
CO-60	AP	889.25	0	0.	99.98	0.000E+00	.000E 0	.000E 0
		1120.51	52	26.	99.99*	1.655E+00	4.762E -8	1.345E -8
PO-210	AP	1173.27	36	17.	100.00	1.600E+00	3.339E -8	9.281E -8
		1332.49	22	25.	100.00*	1.457E+00	2.221E -8	1.227E -8

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
RU-103	FP	477.00	0.	0.	89.90*	0.000E+00	.000E 0	.000E 0
		610.33	67.	50.	5.60	2.588E+00	6.984E -7	1.702E -7
CS-137	FP	661.55	38.	54.	85.12*	2.435E+00	2.766E -8	1.264E -8

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
K-40	NP	1460.81	132.	71.	10.67*	1.362E+00	1.890E -6	1.596E -7
RA-226	NP	186.21	0	0.	3.28	0.000E+00	.000E 0	.000E 0
		241.98	0	0.	7.49	0.000E+00	.000E 0	.000E 0
		295.21	0	0.	19.20	0.000E+00	.000E 0	.000E 0
		351.92	53	70.	37.20	3.360E+00	6.032E -8	2.091E -8
		609.31	67	50.	46.30*	2.588E+00	8.442E -8	2.057E -8
		1120.29	52	26	15.10	1.655E+00	3.152E -7	8.903E -8
		1238.11	0	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	34.	14.	15.80	1.135E+00	2.705E -7	7.913E -8
		2204.27	0	0.	4.98	0.000E+00	.000E 0	.000E 0
TH-232	NP	238.63	94	131	44.60	5.035E+00	6.287E -8	1.753E -8
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.30	0.000E+00	.000E 0	.000E 0
		583.14	0	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	53.	9.	35.86*	8.881E-01	2.522E -7	5.381E -8

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

IDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	*%EFF
1	0	238.77	94.	131.	1.10	423.98	420	12	2.61E-02	27.9	5.03E+00
11	0	2614.88	53.	9.	2.82	5482.32	5473	19	1.48E-02	21.3	8.88E-01

LINES NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLF	DECAY	UCI /gram	ABNDIFF	FAILED
1	TH-232	238.63	1.00E+10Y	1.000E	0	6.287E -8	45.15% ABN
4	RU-103	610.33	37.3Y	1.001E	0	6.984E -7	8.22% ABN
4	XE-135	668.18	9.1H	1.072E	0	1.449E -6	3.11% ABN
6	SC-46	1120.51	83.3Y	1.000E	0	4.762E -8	50.00% ABN
11	TH-232	2614.66	1.00E+10Y	1.000E	0	2.522E -7	45.15% ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(NO PC VERSION DEC 88)

PAGE 3

TOTAL LINES IN SPECTRUM	11	
UNIDENTIFIED PEAKS	2	
IDENTIFIED IN SUMMARY REPORT	9	81.82%

ACTIVATION PRODUCT

NUCLIDE	GBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
BNL-311	AP	109.70M	1.404	1.518E -7	2.275E -8	14.92
CO-60	AP	1925.00D	1.000	2.222E -8	1.227E -8	55.20

MISSION PRODUCT

NUCLIDE	GBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
CS-137	FP	30.17Y	1.000	2.766E -8	1.264E -8	45.70

NATURAL PRODUCT

NUCLIDE	GBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
40	NP	1.28E+09Y	1.000	1.890E -8	1.675E -8	8.82
44-226	NP	1600.00Y	1.000	8.442E -8	1.057E -8	12.52

MINIMUM DETECTABLE ACTIVITY REPORT (NO PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

SLIDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	47.	477.59	1.4099E-07
NA-22	14.	1274.54	1.8354E-08
NA-24	14.	1368.53	2.0294E-08
CL-38	6.	2167.51	0.0000E+00
AR-41	26.	1293.64	3.6125E-08
SC-46	70.	1120.51	3.6746E-08
CR-51	71.	320.08	1.4533E-07
MN-54	64.	834.83	2.7614E-08
MN-56	45.	846.75	3.0365E-08
FE-57	30.	1099.22	4.1996E-08
CO-57	111.	122.06	1.4075E-08
CO-58	37.	810.76	2.0487E-08
NI-65	17.	1481.84	1.2402E-07
CU-64	20.	1345.90	4.9291E-06
ZN-65	35.	1115.52	5.1018E-08
ZN-69M	64.	438.63	1.7734E-08
AS-76	62.	559.10	4.3320E-08
SE-77	67.	264.65	2.1443E-08
BR-82	52.	554.32	2.4809E-08
BR-84	45.	881.50	1.9240E-07
KR-85	108.	513.99	5.4557E-06
KR-85M	139.	151.18	2.1228E-08
KR-87	70.	402.58	5.2402E-08
38	97.	196.32	5.7421E-08
61	23.	1336.01	1.2087E-06
RB-87	26.	1031.88	4.2305E-07
SR-85	108.	513.99	2.3641E-08
SR-89M	80.	231.69	2.5925E-08
SR-91	43.	1024.30	3.3539E-08
SR-92	19.	1383.94	3.2044E-08
Y-88	23.	1836.01	3.0936E-08
Y-91	33.	1204.90	8.9083E-06
Y-91MD	50.	555.57	1.8995E-08
Y-92	45.	934.46	2.2166E-07
Y-93	64.	266.90	1.9434E-07
ZR-95	57.	756.72	4.2605E-08
IR-97	47.	743.36	2.3496E-08
NB-94	36.	702.63	1.7295E-08
N3-95	49.	765.79	2.2161E-08
NB-97D	44.	1024.50	2.6182E-06
MO-90	75.	257.34	1.9124E-08
MO-99	24.	739.58	1.1772E-07
TC-99MD	124.	140.51	1.4359E-08
RU-103	58.	497.08	1.8873E-08
RU-105	39.	724.50	4.3800E-08
RU-106	36.	621.84	1.5838E-07
RH-105	66.	318.90	7.2877E-08
110M	57.	657.75	2.1587E-08
109	93.	88.03	4.0299E-07
113	63.	391.69	2.2669E-08

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
122	50.	563.93	2.4436E-08
124	41.	602.71	1.6574E-08
SB-125	69.	427.89	5.5826E-03
TE-123M	127	158.99	1.5571E-08
TE-132	96.	228.16	1.5497E-08
I-131	69.	364.48	1.8288E-08
I-132	42.	667.69	2.3639E-08
I-133	61.	529.87	2.1531E-08
I-134	51.	347.03	5.3940E-03
SB-135	18.	1260.41	7.9176E-08
GE-131M	121.	163.93	6.4936E-07
GE-133	90.	80.99	4.7321E-08
GE-133M	88.	233.22	1.3007E-07
GE-135	94.	249.79	1.7364E-08
GE-135M	71.	526.56	2.8209E-07
GE-138	73.	258.31	6.1164E-07
OS-134	43.	604.70	1.7051E-03
OS-134M	122.	127.42	1.2299E-07
OS-136	43.	818.50	2.2274E-08
OS-138	19.	1435.86	9.9729E-08
SA-133	70.	356.00	2.4579E-08
SA-139	129.	165.85	1.2162E-07
SA-140	62.	537.32	7.3589E-08
SA-141	113.	190.22	2.0593E-07
140	12.	1596.49	2.1377E-08
139	129.	165.85	1.6308E-08
141	136.	145.44	2.3672E-08
TE-143	80.	293.26	3.5751E-08
TE-144	108.	133.54	1.1342E-07
TE-147	78.	91.11	4.6432E-08
TE-152	56.	344.27	4.9081E-08
TE-154	14.	1274.45	5.1667E-08
IF-181	71.	482.03	2.1956E-08
W-187	56.	479.53	7.0544E-08
HG-203	82.	279.19	1.8911E-08
TH-232	62.	2614.66	0.0000E+00
U-235	130.	185.72	2.4878E-08
U-238	116.	131.20	6.1755E-08
NP-239	138.	106.13	6.3548E-08
AM-241	68.	59.54	1.1253E-07

 ***** 25-FEB-94 03:12:20 *****

FERMI 2/NRC 3PLIT:MONROE WATER INTAKE,SAMPLE #1.

STRAL FILE NAME: L940471.FEV
 SAMPLE DATE: 25-FEB-94 01:25:00
 SAMPLE IDENTIFICATION: L940471.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 498.9000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500

ACQUIRE DATE: 25-FEB-94 01:25:00 * FWHM(1332) 1.886
 ACQUIRE TIME: 3600. SEC * SENSITIVITY: 5.000
 ACQUIRED REAL TIME: 3600. SEC * SHAPE PARAMETER: 5.0 %
 STOP TIME: 3600. SEC * NO. ITERATIONS: 10

DETECTOR: ORTEC * LIBRARY:MASTER.LIB
 ANALYSIS DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.00 KEV
 ANALYSIS CHNL: 4627016 * HALF LIFE RATIO: 8.00
 OFFSET: 32.8252300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	238.97	47.	131.	1.10	423.98	420	12	2.61E-02	37.9	
2	0	351.58	58.	70.	1.11	663.74	659	12	1.60E-02	34.7	
3	0	511.00	121.	85.	1.90	1003.15	995	17	5.63E-02	15.0	
4	0	609.19	67.	50.	1.07	1212.19	1207	11	1.87E-02	24.4	
5	0	661.76	38.	54.	.72	1324.12	1318	13	1.06E-02	45.7	
6	0	1120.21	52.	26.	2.00	2300.16	2294	15	1.45E-02	28.2	
7	0	1172.99	36.	17.	2.15	2412.52	2408	11	9.86E-03	27.8	
8	0	1332.76	22.	23.	.72	2752.68	2744	16	5.99E-03	55.2	
9	0	1460.66	182.	25.	2.03	2924.98	3018	14	5.07E-02	9.0	
10	0	1764.61	34.	14.	1.27	3172.10	3666	14	9.35E-03	29.3	
11	0	2614.88	53.	9.	2.82	5482.32	5473	19	1.48E-02	21.3	

PEAK SEARCH COMPLETED (REV 15.8 - 4D PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND

* AFTER ENERGY INDICATES CORRECTED PEAK

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	238.97*	47.	131.	1.10	423.98	420	12	1.31E-02	77.4	
2	0	351.58	58.	70.	1.11	663.74	659	12	1.60E-02	34.7	
3	0	511.00*	121.	85.	1.90	1003.15	995	17	3.28E-03	****	
4	0	609.19*	67.	50.	1.07	1212.19	1207	11	1.42E-03	****	
5	0	661.76	38.	54.	.72	1324.12	1318	13	1.06E-02	45.7	
1120.21 KEV PEAK DELETED											
7	0	1172.99	36.	17.	2.15	2412.52	2408	11	9.86E-03	27.8	

1452.46 KEV PEAK DELETED
1460.66 KEV PEAK DELETED
1764.61 KEV PEAK DELETED
2614.88 KEV PEAK DELETED

UNIDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1	0	238.97	47.	131.	1.10	423.98	420	12	1.31E-02	77.4	5.03E+00
2	0	351.58	58.	70.	1.11	663.74	659	12	1.60E-02	34.7	3.86E+00
4	0	609.19	5.	50.	1.07	1212.19	1207	11	1.42E-03	****	2.59E+00
7	0	1172.99	36.	17.	2.15	2412.52	2403	11	2.86E-03	27.8	1.60E+00

LINEs NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HL. T	DECAY	UCI /gram	ABNDIFF	FAILED
1	Th-232	238.63	1.00E+10 Y	1.000E 0	3.153E -8	25.03%	ABN
2	Ra-226	351.92	1600.00 Y	1.000E 0	6.032E -8	53.77%	ABN
4	Ru-105	610.33	33.10 D	1.001E 0	5.326E -8	5.92%	ABN
4	Xe-135	608.18	9.12 H	1.072E 0	1.105E -7	3.11%	ABN
4	Ra-226	609.31	1600.00 Y	1.000E 0	6.438E -8	53.77%	ABN
7	Co-60	1173.27	1925.00 D	1.000E 0	3.339E -8	50.00%	ABN

TOTAL LINES IN SPECTRUM	6	
IDENTIFIED PEAKS	4	
IDENTIFIED IN SUMMARY REPORT	2	33.33%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	1.404	8.770E -9	3.312E -8	377.66

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
CS-137	FP	30.17Y	1.000	2.766E -8	1.264E -8	45.70

 ***** 25-FEB-94 09:10:34 *****

FERMI 2/NRC SPLIT: MONROE WATER INTAKE, SAMPLE #2.

CONTROL FILE NAME: L940491.FEV
 SAMPLE DATE: 25-FEB-94 07:10:00
 SAMPLE IDENTIFICATION: L940491.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 515.6000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 25-FEB-94 07:10:00 FWHM(1332) 1.886
 RESET TIME(LIVE): 3600 SENSITIVITY: 1.000
 LIVED RATIO: 3600 SLS SHAPE PARAMETER: 5.00
 LIVED RATIO: 3600 SLS NBR ITERATIONS: 10

DETECTOR: CRILE * LIBRARY: MASTER.LIB
 ANALY DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.000 KEV
 EV/CHNL: 4697016 * HALF LIFE RATIO: 2.00
 OFFSET: 57.8232300 KEV * ABUNDANCE LIMIT: 70.000

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	63.24	53.	80.	.93	49.85	47	7	1.06E-02	44.2	
2	0	75.01	53.	111.	.96	74.91	72	6	1.47E-02	38.0	
3	0	238.42	56.	100.	1.14	422.82	419	8	1.57E-02	34.4	
4	0	242.01	70.	114.	1.15	430.47	427	10	1.94E-02	30.6	
5	0	294.95	58.	91.	1.31	543.17	539	9	1.62E-02	34.2	
6	0	351.78	80.	96.	.93	664.15	660	10	2.24E-02	24.7	
7	0	510.74	146.	97.	2.10	1002.58	997	12	4.06E-02	16.2	
8	0	582.86	45.	23.	2.01	1156.12	1153	7	1.25E-02	27.5	
9	0	609.37	137.	40.	1.50	1212.57	1208	13	3.80E-02	13.6	
10	0	777.21	29.	11.	1.34	1569.91	1567	7	8.02E-03	32.1	
11	0	1331.95	24.	12.	1.10	2750.96	2745	15	6.61E-03	32.4	
12	0	1460.89	216.	6.	1.86	3025.46	3019	14	5.99E-02	7.8	
13	0	1763.97	77.	3.	2.47	3670.72	3660	21	2.13E-02	13.5	
14	0	2614.76	55.	0.	2.96	5482.07	5475	18	1.53E-02	17.8	

PEAK SEARCH COMPLETED (REV 15.8 - ND PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

IT	ENERGY	AREA	BKND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR
1	0	63.24	38.	80.	.93	49.85	47	7	1.06E-02 44.2
2	0	75.01	53.	111.	.96	74.91	72	6	1.47E-02 38.0
3	0	238.42	56.	100.	1.14	422.82	419	8	1.57E-02 34.4
4	0	242.01	70.	114.	1.15	430.47	427	10	1.94E-02 30.6
5	0	294.95	58.	91.	1.31	543.17	539	9	1.62E-02 34.2
6	0	351.78	80.	96.	.93	664.15	660	10	2.24E-02 24.7

8	0	582.86	45.	23.	2.01	1156.12	1153	7	1.25E-02	27.5
9	0	609.37	137.	40.	1.50	1212.57	1208	13	3.80E-02	13.6
10	0	777.21*	29.	11.	1.34	1569.91*	1567	7	8.02E-03	32.1
11	0	1331.95	24.	19.	1.10	2750.96	2745	15	6.61E-03	52.4
12	0	1460.89	216.	6.	1.86	3025.46	3019	14	5.99E-02	7.8
13	0	1763.97	77.	3.	2.47	3670.72	3660	21	2.13E-02	13.5
14	0	2614.76	55.	0.	2.96	5482.07	5475	18	1.53E-02	17.8

PILE-UP CORRECTION COMPLETED

ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

FISSION GAS

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
XE-135	FG	249.79	0.	0.	89.90*	0.000E+00	.000E 0	.000E 0
		608.18	137.	40.	2.89	2.587E+00	2.882E -6	3.918E -7

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
ANIL-511	AP	511.00	146.	97.	26.73*	2.244E+00	1.100E -7	1.777E -8
CO-60	AP	1173.22	0.	0.	100.00	0.000E+00	.000E 0	.000E 0
		1332.49	14.	19.	100.00*	1.457E+00	2.379E -8	1.246E -8

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
IR-82	HFP	554.32	0.	0.	70.10*	0.000E+00	.000E 0	.000E 0
		619.07	0.	0.	43.10	0.000E+00	.000E 0	.000E 0
		698.33	0.	0.	23.20	0.000E+00	.000E 0	.000E 0
		776.49	27.	11.	33.31	2.164E+00	2.379E -8	7.639E -9
		827.31	0.	0.	24.20	0.000E+00	.000E 0	.000E 0
		1043.97	0.	0.	27.30	0.000E+00	.000E 0	.000E 0
		1317.47	0.	0.	26.90	0.000E+00	.000E 0	.000E 0
		1474.82	0.	0.	16.58	0.000E+00	.000E 0	.000E 0

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
SR-92	FP	241.52	70.	114.	3.00	4.994E+00	3.333E -7	2.706E -7
		430.58	0.	0.	3.30	0.000E+00	.000E 0	.000E 0
		753.32	0.	0.	3.60	0.000E+00	.000E 0	.000E 0
		1142.30	0.	0.	2.90	0.000E+00	.000E 0	.000E 0
		1383.94	0.	0.	90.00*	0.000E+00	.000E 0	.000E 0
MO-99	FP	140.51	0.	0.	90.60	0.000E+00	.000E 0	.000E 0
		181.06	0.	0.	6.20	0.000E+00	.000E 0	.000E 0
		366.43	0.	0.	1.37	0.000E+00	.000E 0	.000E 0
		739.58	0.	0.	12.80*	0.000E+00	.000E 0	.000E 0
		778.00	29.	11.	4.50	2.164E+00	4.364E -7	1.401E -7
RU-103	FP	497.08	0.	0.	89.00*	0.000E+00	.000E 0	.000E 0
		610.33	137.	40.	5.60	2.587E+00	1.376E -6	1.871E -7

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
K-40	NP	1460.81	216.	6.	10.67*	1.362E+00	2.161E -6	1.686E -7

NUCLIDE PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
RA-226	NP	186.21	0.	0.	3.28	0.000E+00	.000E 0	.000E 0
		241.98	70.	114.	7.49	4.994E+00	2.723E -7	8.340E -8
		295.21	58.	91.	19.20	4.370E+00	1.013E -7	3.458E -8
		351.92	00.	96.	37.20	3.858E+00	8.166E -8	2.016E -8
		609.31	137.	40.	46.30*	2.987E+00	1.663E -7	2.261E -8
		1120.27	0.	0.	15.10	0.000E+00	.000E 0	.000E 0
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	77.	3.	15.80	1.186E+00	5.956E -7	8.060E -8
		2204.22	0.	0.	4.98	0.000E+00	.000E 0	.000E 0
TH-232	NP	238.63	56.	100.	44.60	5.042E+00	3.654E -8	1.256E -8
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		427.17	0.	0.	11.30	0.000E+00	.000E 0	.000E 0
		583.14	45.	23.	30.25	2.673E+00	2.115E -8	2.233E -8
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2014.06	55.	0.	35.86*	8.881E-01	2.515E -7	4.468E -8

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

UNIDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF	
1	0	63.24	38.	80.	.93	49.85	47	7	1.06E-02	44.2	1.86E+00
2	0	75.01	53.	111.	.96	74.91	72	6	1.47E-02	38.0	2.96E+00
3	0	238.42	56.	100.	1.14	422.82	419	8	1.57E-02	34.4	5.04E+00
3	0	582.36	45.	23.	2.01	1156.12	1153	7	1.25E-02	27.5	2.67E+00
10	0	777.21	29.	11.	1.34	1569.91	1567	7	8.02E-03	32.1	2.16E+00
11	0	1331.75	14.	17.	1.10	2750.96	2745	19	6.51E-03	52.4	1.46E+00
14	0	2614.76	55.	0.	2.96	5482.07	5475	14	1.53E-02	17.8	8.88E-01

LINES NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /gram	ABNDIFF	FAILED
3	TH-232	238.43	1.00E+10Y	1.000E 0	3.654E -7	62.12%	ABN
4	SR-92	241.53	2.71H	1.292E 0	8.833E -7	2.92%	ABN
8	TH-232	583.14	1.00E+10Y	1.000E 0	8.115E -8	62.12%	ABN
9	RU-103	610.33	39.35D	1.001E 0	1.376E -6	1.92%	ABN
9	XE-135	608.17	9.11H	1.082E 0	2.882E -6	3.11%	ABN
10	SR-82	776.49	35.30H	1.021E 0	2.379E -6	36.02%	ABN
10	MO-99	778.06	66.02H	1.011E 0	4.364E -7	5.90%	ABN
11	CO-60	1332.49	1925.00D	1.000E 0	2.379E -6	50.00%	ABN
14	TH-232	2614.66	1.00E+10Y	1.000E 0	2.515E -7	62.12%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(NO PC VERSION DEC 88)

PAGE 4

TOTAL LINES IN SPECTRUM	14	
IDENTIFIED PEAKS	7	
IDENTIFIED IN SUMMARY REPORT	7	50.00%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	1.471	1.100E -7	1.777E -8	16.16

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	RP	1.20E+09Y	1.000	2.161E -6	1.636E -7	7.80
Ra-226	R	1600.00Y	1.000	1.663E -7	2.261E -8	13.59

MINIMUM DETECTABLE ACTIVITY REPORT (NO PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

LIDE	BKG	ENERGY	MINIMUM UCI /gram
7	59.	477.59	1.5286E-07
NA-22	21.	1274.54	2.1751E-08
NA-24	22.	1368.53	2.4756E-08
CL-38	6.	2167.51	0.0000E+00
AR-41	24.	1293.64	3.5185E-08
SC-46	56.	1120.51	3.1803E-08
CR-51	62.	320.08	1.3142E-07
IN-54	44.	834.83	2.2155E-08
IN-56	42.	846.75	2.9337E-08
FE-57	51.	1099.22	4.1310E-08
CO-57	122.	122.06	1.4279E-08
CO-58	41.	810.76	2.0869E-08
CO-60	31.	1352.49	3.1594E-08
AI-65	20.	1481.84	1.3463E-07
CU-64	27.	1345.90	5.5789E-06
FM-65	29.	1115.52	4.4936E-08
CR-69M	55.	430.63	1.6006E-08
AS-76	47.	559.10	3.6614E-08
SE-75	34.	264.65	2.3233E-08
SR-82	53.	554.32	2.4293E-08
SR-84	42.	881.50	2.1118E-07
CR-85	104.	513.99	5.1803E-06
CR-85M	119.	151.18	1.9370E-08
87	71.	402.58	5.4600E-08
88	102.	196.32	5.3708E-08
88-88	18.	1836.01	1.3784E-06
88-89	37.	1031.88	6.7972E-07
88-85	104.	513.99	2.2449E-08
88-85M	105.	231.69	3.0991E-08
SR-91	53.	1024.30	6.3220E-08
SR-92	18.	1383.94	3.1142E-08
Y-88	18.	1836.01	2.6482E-08
Y-91	29.	1204.90	8.0810E-06
Y-91MD	40.	555.57	1.6587E-08
Y-92	47.	934.46	2.2453E-07
Y-93	78.	266.90	2.0935E-07
ZR-95	40.	756.72	3.4537E-08
ZR-97	42.	743.36	2.1600E-08
NB-94	46.	702.63	1.8917E-08
NB-95	50.	765.79	2.1663E-08
NB-97D	24.	1024.50	1.8805E-06
MO-90	87.	257.34	2.0232E-08
MO-99	26.	739.58	1.1871E-07
TC-99MD	119.	140.51	1.3628E-08
RU-103	52.	497.08	1.7293E-08
RU-105	41.	724.50	4.4295E-08
RU-106	44.	621.84	1.6943E-07
RH-105	70.	318.90	7.2797E-08
110M	50.	657.75	1.9563E-08
109	116.	88.03	4.3550E-07

CLIDE	BKG	ENERGY	MINIMUM UCI /gram
113	85.	391.69	2.5479E-08
SB-122	43.	563.93	2.1955E-08
SB-124	48.	602.71	1.7353E-08
SB-125	64.	427.89	5.2024E-08
TE-123M	136.	158.99	1.5591E-08
TE-132	110.	228.16	1.6071E-08
I-131	75.	364.48	1.8457E-08
I-132	52.	667.69	2.6410E-08
I-133	60.	529.87	2.0747E-08
I-134	42.	847.03	5.2193E-08
I-135	19.	1260.41	7.0731E-08
XE-131M	129.	163.93	4.896E-07
XE-133	70.	30.99	4.0409E-08
XE-133M	102.	233.52	1.3574E-07
XE-135	82.	249.79	1.5840E-08
XE-135M	52.	526.56	3.2571E-07
XE-136	84.	258.31	9.1121E-07
CS-138	51.	604.70	1.7963E-08
CS-138M	121.	127.42	1.2205E-07
CS-139	48.	818.50	2.2777E-08
CS-139	82.	661.65	2.7925E-08
CS-139	25.	1435.86	1.2971E-07
BA-133	80.	356.00	2.5425E-08
BA-139	125.	165.85	1.2318E-07
LA-140	58.	537.32	6.0839E-08
LA-141	107.	190.22	2.5643E-07
LA-140	9.	1596.49	1.7952E-08
CE-139	125.	165.85	1.5533E-08
CE-141	121.	145.44	2.6179E-08
CE-141	86.	293.26	3.5960E-08
CE-143	134.	133.54	1.2224E-07
ND-147	95.	91.11	4.9599E-08
EU-152	64.	344.27	5.0771E-08
EU-154	21.	1274.45	6.1229E-08
HF-181	68.	482.03	2.0793E-08
W-187	58.	479.53	6.9716E-08
HG-203	63.	279.19	1.6040E-08
TH-232	54.	2614.66	0.0000E+00
U-235	128.	185.72	2.3886E-08
U-238	128.	131.20	6.2769E-08
NP-239	124.	106.13	5.3375E-08
AM-241	70.	59.54	1.1048E-07

 ***** 25-FEB-94 15:51:00 *****

FERMII 2/NRC SPLIT: MONROE WATER INTAKE, SAMPLE #3. (18 HOUR) *Rpt BKG*

CONTROL FILE NAME: L940521.FEV
 SAMPLE DATE: 25-FEB-94 13:25:00
 SAMPLE IDENTIFICATION: L940521.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 513.4000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 25-FEB-94 14:29:26 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 3600 SEC * SENSITIVITY: 1000
 ELAPSED REAL TIME: 3600 SEC * SHAPE PARAMETER 5.02
 ELAPSED LIVE TIME: 3600 SEC * NBR ITERATIONS: 10

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1000 KEV
 EV/CHNL: 4697016 * HALF LIFE RATIO: 0.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 0.002

ENERGY WINDOW 40.27 TO 2859.03

PK	CH	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	CORR	FTI
1	0	238.61	53.	90.	1.36	423.21	422	6	1.47E-02	12.7	
2	0	351.92	53.	74.	1.30	664.46	659	11	1.48E-02	36.0	
3	0	511.54	176.	131.	2.56	1004.30	996	21	1.58E-02	18.3	
4	0	610.12	49.	62.	.72	1214.17	1209	13	1.37E-02	38.0	
5	0	661.75	39.	56.	1.28	1324.10	1320	10	1.08E-02	42.9	
6	0	1120.62	33.	41.	.95	2301.03	2297	12	9.26E-03	46.1	
7	0	1331.81	26.	32.	.77	2750.65	2746	12	7.31E-03	51.5	
8	0	1460.84	203.	28.	1.74	3025.36	3018	17	5.64E-02	9.8	
9	0	1764.37	89.	0.	1.67	3671.57	3662	18	2.47E-02	12.8	
10	0	1836.53	33.	3.	2.20	3825.20	3819	14	9.17E-03	25.8	
11	0	2204.61	12.	13.	.56	4608.85	4606	11	3.37E-03	69.1	
12	0	2614.44	38.	15.	1.62	5481.38	5472	17	1.06E-02	24.7	

PEAK SEARCH COMPLETED (REV 15.3 - NO PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND
 * AFTER ENERGY INDICATES CORRECTED PEAK

PK	CH	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	CORR	FTI
238.61 KEV PEAK DELETED											
2	0	351.92	53.	74.	1.30	664.46	659	11	1.48E-02	36.0	
511.54 KEV PEAK DELETED											
4	0	610.12*	3.	62.	.72	1214.17	1209	13	1.09E-03	****	
661.75 KEV PEAK DELETED											
6	0	1120.62	33.	41.	.95	2301.03	2297	12	9.26E-03	46.1	

1331 KEV PEAK DELETED

1460.84 KEV PEAK DELETED

9	Q	1764.37*	42.	0.	1.67	3671.57	3662	18	1.18E-02	34.2
10	O	1836.53	33.	3.	2.20	3825.20	3819	14	9.17E-03	25.8
11	O	2204.61	12.	13.	.56	4608.85	4606	11	3.37E-03	69.1

2614.44 KEV PEAK DELETED

UNIDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
0		1836.53	33.	3.	2.20	3825.20	3819	14	9.17E-03	25.8	1.15E+00

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /gram	ABNDIFF	FAILED
4	RU-103	610.33	37.330	1.001E 0	7.609E -8	5.92%	ABN
6	BC-46	1120.31	33.830	1.001E 0	2.948E -8	50.00%	ABN
10	RB-88	1836.01	17.80M	3.180E 1	6.234E -6	57.28%	ABN
10	Y-88	1836.01	106.600	1.000E 0	4.223E -3	51.55%	ABN

TOTAL LINES IN SPECTRUM 6
IDENTIFIED PEAKS 1
IDENTIFIED IN SUMMARY REPORT 5 83.33%

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UC1 /gram	1-SIGMA ERROR	%ERR
RA-226	HP	1600.00Y	1.000	9.192E -2	2.954E -8	321.41

MINIMUM DETECTABLE ACTIVITY REPORT (ND PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
7	59.	477.59	1.5356E-07
ANIL-511	231.	511.00	6.2334E-08
NA-22	26.	1274.54	2.4307E-08
NA-24	17.	1368.53	2.2407E-08
CL-38	7.	2167.31	0.0000E+00
AR-41	20.	1293.64	3.9585E-08
K-40	226.	1460.81	7.4548E-07
SC-46	72.	1120.51	3.6223E-08
CR-51	76.	320.08	1.4621E-07
MN-54	41.	834.83	2.1479E-08
MN-56	41.	846.75	3.3653E-08
FE-57	31.	1099.22	4.1502E-08
CO-57	143.	122.06	1.5526E-08
CO-58	53.	810.76	2.3834E-08
CO-60	64.	1332.49	3.9643E-08
NI-63	19.	1481.34	1.5287E-07
CU-66	29.	1345.90	5.9801E-06
ZN-69	37.	1113.32	5.0978E-08
ZN-69M	72.	438.63	1.3399E-08
AS-76	68.	559.10	4.4862E-08
SE-75	34.	264.63	2.5336E-08
BR-82	52.	554.32	2.4423E-08
BR-84	45.	881.50	4.4451E-07
85	135.	513.99	5.9274E-06
85M	132.	151.18	2.2772E-08
R-87	68.	402.56	7.2007E-08
CR-88	99.	196.32	6.6260E-08
RE-88	35.	1836.01	6.8079E-06
RB-87	33.	1031.88	2.7567E-06
SR-85	135.	513.99	2.5693E-08
SR-85M	66.	231.69	3.4378E-08
SR-91	33.	1024.30	7.9104E-08
SR-92	28.	1383.94	4.4778E-08
Y-88	35.	1836.01	3.7092E-08
Y-91	37.	1204.90	9.1694E-06
Y-91MD	54.	555.57	2.0132E-08
Y-92	44.	934.46	2.4248E-07
Y-93	95.	266.90	2.4078E-07
ZR-95	74.	756.72	4.7188E-08
ZR-97	46.	743.36	2.3210E-08
NB-94	64.	702.63	2.2409E-08
NB-95	62.	765.79	2.4237E-08
NB-97D	32.	1024.30	2.2295E-06
HO-90	90.	257.34	2.2075E-08
HO-99	25.	739.58	1.1757E-07
TC-99MD	115.	140.51	1.3531E-08
RU-103	43.	497.08	1.5799E-08
RU-105	41.	724.50	4.8394E-08
106	59.	621.84	1.9704E-07
105	78.	318.90	7.7994E-08

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
110M	49.	657.75	1.9451E-08
CD-109	116.	88.03	4.3738E-07
SN-113	85.	391.69	2.5592E-08
SB-122	55.	563.93	2.5081E-08
SB-124	52.	602.71	1.8144E-08
SB-125	80.	427.89	5.8415E-08
TE-123M	101.	158.79	1.3496E-08
TE-132	122.	228.16	1.7079E-08
I-131	86.	364.48	1.9888E-08
I-132	53.	667.67	3.1504E-08
I-133	60.	529.87	2.1213E-08
I-134	38.	847.03	7.6378E-08
I-135	30.	1260.41	1.0647E-07
XE-131M	114.	163.93	6.1348E-07
XE-133	85.	80.99	4.4853E-08
XE-133M	79.	233.22	1.2083E-07
XE-135	103.	249.79	1.3576E-08
XE-135M	65.	526.56	1.5757E-06
XE-138	92.	258.31	4.6958E-06
CS-134	53.	604.70	1.8396E-08
CS-134M	137.	127.42	1.4837E-07
CS-136	42.	818.50	2.1423E-08
CS-137	95.	661.65	3.0186E-08
CS-138	20.	1435.86	2.3387E-07
133	94.	356.00	2.7679E-08
139	105.	165.85	1.4852E-07
BA-140	56.	537.32	6.8064E-08
BA-141	107.	190.22	8.7926E-07
LA-140	21.	1596.49	2.7796E-08
CE-139	105.	165.85	1.4299E-08
CE-141	145.	145.44	2.8786E-08
CE-143	79.	293.20	3.5007E-08
CE-144	138.	133.54	1.2459E-07
ND-147	101.	91.11	5.1434E-08
EU-152	68.	344.27	5.2558E-08
EU-154	26.	1274.45	6.8422E-08
HF-181	67.	482.03	2.0736E-08
W-187	66.	479.53	7.5868E-08
HG-203	80.	279.19	1.8158E-08
TH-232	52.	2614.66	0.0000E+00
U-235	134.	185.72	2.4544E-08
U-238	127.	131.20	6.2792E-08
NP-239	124.	106.13	5.9014E-08
AM-241	76.	59.54	1.1561E-07

 ***** 25-FEB-94 15:38:36 *****

FERMI 2/NRC SPLIT: MONROE WATER INTAKE, SAMPLE #3.(18 HOURS).

STRAL FILE NAME: L940521.FEV
 FILE DATE: 25-FEB-94 13:25:00
 SAMPLE IDENTIFICATION: L940521.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 513.4000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 25-FEB-94 14:27:26 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 3600 SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER: 5.0 %
 LAPPED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY:MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV, CHNL: .4697016 * HALF LIFE RATIO: 8.00
 OFFSET: 39.3232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGR	WHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	238.61	32.	90.	.86	423.21	422	6	1.47E-02	32.7	
2	0	351.92	53.	74.	1.30	664.46	659	11	1.48E-02	36.0	
3	0	511.54	196.	131.	2.36	1004.30	996	21	5.45E-02	18.3	
4	0	610.12	49.	62.	.72	1214.17	1209	13	1.37E-02	38.0	
5	0	661.75	39.	56.	1.28	1324.10	1320	10	1.08E-02	42.9	
6	0	1120.62	33.	41.	.95	2301.03	2297	12	9.26E-03	46.1	
7	0	1331.81	26.	32.	.77	2750.65	2746	12	7.31E-03	51.5	
8	0	1460.84	203.	28.	1.74	3025.36	3018	17	5.64E-02	9.8	
9	0	1764.37	89.	0.	1.67	3571.57	3662	18	2.47E-02	12.8	
10	0	1836.53	33.	3.	2.20	3825.20	3819	14	9.17E-03	25.8	
11	0	2204.61	12.	13.	.56	4608.85	4606	11	3.37E-03	69.1	
12	0	2614.44	38.	15.	1.62	5481.38	5472	17	1.06E-02	24.7	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKGR	WHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR
1	0	238.61	32.	90.	.86	423.21	422	6	1.47E-02	32.7
2	0	351.92	53.	74.	1.30	664.46	659	11	1.48E-02	36.0
3	0	511.54	196.	131.	2.36	1004.30	996	21	5.45E-02	18.3
4	0	610.12	49.	62.	.72	1214.17	1209	13	1.37E-02	38.0
5	0	661.75	39.	56.	1.28	1324.10	1320	10	1.08E-02	42.9
6	0	1120.62	33.	41.	.95	2301.03	2297	12	9.26E-03	46.1
7	0	1331.81	26.	32.	.77	2750.65	2746	12	7.31E-03	51.5
8	0	1460.84	203.	28.	1.74	3025.36	3018	17	5.64E-02	9.8

10	0	1836.53	33.	3.	2.20	3825.20	3819	14	9.17E-03	25.8
11	0	2204.61	12.	13.	.56	4608.85	4606	11	3.37E-03	69.1
12	0	2614.44	38.	15.	1.62	5481.38	5472	17	1.06E-02	24.7

PILE-UP CORRECTION COMPLETED

ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
ANIL-511	AP	511.00	196.	131.	96.73*	2.941E+00	1.822E -7	3.336E -8
SC-46	AP	889.25	0.	0.	99.98	0.000E+00	.000E 0	.000E 0
		1120.51	33.	41.	99.99*	1.655E+00	2.948E -8	1.359E -8
CO-60	AP	1173.22	0.	0.	100.00	0.000E+00	.000E 0	.000E 0
		1332.49	26.	32.	100.00*	1.458E+00	2.641E -8	1.361E -8

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
RB-88	FP	898.02	0.	0.	14.00	0.000E+00	.000E 0	.000E 0
		1836.01	33.	3.	21.40*	1.151E+00	6.234E -6	1.610E -6
		2677.86	0.	0.	1.76	0.000E+00	.000E 0	.000E 0
Y-88	FP	898.02	0.	0.	93.40	0.000E+00	.000E 0	.000E 0
		1836.01	33.	3.	99.38*	1.151E+00	4.223E -8	1.091E -8
RU-103	FP	497.05	0.	0.	39.00*	0.000E+00	.000E 0	.000E 0
		610.33	39.	62.	5.60	2.585E+00	5.002E -7	1.903E -7
CE-137	FP	661.65	39.	56.	85.12*	2.435E+00	2.732E -8	1.172E -8

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
Th-232	NP	1460.31	203.	28.	10.67*	1.362E+00	2.044E -6	1.996E -7
		186.21	0.	0.	3.28	0.000E+00	.000E 0	.000E 0
		241.28	0.	0.	7.49	0.000E+00	.000E 0	.000E 0
		295.21	0.	0.	12.20	0.000E+00	.000E 0	.000E 0
		351.72	33.	74.	37.20	3.857E+00	5.444E -8	1.758E -8
		609.31	49.	62.	46.30*	2.585E+00	6.043E -8	2.299E -8
		1120.29	33.	41.	15.10	1.655E+00	1.951E -7	8.992E -8
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	89.	0.	15.80	1.186E+00	6.948E -7	8.884E -8
		2204.22	12.	13.	4.98	1.007E+00	3.541E -7	2.447E -7
H-232	NP	238.63	53.	90.	44.60	5.039E+00	3.454E -8	1.128E -8
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0	.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		959.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	38.	15.	35.86*	8.832E-01	1.756E -7	4.334E -8

IDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1	0 238.61	53.	90.	.86	423.21	422	6	1.47E-02	32.7	5.04E+00
7	0 1331.81	26.	32.	.77	2750.65	2746	12	7.31E-03	51.5	1.46E+00
10	0 1836.93	33.	3.	2.20	3825.20	3819	14	9.17E-03	25.8	1.15E+00
12	0 2614.44	38.	15.	1.62	5481.38	5472	17	1.06E-02	24.7	3.38E-01

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /gram	ABNDIFF	FAILED
1	TH-232	238.63	1.00E+10Y	1.000E 0	3.454E -8	45.15%	ABN
4	KU-103	610.33	37.20Y	1.001E 0	5.003E -8	5.92%	ABN
6	SC-46	1120.51	83.23D	1.001E 0	2.948E -8	50.00%	ABN
7	CO-60	1332.49	1925.00D	1.000E 0	2.641E -8	50.00%	ABN
10	RB-88	1836.01	17.80M	3.180E 1	6.234E -6	57.28%	ABN
10	Y-88	1836.01	106.60D	1.000E 0	4.223E -8	51.55%	ABN
12	TH-232	2614.66	1.00E+10Y	1.000E 0	1.756E -7	45.15%	ABN

TOTAL LINES IN SPECTRUM 12
 UNIDENTIFIED PEAKS 4
 IDENTIFIED IN SUMMARY REPORT 8 66.67%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	1.805	1.822E -7	3.336E -8	18.31

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
CS-137	FP	30.17Y	1.000	2.732E -8	1.172E -8	42.91

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	1.000	2.044E -6	1.996E -7	9.76
RA-226	NP	1600.00Y	1.000	6.043E -8	2.299E -8	38.04

MINIMUM DETECTABLE ACTIVITY REPORT (ND PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

IDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	59.	477.59	1.5356E-07
NA-22	26.	1274.54	2.4307E-08
NA-24	17.	1368.53	2.2407E-08
CL-38	7.	2167.51	0.0000E+00
AR-41	20.	1293.64	3.9585E-08
SC-46	72.	1120.51	3.6223E-08
CR-51	76.	320.08	1.4621E-07
MN-54	41.	834.83	2.1479E-08
MN-56	41.	346.75	3.3653E-08
FE-59	31.	1099.22	4.1502E-08
CO-57	143.	122.06	1.5526E-08
CO-58	53.	810.76	2.3834E-08
CO-60	64.	1332.49	3.9643E-08
NI-65	19.	1481.84	1.5287E-07
CU-64	29.	1345.90	5.9801E-06
ZN-65	37.	1115.52	5.0978E-08
ZN-69M	77.	438.63	1.8899E-08
AS-76	58.	559.10	4.4862E-08
SE-75	84.	264.65	2.3336E-08
BR-82	52.	554.32	2.4423E-08
BR-84	45.	881.50	4.4451E-07
KR-85	135.	513.99	5.9274E-06
KR-85M	132.	151.18	2.2272E-08
87	68.	402.58	7.2007E-08
88	99.	196.32	6.6260E-08
RB-88	35.	1876.01	6.8079E-06
RB-89	33.	1031.88	2.7567E-06
SR-85	135.	513.99	2.5693E-08
SR-85M	66.	231.59	3.4378E-08
SR-91	33.	1024.30	7.9104E-08
SR-92	28.	1383.94	4.4778E-08
Y-88	35.	1836.01	3.7092E-08
Y-91	37.	1204.90	9.1694E-06
Y-91MD	54.	555.57	2.0132E-08
Y-92	44.	934.46	2.4248E-07
Y-93	95.	266.90	2.4078E-07
ZR-95	74.	756.72	4.7188E-08
ZR-97	46.	743.36	2.3210E-08
NB-94	64.	702.63	2.2409E-08
NB-95	62.	765.79	2.4237E-08
NB-97D	32.	1024.50	2.2295E-06
MO-90	90.	257.34	2.2075E-08
MO-99	25.	732.58	1.1757E-07
TC-99MD	115.	140.51	1.3531E-08
RU-103	43.	497.08	1.5799E-08
RU-105	41.	724.50	4.8394E-08
RU-106	59.	621.84	1.9704E-07
105	78.	318.90	7.7994E-08
110M	49.	657.75	1.9451E-08
109	116.	88.03	4.3738E-07

PEAK WIDTH = 3.00 FWHM CONFIDENCE LEVEL = 4.66. PAGE 2

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
113	85.	391.69	2.5592E-08
122	55.	563.93	2.5081E-08
SB-124	52.	602.71	1.8144E-08
SB-125	80.	427.89	5.8415E-08
TE-123M	101.	158.79	1.3496E-08
TE-132	122.	228.16	1.7079E-08
I-131	86.	364.48	1.9888E-08
I-132	53.	667.69	3.1504E-08
I-133	60.	529.87	2.1213E-08
I-134	38.	847.03	7.6378E-08
I-135	30.	1260.41	1.0647E-07
XE-131M	114.	163.93	6.1348E-07
XE-133	85.	80.29	4.4353E-08
XE-133M	79.	233.22	1.2083E-07
XE-135	103.	249.79	1.8576E-08
XE-135M	65.	526.56	1.5757E-06
XE-138	92.	258.31	4.6858E-06
CS-134	53.	604.70	1.8396E-08
CS-134M	137.	127.42	1.4837E-07
CS-136	42.	818.50	2.1423E-08
CS-138	20.	1435.36	2.3387E-07
BA-133	94.	356.00	2.7679E-08
BA-139	105.	165.85	1.4852E-07
BA-140	56.	537.32	6.8064E-08
141	107.	190.22	8.7926E-07
140	21.	1596.49	2.7796E-08
CE-139	105.	165.85	1.4299E-08
CE-141	145.	145.44	2.8786E-08
CE-143	79.	293.26	3.5007E-08
CE-144	138.	133.54	1.2459E-07
ND-147	101.	91.11	5.1434E-08
EU-152	68.	344.27	5.2558E-08
EU-154	26.	1274.45	6.8422E-08
HF-181	67.	482.03	2.0736E-08
W-187	66.	479.53	7.5868E-08
HG-203	80.	279.19	1.8158E-08
TH-232	52.	2614.66	0.0000E+00
U-235	134.	185.72	2.4544E-08
U-238	127.	131.20	6.2792E-08
NP-239	124.	106.13	5.9014E-08
AM-241	76.	59.54	1.1561E-07

 ***** 26-FEB-94 04:09:35 *****

FERMI 2 SPLIT SAMPLE; MONROE WATER #4

ORIGINAL FILE NAME: L940541.FEV
 FILE DATE: 25-FEB-94 19:30:00
 SAMPLE IDENTIFICATION: L940541.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 467.2000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQ: DATE: 25-FEB-94 19:35:42 * FWHM(1332) 1.886
 PRE: TIME(LIVE): 3600 SEC * SENSITIVITY 1.000
 CLAF: REAL TIME: 3600 SEC * SHAPE PARAMETER: 5.00
 CLAF: LIVE TIME: 3600 SEC * NBR ITERATIONS: 10

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 ANALY: DATE: 25-FEB-94 07:25:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CH: 14607016 * HALF LIFE RATIO: 5.00
 OFF3: 39.8232300 KEV * ABUNDANCE LIMIT: 10.00%

ENERGY WINDOW 40.29 TO 2558.03

PK	IT	ENERGY	AREA	BKQND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	F11
1	0	74.84	28.	139.	1.18	74.54	72	7	7.76E-03	75.3	
2	0	295.36	27.	88.	1.00	544.04	539	8	7.52E-03	65.5	
3	0	352.29	65.	64.	1.15	665.25	662	8	1.80E-02	24.9	
4	0	511.00	175.	134.	1.98	1003.14	995	20	4.85E-02	17.7	
5	0	609.42	50.	40.	1.09	1212.67	1208	9	1.38E-02	30.0	
6	0	662.10	30.	31.	1.41	1324.84	1320	9	8.39E-03	38.7	
7	0	1120.12	49.	16.	1.89	2299.95	2296	9	1.35E-02	23.5	
8	0	1237.03	35.	19.	.96	2548.87	2541	15	9.81E-03	40.9	
9	0	1460.81	194.	16.	1.71	3025.29	3017	15	5.40E-02	8.8	
10	0	1764.65	58.	6.	1.35	3672.17	3665	13	1.62E-02	14.8	
11	0	2615.10	51.	0	2.32	5482.78	5474	19	1.42E-02	14.0	

PEAK SEARCH COMPLETED (REV 15.8 - ND PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKQND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR
1	0	74.84	28.	139.	1.18	74.54	72	7	7.76E-03	75.3
2	0	295.36	27.	88.	1.00	544.04	539	8	7.52E-03	65.5
3	0	352.29	65.	64.	1.15	665.25	662	8	1.80E-02	24.9
4	0	511.00	175.	134.	1.98	1003.14	995	20	4.85E-02	17.7
5	0	609.42	50.	40.	1.09	1212.67	1208	9	1.38E-02	30.0
6	0	662.10	30.	31.	1.41	1324.84	1320	9	8.39E-03	38.7
7	0	1120.12	49.	16.	1.89	2299.95	2296	9	1.35E-02	23.5
8	0	1237.03	35.	19.	.96	2548.87	2541	15	9.81E-03	40.9
9	0	1460.81	194.	16.	1.71	3025.29	3017	15	5.40E-02	8.8

11 0 2615.10 51. 0. 2.32 5482.78 5474 19 1.42E-02 14.0

PILE-UP CORRECTION COMPLETED

NUCLIDE IDENTIFICATION SYSTEM (NO PC VERSION, DEC 88)
 NUCLIDE LINE ACTIVITY REPORT
 ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

PAGE 1

FISSION GAS

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
XE-135	FG	249.79	0.	0.	89.90*	0.000E+00	.000E 0	.000E 0
		608.18	50.	40.	2.89	2.587E+00	1.141E -6	3.424E -7

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
ANIL-511	AP	511.00	175.	124	96.73*	2.740E+00	1.376E -7	2.440E -8
C-14	AP	889.25	49.	0.	99.98	0.000E+00	.000E 0	.000E 0
		1120.31	49.	16.	99.99*	1.655E+00	1.735E -8	1.111E -8

HALOGEN FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
I-131	HP	529.87	0.	0.	56.30*	0.000E+00	.000E 0	.000E 0
		706.58	0.	0.	1.45	0.000E+00	.000E 0	.000E 0
		856.28	0.	0.	1.23	0.000E+00	.000E 0	.000E 0
		875.33	0.	0.	4.47	0.000E+00	.000E 0	.000E 0
		1236.41	35.	19.	1.47	1.539E+00	2.350E -6	1.043E -6
		1298.22	0.	0.	2.33	0.000E+00	.000E 0	.000E 0

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
C-1405	AP	477.08	0.	0.	39.00*	0.000E+00	.000E 0	.000E 0
		610.33	30.	40.	5.60	2.587E+00	5.507E -7	1.652E -7
C-1407	AP	661.65	10.	31.	35.12*	2.434E+00	2.342E -8	9.075E -9

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
K-40	NP	1460.81	194.	16.	10.67*	1.362E+00	2.150E -6	1.877E -7
RA-226	NP	186.21	0.	0.	3.28	0.000E+00	.000E 0	.000E 0
		241.98	0.	0.	7.47	0.000E+00	.000E 0	.000E 0
		295.21	27.	88.	19.20	4.366E+00	5.191E -8	3.402E -8
		351.92	65.	64.	37.20	3.354E+00	7.270E -8	1.811E -8
		609.31	50.	40.	46.30*	2.587E+00	6.656E -8	1.997E -8
		1120.29	49.	16.	15.10	1.655E+00	3.135E -7	7.354E -8
		1238.11	35.	19.	5.94	1.539E+00	6.209E -7	2.540E -7
		1764.49	58.	6.	15.80	1.185E+00	5.019E -7	7.408E -8
		2204.22	0.	0.	4.98	0.000E+00	.000E 0	.000E 0
H-232	NP	238.63	0.	0.	44.60	0.000E+00	.000E 0	.000E 0
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0	.000E 0
		583.16	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	51.	0.	35.36*	8.880E-01	2.574E -7	3.604E -8

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

IDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1	0	74.84	28.	139.	1.18	74.54	72	7	7.76E-03	75.3	2.94E+00
11	0	2615.10	51.	0.	2.32	5482.78	5474	15	1.42E-02	14.0	8.88E-01

LINES NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	PL	DECAY	UCI /gram	ABNDIFF	FAILED
5	20-102	610.33	39.350	1.001E	0	5.507E -7	5.92% ABN
3	20-133	602.18	9.111	1.070E	0	1.141E -7	3.11% ABN
7	30-46	1120.51	33.130	1.000E	0	4.735E -8	50.00% ABN
3	1-133	1236.41	20.001	1.030E	0	2.550E -6	1.1% ABN
11	78-232	2615.60	1.00E+10V	1.000E	0	2.574E -7	20.12% ABN

TOTAL LINES IN SPECTRUM 11
UNIDENTIFIED PEAKS 2
IDENTIFIED IN SUMMARY REPORT 9 81.82%

ACTIVATION PRODUCT

NUCLIDE	SBHP	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	1.396	1.376E -7	2.440E -8	17.73

ACTIVATION PRODUCT

NUCLIDE	SBHP	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	30.17Y	1.000	2.342E -8	2.071E -9	38.74

ACTIVATION PRODUCT

NUCLIDE	SBHP	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	1.29E+07Y	1.000	2.150E -6	1.897E -7	3.32
ANIL-511	NP	1600.00Y	1.000	6.656E -8	1.997E -8	30.01

MINIMUM DETECTABLE ACTIVITY REPORT (NO PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

LIDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	63.	477.59	1.7431E-07
NA-22	20.	1274.54	2.3426E-08
NA-24	23.	1368.53	2.7755E-08
CL-38	8.	2167.51	0.0000E+00
AR-41	21.	1293.64	3.4451E-08
SC-46	71.	1120.51	3.9518E-08
CR-51	74.	320.08	1.5843E-07
MN-54	34.	834.83	2.1493E-08
MN-56	41.	846.71	3.0812E-08
RE-59	38.	1099.21	5.0471E-08
CO-57	117.	122.0	1.5843E-08
CO-60	46.	310.76	2.4393E-08
TO-60	43.	1832.49	3.7726E-08
NI-63	8.	1481.84	9.0435E-08
CU-64	19.	1345.90	5.1256E-06
ZN-66	56.	1115.57	5.5252E-08
IN-89M	77.	438.64	2.0754E-08
RS-76	66.	559.16	4.7707E-08
DE-78	85.	264.65	2.5791E-08
BR-82	45.	554.32	2.4636E-08
BR-84	24.	381.50	1.4680E-07
KR-85	110.	513.99	5.8796E-06
KR-85M	130.	151.18	2.1866E-08
ST-87	68.	402.58	5.4653E-08
ST-88	114.	196.37	6.6203E-08
RE-88	19.	1836.01	1.1283E-06
RB-89	37.	1631.88	5.1525E-07
SR-89	10.	513.99	2.5478E-08
SR-91M	71.	231.60	2.9225E-08
CR-91	39.	1024.30	8.9933E-08
CR-92	12.	1383.94	2.7078E-08
Y-88	19.	1836.01	3.0026E-08
Y-91	21.	1204.90	7.5885E-06
Y-91MD	47.	555.57	1.9642E-08
Y-92	55.	934.46	2.6083E-07
Y-93	81.	266.90	2.3320E-07
ZR-95	59.	756.72	4.6287E-08
ZR-97	40.	743.36	2.3131E-08
NE-94	43.	702.63	2.0185E-08
NB-95	54.	765.79	2.4842E-08
NB-97D	35.	1024.50	2.4919E-06
MO-90	79.	257.34	2.0917E-08
MO-99	32.	739.58	1.4513E-07
TC-99MD	125.	140.51	1.5392E-08
RU-103	56.	497.08	1.9803E-08
RU-105	41.	724.50	4.7832E-08
RU-106	60.	621.84	2.1834E-07
RU-105	69.	318.90	7.9545E-08
RU-10M	40.	657.75	1.9310E-08
RU-109	100.	88.03	4.4623E-07

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66. PAGE 2

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
113	62.	391.69	2.4014E-08
122	56.	563.93	2.7610E-08
SB-124	69.	602.71	2.2959E-08
SB-125	57.	427.89	5.4183E-08
TE-123M	125.	158.77	1.6496E-08
TE-132	75.	228.16	1.6462E-08
I-131	62.	364.48	1.8511E-08
I-132	49.	667.69	2.7129E-08
I-133	53.	527.87	2.1419E-08
I-134	42.	847.03	5.1587E-08
I-135	25.	1260.41	1.0144E-07
XE-131M	105.	163.93	6.4592E-07
XE-133	30.	80.79	4.7638E-08
XE-133M	89.	233.27	1.3767E-07
XE-135	35.	247.79	1.7610E-08
XE-135M	58.	526.56	2.6025E-07
XE-138	74.	258.31	6.2612E-07
CS-134	69.	604.76	2.3065E-08
CS-134M	176.	12.47	1.3294E-07
CS-136	57.	818.50	2.2063E-08
CS-138	21.	1435.86	1.0258E-07
BA-133	81.	356.00	2.8234E-08
BA-139	110.	165.85	1.1893E-07
BA-140	53.	537.32	7.2652E-08
141	104.	190.22	2.0311E-07
140	10.	1596.49	2.0833E-08
CE-139	110.	165.85	1.6081E-08
CE-141	172.	145.44	2.8998E-07
CE-143	75.	293.26	3.6952E-08
CE-144	120.	133.54	1.2925E-07
ND-147	83.	91.11	5.1757E-08
EU-152	66.	344.27	5.6899E-08
EU-154	20.	1274.45	6.5944E-08
HF-181	57.	482.03	2.1007E-08
W-187	62.	479.53	7.9225E-08
HQ-203	67.	279.19	1.8253E-08
TH-232	50.	2614.66	0.0000E+00
U-235	174.	185.72	2.5945E-08
U-238	118.	131.20	6.6511E-08
NP-239	108.	106.13	6.0020E-08
AM-241	58.	59.54	1.1093E-07

 ***** 26-FEB-94 04:12:11 *****

RAT-DKG

FERMI 2 SPLIT SAMPLE; MONROE WATER #4

TRIAL FILE NAME: L940541.FEV
 SAMPLE DATE: 25-FEB-94 19:30:00
 SAMPLE IDENTIFICATION: L940541.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 467.2000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 25-FEB-94 19:53:42 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 3.000
 ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER: 5.0 %
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10

DETECTOR: ORTEC * LIBRARY:MASTER.LIB
 CALIB DATE: 23-FEB-94 07:30:01 * ENERGY TOLERANCE: 1.500 KEV
 KEY/CHNL: .4697016 * HALF LIFE RATIO: 8.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 10.002

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FI
1	0	74.84	28.	139.	1.18	74.54	72	7	7.76E-03	75.3	
2	0	295.36	27.	88.	1.00	544.04	539	8	7.52E-03	68.5	
3	0	352.29	65.	64.	1.15	665.25	662	3	1.80E-02	24.9	
4	0	511.00	175.	134.	1.98	1003.14	995	20	4.85E-02	17.7	
5	0	609.42	50.	40.	1.09	1212.67	1208	9	1.38E-02	30.0	
6	0	662.10	30.	31.	1.41	1324.84	1320	9	8.39E-03	38.7	
7	0	1120.12	49.	16.	1.89	2299.95	2296	9	1.35E-02	23.5	
8	0	1237.03	35.	19.	.96	2548.87	2541	15	9.81E-03	40.0	
9	0	1460.81	194.	16.	1.71	3025.29	3017	15	5.40E-02	8.8	
10	0	1764.65	58.	6.	1.35	3672.17	3665	13	1.62E-02	14.8	
11	0	2615.10	51.	0.	2.32	5482.78	5474	19	1.42E-02	14.0	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND

* AFTER ENERGY INDICATES CORRECTED PEAK

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FI
1	0	74.84	28.	139.	1.18	74.54	72	7	7.76E-03	75.3	
2	0	295.36	27.	88.	1.00	544.04	539	8	7.52E-03	68.5	
3	0	352.29	65.	64.	1.15	665.25	662	8	1.80E-02	24.9	
		511.00 KEV-PEAK DELETED									
5	0	609.42*	3.	40.	1.09	1212.67	1208	9	2.13E-03	99.7	
		662.10 KEV PEAK DELETED									
7	0	1120.12	49.	16.	1.89	2299.95	2296	9	1.35E-02	23.5	

8 0 1237.03 35 19 94 7548 87 7541 15 9 21E-03 20 9
1460.81 KEV PEAK DELETED
10 0 1764.65* 12. 6. 1.35 3672.17 3665 13 3.31E-03 ****
2615.10 KEV PEAK DELETED

UNIDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
0		74.84	28.	139.	1.18	74.54	72	7	7.76E-03	75.3	2.94E+00

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /gram	ABNDIFF	FAILED
5	RU-103	610.33	39.35	1.001E 0	8.518E -8	5.92%	ABN
6	XE-134	608.18	9.12	1.070E 0	1.765E -7	3.11%	ABN
7	SC-46	1120.51	83.33	1.000E 0	4.735E -8	50.00%	ABN
8	I-133	1226.41	20.44	1.030E 0	2.350E -6	1.33%	ABN

TOTAL LINES IN SPECTRUM 7
IDENTIFIED PEAKS 1
IDENTIFIED IN SUMMARY REPORT 6 85.71%

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
RA-226	NP	1600.00Y	1.000	1.030E -8	2.853E -8	277.13

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

LIDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	63.	477.59	1.7431E-07
ANIL-511	221.	511.00	5.1795E-08
NA-22	20.	1274.54	2.3426E-08
NA-24	23.	1368.53	2.7755E-08
CL-33	8.	2167.51	0.0000E+00
AR-41	21.	1293.64	3.4451E-08
K-40	209.	1460.81	7.3779E-07
GO-41	71.	1120.51	3.9518E-08
CR-51	74.	320.08	1.5843E-07
HN-51	34.	834.83	2.1493E-08
HN-51	41.	846.75	3.0812E-08
FE-57	38.	1099.22	3.0471E-08
CO-57	119.	122.06	1.5563E-08
CO-58	46.	819.76	2.4393E-08
CO-60	48.	1332.49	3.7726E-08
NI-63	8.	1481.84	9.0435E-08
CU-64	19.	1345.90	3.1236E-06
ZN-64	30.	1115.52	5.5252E-08
ZN-64	77.	433.63	2.0754E-08
AS-74	66.	559.16	4.7707E-08
SE-75	35.	264.63	2.5791E-08
BR-82	45.	554.32	2.4636E-08
BR-84	24.	881.50	1.4680E-07
BR-84	110.	513.99	5.8796E-06
BR-84	130.	151.18	2.1866E-08
AR-86	65.	402.58	5.4653E-08
KR-83	114.	196.32	5.6203E-08
RB-87	19.	1836.01	2.1283E-06
RB-87	37.	1031.88	5.1529E-07
SR-87	110.	513.99	2.5473E-08
SR-87	91.	231.67	2.9223E-08
SR-91	39.	1024.30	5.9933E-08
SR-92	12.	1383.94	2.7078E-08
Y-88	19.	1836.01	3.0026E-08
Y-91	21.	1204.90	7.3885E-06
Y-91MD	47.	555.57	1.9642E-08
Y-92	55.	934.46	2.5083E-07
Y-93	61.	266.90	2.3320E-07
ZR-95	59.	756.72	4.6287E-08
ZR-97	40.	743.26	2.3131E-08
NB-94	43.	702.63	2.9185E-08
NB-95	54.	765.79	2.4842E-08
NB-97D	35.	1024.50	2.4919E-06
MO-90	79.	257.34	2.0917E-08
MO-99	32.	739.58	1.4513E-07
TC-99MD	125.	140.51	1.5392E-08
RU-103	56.	497.08	1.9803E-08
RU-103	41.	724.50	4.7832E-08
RU-106	60.	621.84	2.1834E-07
RU-103	69.	318.90	7.9545E-08

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66. PAGE 2

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
110M	40.	657.75	1.9310E-08
109	100.	88.03	4.4623E-07
GN-113	62.	391.69	2.4014E-08
SB-122	56.	563.93	2.7610E-08
SB-124	69.	602.71	2.2959E-08
SB-125	57.	427.83	5.4183E-08
TE-123M	125.	158.22	1.6496E-08
TE-132	95.	228.16	1.6462E-08
T-131	62.	364.45	1.3511E-08
T-132	49.	667.69	2.7129E-08
T-133	93.	529.37	2.1419E-08
T-134	42.	847.03	5.1587E-08
T-135	26.	1260.41	1.0144E-07
KL-131M	105.	163.93	6.4592E-07
KE-133	30.	30.99	4.7638E-08
KL-133M	89.	233.22	1.3967E-07
KE-135	35.	249.70	1.7610E-08
KE-135M	38.	526.50	2.6025E-07
AE-138	74.	258.31	6.2612E-07
CS-134	69.	604.70	2.3065E-08
CS-134M	126.	127.42	1.3294E-07
CS-136	37.	818.50	2.2063E-08
CS-137	35.	661.65	2.7438E-08
CS-138	21.	1435.86	1.0958E-07
133	31.	356.00	2.8234E-08
139	110.	165.05	1.1893E-07
AN-140	53.	537.32	7.2632E-08
SA-141	104.	190.22	2.0311E-07
AR-140	10.	1596.49	2.0333E-08
SE-139	110.	165.05	1.6081E-08
SE-141	122.	145.64	2.8998E-08
SE-143	75.	293.26	3.6952E-08
SE-144	123.	133.54	1.2925E-07
ND-147	85.	91.11	5.1757E-08
EU-152	66.	344.27	5.6899E-08
EU-154	20.	1274.45	6.5944E-08
HF-181	57.	482.03	2.1007E-08
W-187	62.	479.53	7.9225E-08
HG-203	67.	279.19	1.8253E-08
TH-232	50.	2614.66	0.0000E+00
U-235	124.	185.72	2.5945E-08
U-238	118.	131.20	6.6511E-08
NP-239	108.	106.13	6.0020E-08
AM-241	58.	59.54	1.1098E-07

 ***** 26-FEB-94 10:29:36 *****

FERMI 2/NRC SPLIT: MONROE WATER INTAKE. SAMPLE #5.

CTRAL FILE NAME: L940551.FEV
 FILE DATE: 26-FEB-94 03:30:00
 SAMPLE IDENTIFICATION: L940551.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 511.3000 UNITS. gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 26-FEB-94 04:01:40 * FWHM(1332) 1.886
 RESOLUTION (E.V.) 3600 * SENSITIVITY 1.000
 LAPS: REAL TIME: 3600.300 * SHAPE PARAMETER 510 %
 LAPS: LIVE TIME: 3600.300 * NUMBER OF ITERATIONS: 10.

STEC: ORTEX * LIBRARY: MASTER.L
 ALU DATE: 26-FEB-94 07:00:00 * ENERGY TOLERANCE 1500 KEV
 * HALF LIFE 8.26E+01 YR
 * ABUNDANCE 1.00E+00

ENERGY WINDOW 40.29 TO 2838.00

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR
1	0	74.58	44.	38.	1.76	74.00	72	1.23E-02	38.7	
2	0	92.24	59.	137.	2.26	111.60	108	1.63E-02	46.5	
3	0	238.38	81.	80.	1.53	422.73	419	2.26E-02	24.2	
4	0	511.00	177.	116.	2.29	1003.14	997	4.92E-02	17.8	
5	0	582.84	44.	31.	4.46	1156.08	1149	1.22E-02	37.3	
6	0	662.09	45.	40.	1.45	1324.82	1320	1.25E-02	32.2	
7	0	1356.08	21.	14.	3.63	2802.33	2796	5.83E-03	54.9	
8	0	1460.82	179.	16.	1.94	3025.32	3017	4.98E-02	9.1	
9	0	1764.36	46.	7.	1.38	3671.97	3664	1.27E-02	21.4	
10	0	2614.50	50.	0.	1.64	5481.52	5473	1.39E-02	16.5	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PULSE-FILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR
1	0	74.58	44.	38.	1.76	74.00	72	1.23E-02	38.7	
2	0	92.24	59.	137.	2.26	111.60	108	1.63E-02	46.5	
3	0	238.38	81.	80.	1.53	422.73	419	2.26E-02	24.2	
4	0	511.00	177.	116.	2.29	1003.14	997	4.92E-02	17.8	
5	0	582.84	44.	31.	4.46	1156.08	1149	1.22E-02	37.3	
6	0	662.09	45.	40.	1.45	1324.82	1320	1.25E-02	32.2	
7	0	1356.08	21.	14.	3.63	2802.33	2796	5.83E-03	54.9	
8	0	1460.82	179.	16.	1.94	3025.32	3017	4.98E-02	9.1	
9	0	1764.36	46.	7.	1.38	3671.97	3664	1.27E-02	21.4	
10	0	2614.50	50.	0.	1.64	5481.52	5473	1.39E-02	16.5	

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
ANIL-511	AP	511.00	177.	116.	96.73*	2.943E+00	1.794E -7	3.189E -8

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
99-137	FP	661.65	45.	40.	35.12*	2.434E+00	3.132E -8	2.027E -8
ND-147	FP	91.11	59.	137.	28.00*	4.551E+00	6.793E -8	2.751E -8
		331.02	0.	0.	15.10	0.000E+00	.000E 0	.000E 0

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
40	NP	1460.31	1.7.	16.	10.67*	1.262E+00	1.310E -6	1.646E -7
232	NP	186.21	0.	0.	3.28	0.000E+00	.000E 0	.000E 0
		241.98	0.	0.	7.49	0.000E+00	.000E 0	.000E 0
		295.21	0.	0.	19.20	0.000E+00	.000E 0	.000E 0
		351.92	0.	0.	57.20	0.000E+00	.000E 0	.000E 0
		609.31	0.	0.	46.30*	0.000E+00	.000E 0	.000E 0
		1120.29	0.	0.	15.10	0.000E+00	.000E 0	.000E 0
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	46.	7.	15.80	1.185E+00	3.578E -7	7.651E -8
		2204.22	0.	0.	4.98	0.000E+00	.000E 0	.000E 0
232	NP	233.63	81.	80.	44.60	5.042E+00	5.315E -8	1.287E -8
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	1.80	0.000E+00	.000E 0	.000E 0
		583.14	44.	31.	30.25	2.673E+00	7.983E -8	3.015E -8
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	50.	0.	35.26*	8.882E-01	2.305E -7	3.803E -8

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

IDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1	0	74.58	44.	88.	.76	74.00	72	6	1.23E-02	38.9	2.92E+00
2	0	92.24	59.	137.	2.26	111.60	108	10	1.63E-02	40.5	4.55E+00
3	0	238.35	81.	30.	1.53	422.73	419	9	2.26E-02	24.2	5.04E+00
5	0	582.34	41.	7.	4.46	1156.08	1149	13	1.22E-02	37.8	2.67E+00
7	0	1356.00	21.	1.	3.63	2802.33	2796	14	5.83E-03	54.9	1.44E+00
9	0	1764.56	46.	1.	1.38	3671.97	3664	15	1.27E-02	21.4	1.19E+00
10	0	2614.50	50.	1.	1.64	5481.52	5473	17	1.39E-02	16.5	8.80E-01

LINE: NOT MEETING SUMMARY SET DATA

PK	NUCLIDE	ENERGY	HLF	DECAY	UCI /gram	ABNO	FAIL
2	ND-147	91.11	10.75	1.005E-0	6.793E-8	68.13%	ABN
3	TH-232	238.63	1.00E+10	1.000E-0	5.315E-8	62.10%	ABN
5	TH-232	582.14	1.00E+10	1.000E-0	7.983E-8	62.12%	ABN
7	Pa-226	1356.00	1.00E+10	1.000E-0	3.578E-7	10.17%	ADN
10	Th-232	2614.50	1.00E+10	1.000E-0	2.305E-7	63.17%	ABN

TOTAL LINES IN SPECTRUM 10
 UNIDENTIFIED PEAKS 7
 IDENTIFIED IN SUMMARY REPORT 3 30.00%

ACTIVATION PRODUCT

NUCLIDE	SDHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	1.203	1.794E-7	7.189E-8	17.78

FIS.ION PRODUCT

NUCLIDE	SDHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
13-137	FP	30.17Y	1.000	3.182E-8	1.027E-8	32.20

NATURAL PRODUCT

NUCLIDE	SDHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
54-101	NP	1.28E+09Y	1.000	1.310E-6	1.646E-7	9.09

MINIMUM DETECTABLE ACTIVITY REPORT (ND PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

SLIDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	56.	477.59	1.5024E-07
NA-22	20.	1274.54	2.1406E-08
NA-24	13.	1368.53	1.9876E-08
C-38	2.	2167.51	0.0000E+00
AR-41	16.	1293.64	3.3654E-08
SC-46	57.	1120.51	3.2364E-08
CR-51	69.	320.08	1.3992E-07
MN-54	47.	834.83	2.3092E-08
MN-56	42.	846.75	3.6290E-08
FE-59	51.	1099.22	4.1678E-08
CO-57	126.	122.06	1.4634E-08
CO-58	42.	810.76	2.1306E-08
CO-60	38.	1332.49	3.0673E-08
NI-65	15.	1481.84	1.4491E-07
CU-64	23.	1345.90	5.4122E-06
ZN-66	22.	1115.57	3.9471E-08
ZN-67M	53.	438.63	1.6463E-08
PD-76	54.	559.10	4.0376E-08
SE-75	41.	764.65	2.3011E-08
BR-82	43.	554.77	2.2398E-08
BR-84	50.	881.50	4.8628E-07
KR-85	97.	513.99	5.0450E-06
KR-85M	106.	151.18	2.0736E-08
87	69.	402.58	8.2136E-08
83	100.	196.33	7.0566E-08
88	16.	1836.01	7.7378E-06
82	30.	1031.88	4.7806E-06
81	97.	513.99	2.1870E-08
83M	99.	231.69	4.8415E-08
91	30.	1024.30	7.6962E-08
92	22.	1383.74	4.2168E-08
Y-88	16.	1836.01	2.5183E-08
Y-91	20.	1204.90	6.7699E-06
Y-91MD	53.	555.57	2.0352E-08
Y-92	43.	934.46	2.5131E-07
Y-93	75.	266.90	2.1810E-07
ZR-95	41.	756.72	3.5272E-08
ZR-97	34.	743.36	2.0218E-08
NB-94	44.	702.43	1.8657E-08
NB-95	50.	765.79	2.1859E-08
NB-97D	29.	1024.50	2.1505E-06
MO-90	91.	257.34	2.2897E-08
MO-99	37.	739.58	1.4395E-07
TC-99MD	116.	140.51	1.3677E-08
RU-103	60.	497.08	1.8742E-08
RU-105	49.	724.50	5.4983E-08
RU-106	48.	621.84	1.7846E-07
105	78.	318.90	7.8654E-08
110M	46.	657.75	1.8924E-08
109	78.	88.03	3.6013E-07

* PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
113	76.	391.69	2.4300E-08
122	36.	563.93	2.0423E-08
SB-124	39.	602.71	1.5779E-08
SB-125	62.	427.89	5.1637E-08
TE-123M	119.	158.99	1.4710E-08
TE-132	91.	228.16	1.4840E-08
I-131	71.	364.48	1.8159E-08
I-131	43.	667.69	3.0452E-08
I-131	50.	529.87	1.2588E-08
I-131	45.	847.03	9.9357E-08
I-131	20.	1260.41	8.9333E-08
XE-131M	103.	163.93	5.8585E-07
XE-131	79.	30.99	1.3471E-08
XE-131M	81.	233.22	1.2321E-07
XE-131	78.	249.79	1.6506E-08
XE-131M	50.	526.56	2.5214E-06
XE-131	32.	208.31	3.5016E-06
CS-134	42.	604.70	1.6444E-08
CS-134M	110.	127.42	1.4077E-07
CS-134	43.	818.50	2.1776E-08
CS-134	17.	1435.86	2.3786E-07
BA-139	85.	356.00	2.6428E-08
BA-139	103.	165.85	1.6494E-07
BA-140	57.	537.32	6.8986E-08
BA-141	90.	190.22	1.3377E-06
BA-141	9.	1596.49	1.8341E-08
CE-141	103.	165.85	1.4221E-08
CE-141	111.	145.44	2.5295E-08
TE-141	71.	293.26	3.3479E-08
TE-141	125.	133.54	1.1707E-07
ND-147	84.	91.11	4.7126E-08
EU-152	67.	344.27	5.2384E-08
EU-154	20.	1274.45	6.0256E-08
HF-181	67.	482.03	2.0824E-08
W-187	64.	479.53	7.5499E-08
HG-203	88.	279.19	1.9126E-08
RA-226	89.	609.31	5.0716E-08
TH-232	50.	2614.66	0.0000E+00
U-235	140.	185.72	2.5191E-08
U-235	106.	131.20	5.7601E-08
NP-239	108.	106.13	5.5451E-08
AM-241	57.	59.54	1.0053E-07

 ***** 26-FEB-94 10:32:33 *****

PMI 2/NRC SPLIT: MONROE WATER INTAKE, SAMPLE #5.

SPECTRAL FILE NAME: L940551.FEV
 SAMPLE DATE: 26-FEB-94 03:30:00
 SAMPLE IDENTIFICATION: L940551.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 511.3000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 26-FEB-94 04:47:40 * FWHM(1332) 1.88%
 PRESET TIME(LIVE): 3600 SEC * SENSITIVITY: 1.00%
 ELAPSED REAL TIME: 3600 SEC * SHAPE PARAMETER: 0.00
 ELAPSED LIVE TIME: 3600 SEC * NBR ITERATIONS: 10

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 0.300 KEV
 KEV/CHNL: 4697016 * HALF LIFE RATIO: 1.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 10.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	FW	CTS/SEC	ERR	FIT
1	0	74.58	44.	88.	1.76	74.00	72	6	1.23E-02	38.9	
2	0	92.24	59.	137.	2.26	111.60	108	10	1.66E-02	40.5	
3	0	238.38	31.	80.	1.53	422.73	419	9	1.26E-02	24.2	
4	0	511.00	177.	116.	2.29	1003.14	997	19	4.72E-02	17.8	
5	0	582.84	44.	31.	4.46	1156.08	1149	13	1.22E-02	37.8	
6	0	662.09	45.	40.	1.45	1324.82	1320	10	1.25E-02	32.2	
7	0	1356.08	21.	14.	3.63	2802.33	2796	14	5.83E-03	54.9	
8	0	1460.82	179.	16.	1.94	3025.32	3017	15	4.98E-02	9.1	
9	0	1764.56	46.	7.	1.38	3671.97	3664	13	1.27E-02	21.4	
10	0	2614.50	50.	0.	1.64	5481.52	5473	17	1.39E-02	16.5	

PEAK SEARCH COMPLETED (REV 15.8 - ND PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND

* AFTER ENERGY INDICATES CORRECTED PEAK

IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	FW	CTS/SEC	ERR	FIT	
1	0	74.58	44.	88.	1.76	74.00	72	6	1.23E-02	38.9	
2	0	92.24*	27.	137.	2.26	111.60	108	10	7.61E-03	****	
3	0	238.38*	14.	80.	1.53	422.73	419	9	3.42E-03	****	
		511.00 KEV PEAK DELETED									
5	0	582.84	44.	31.	4.46	1156.08	1149	13	1.22E-02	37.8	
		662.09 KEV PEAK DELETED									
7	0	1356.08	21.	14.	3.63	2802.33	2796	14	5.83E-03	54.9	
		1460.82 KEV PEAK DELETED									

2614.50 KEV PEAK DELETED
2614.50 KEV PEAK DELETED

NUCLIDE IDENTIFICATION SYSTEM UNKNOWN LINE REPORT

(NO PC VERSION DEC 88)

PAGE 1

UNIDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%
1	0	74.58								
2	0	92.24	44.	88.	74.00	72	6	1.23E-02	38.9	2.92E
3	0	238.38	27.	137.	111.60	108	10	7.61E-03	****	4.55E
5	0	582.84	14.	80.	422.73	419	9	3.92E-03	****	5.04E
7	0	1356.08	44.	31.	1156.08	1149	13	1.22E-02	37.8	2.67E
		21.	14.	3.63	2802.3	2796	14	5.83E-03	54.9	1.44E

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLT	DECAY	UCI /gram	ABND OFF	FALL
2	ND-147	91.1	10.72	1.003E	0	3.172E	ABD
3	TH-232	238.03	1.00E-10Y	1.000E	0	9.213E	ABD
5	TH-232	583.14	1.00E-10Y	1.000E	0	7.983E	ABD
						42.13%	ABD
						42.00%	ABD

 ***** 26-FEB-94 14:02:58 *****

ROE WATER INTAKE #5

CTRAL FILE NAME: L940561.FEV
 FILE DATE: 26-FEB-94 11:40:00
 SAMPLE IDENTIFICATION: L940561.FEV
 TYPE OF SAMPLE: LIQUID
 SAMPLE QUANTITY: 497.6000 UNITS: GRAM
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 26-FEB-94 13:00:39 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER 5.0 %
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 ORGIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHNL 1.4697016 * HALF LIFE RATIO: 8.00
 OFFSET 39.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2856.03

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	75.78	74.	168.	3.04	76.56	71	11	2.07E-02	35.3	
2	0	238.30	68.	98.	1.03	422.56	417	10	1.90E-02	31.4	
3	0	351.36	30.	64.	1.13	663.27	660	9	8.24E-03	54.5	
4	0	510.87	215.	76.	2.09	1002.86	995	17	5.98E-02	12.4	
5	0	609.34	33.	37.	2.09	1212.52	1209	9	9.27E-03	39.2	
6	0	662.80	37.	106.	4.06	1326.33	1314	24	1.03E-02	85.7	
7	0	1460.45	186.	9.	1.82	3024.53	3015	17	5.15E-02	9.9	
8	5	2613.84	32.	8.	2.19	5480.11	5473	17	8.90E-03	24.0	1.03E+00
9	5	2615.76	26.	7.	2.19	5484.20	5473	17	7.19E-03	28.6	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND
 * AFTER ENERGY INDICATES CORRECTED PEAK

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
0	0	75.78	74.	168.	3.04	76.56	71	11	2.07E-02	35.3	
0	0	238.30*	1.	98.	1.03	422.56	417	10	3.03E-04	****	
0	0	351.36	30.	64.	1.13	663.27	660	9	8.24E-03	54.5	
4	0	510.87*	18.	76.	2.09	1002.86	995	17	4.77E-03	****	
609.34 KEV PEAK DELETED											
662.80 KEV PEAK DELETED											
1460.45 KEV PEAK DELETED											
2613.84 KEV PEAK DELETED											
2615.76 KEV PEAK DELETED											

UNIDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
0	75.78	74.	168.	3.04	76.56	71	11	2.07E-02	35.8	3.04E+00
0	238.30	1.	98.	1.03	422.56	417	1C	3.03E-04	****	5.04E+00
0	351.36	30.	64.	1.13	663.27	660	9	8.24E-03	54.5	3.86E+00

LINE: NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	FWHM	DECAY	UCI /GRAM	ABNDIFF	FAILED
2	Th-232	238.63	1.00E-10Y	1.000E 0	7.314E-10	25.03%	ABN
3	Pa-226	351.92	1600 DAY	1.000E 0	3.115E-03	23.96%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(NO PC VERSION DEC 88).

PAGE 2

TOTAL LINES IN SPECTRUM	4	
IDENTIFIED PEAKS	3	
IDENTIFIED IN SUMMARY REPORT	1	25.00%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GRAM	1-SIGMA ERROR	2ERR
ANIL-511	AP	109.70M	2.000	1.876E -8	4.040E -8	213.06

 ***** 26-FEB-94 14:01:16 *****

MONROE WATER INTAKE #16

CTRAL FILE NAME: L940561.FEV
 FILE DATE: 26-FEB-94 11:40:00
 SAMPLE IDENTIFICATION: L940561.FEV
 TYPE OF SAMPLE: LIQUID
 SAMPLE QUANTITY: 497.6000 UNITS: GRAM
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

SQUARE DATE: 26-FEB-94 13:00:39 * FWHM(1332) 1.880
 PREP TIME(LIVE): 3600. SEC * SENSITIVITY: 1.000
 ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER: 5.0 %
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:20:01 * ENERGY TOLERANCE: 1.000 KEV
 GY/CHNL: .4697016 * HALF LIFE RATIO: 8.00
 OFFSET: 37.8232300 KEV * ABUNDANCE LIMIT: 70.000

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	75.78	74.	143.	3.04	76.56	71	11	2.07E-02	35.8	
2	0	238.30	68.	98.	1.03	422.56	417	10	1.90E-02	31.4	
3	0	351.36	30.	64.	1.13	663.27	660	9	8.24E-03	54.5	
4	0	510.87	215.	76.	2.09	1002.86	995	17	5.98E-02	12.4	
5	0	609.34	33.	37.	2.09	1212.52	1209	9	9.27E-03	39.2	
6	0	662.80	37.	106.	4.06	1326.33	1314	24	1.03E-02	85.7	
7	0	1460.45	186.	9.	1.82	3024.53	3015	17	5.15E-02	9.9	
8	5	2613.84	32.	8.	2.19	5480.11	5473	17	8.90E-03	24.0	1.03E+00
9	5	2615.76	26.	7.	2.19	5484.20	5473	17	7.19E-03	28.6	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR
1	0	75.78	74.	168.	3.04	76.56	71	11	2.07E-02	35.8
2	0	238.30	68.	98.	1.03	422.56	417	10	1.90E-02	31.4
3	0	351.36	30.	64.	1.13	663.27	660	9	8.24E-03	54.5
4	0	510.87	215.	76.	2.09	1002.86	995	17	5.98E-02	12.4
5	0	609.34	33.	37.	2.09	1212.52	1209	9	9.27E-03	39.2
6	0	662.80	37.	106.	4.06	1326.33	1314	24	1.03E-02	85.7
7	0	1460.45	186.	9.	1.82	3024.53	3015	17	5.15E-02	9.9
8	5	2613.84	32.	8.	2.19	5480.11	5473	17	8.90E-03	24.0
9	5	2615.76	26.	7.	2.19	5484.20	5473	17	7.19E-03	28.6

PILE-UP CORRECTION COMPLETED

ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

ION GAS

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GRAM	1-SIGMA ERROR
XE-135	FG	249.79	0.	0.	89.90*	0.000E+00	.000E 0	.000E 0
		608.18	33.	37.	2.89	2.587E+00	7.750E -7	3.038E -7

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GRAM	1-SIGMA ERROR
ANIL-511	AP	511.00	215.	76.	96.73*	2.943E+00	2.281E -7	2.817E -8

ION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GRAM	1-SIGMA ERROR
RU-103	FP	497.03	1.	0.	89.00*	0.000E+00	.000E 0	.000E 0
		610.34	2.	37.	5.60	2.587E+00	3.481E -7	1.365E -7
U-237	FP	661.03	37.	106.	35.12*	2.433E+00	2.678E -8	3.312E -8

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GRAM	1-SIGMA ERROR
U-238	NP	1460.81	186.	9.	10.67*	1.362E+00	1.926E -6	1.910E -7
U-238	NP	186.21	0.	0.	3.28	0.000E+00	.000E 0	.000E 0
		241.90	0.	0.	7.49	0.000E+00	.000E 0	.000E 0
		295.21	0.	0.	19.20	0.000E+00	.000E 0	.000E 0
		351.92	30.	64.	37.20	3.861E+00	3.115E -8	1.697E -8
		609.31	32.	37.	46.30*	2.587E+00	4.205E -8	1.648E -8
		1120.27	0.	0.	15.10	0.000E+00	.000E 0	.000E 0
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	0.	0.	13.80	0.000E+00	.000E 0	.000E 0
		2204.22	0.	0.	4.98	0.000E+00	.000E 0	.000E 0
Th-232	NP	238.33	63.	98.	44.60	5.044E+00	4.587E -8	1.438E -8
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0	.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	32.	8.	35.86*	3.883E+01	1.517E -7	3.638E -8

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

IDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1 0	75.78	74.	168.	3.04	76.56	71	11	2.07E-02	35.8	3.04E+00
2 0	238.30	68.	98.	1.03	422.56	417	10	1.90E-02	31.4	5.04E+00
3 0	351.36	30.	64.	1.13	663.27	660	9	8.24E-03	54.5	3.86E+00
5 0	609.34	33.	37.	2.09	1212.52	1209	9	9.27E-03	39.2	2.59E+00
8 5	2613.84	32.	8.	2.19	5480.11	5473	17	8.90E-03	24.0	8.88E-01
9 5	2615.76	26.	7.	2.19	5484.20	5473	17	7.19E-03	28.6	8.88E-01

LINES NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI	/GRAM	ABNDIFF	FAILED
2	TH-232	238.03	1.00E+10Y	1.000E	0	4.587E -8	45.15%	ABN
3	RA-226	351.92	1600.00Y	1.000E	0	3.115E -8	53.77%	ABN
5	RU-103	610.33	39.35D	1.001E	0	3.481E -7	5.92%	ABN
5	XE-135	608.18	9.11H	1.150E	0	7.750E -7	3.11%	ABN
8	RA-226	609.31	1600.00Y	1.000E	0	4.205E -8	53.77%	ABN
8	TH-232	2614.66	1.00E+10Y	1.000E	0	1.317E -7	45.15%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(NO PC VERSION DEC 88)

PAGE 3

TOTAL LINES IN SPECTRUM	9	
UNIDENTIFIED PEAKS	6	
IDENTIFIED IN SUMMARY REPORT	3	33.33%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GRAM	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	2.000	2.281E -7	2.817E -8	12.35

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GRAM	1-SIGMA ERROR	%ERR
U3-137	FP	30.17Y	2.000	2.698E -8	2.312E -8	35.70

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GRAM	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	2.000	1.926E -6	1.710E -7	9.92

MINIMUM DETECTABLE ACTIVITY REPORT (ND PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

IDE	BKG	ENERGY	MINIMUM UCI /GRAM
BE-7	54.	477.59	1.5160E-07
NA-22	22.	1274.54	2.3069E-08
NA-24	16.	1368.53	2.2710E-08
CL-38	5.	2167.51	0.0000E+00
AR-41	21.	1293.64	4.6370E-08
SC-46	44.	1120.51	2.9219E-08
CR-51	70.	320.00	1.4482E-07
MN-54	28.	834.87	1.8314E-08
MN-55	40.	846.77	3.6881E-08
FE-59	24.	1099.22	3.7683E-08
CO-57	122.	122.00	1.4796E-08
CO-58	41.	810.70	2.1631E-08
CO-60	45.	1332.40	3.4297E-08
NI-63	15.	1481.84	1.5095E-07
CU-64	26.	1345.90	5.9289E-06
ZN-65	29.	1115.52	4.6566E-08
ZN-66M	56.	438.60	1.7432E-08
AS-75	50.	559.10	3.9974E-08
SE-78	60.	264.60	2.0350E-08
BR-82	49.	554.37	2.4591E-08
BR-84	53.	881.50	5.9927E-07
KR-85	95.	513.99	5.1302E-06
KR-85M	113.	151.18	2.2169E-08
07	66.	402.58	8.4810E-08
38	95.	196.32	7.1535E-08
RB-88	18.	1836.01	9.4720E-06
RB-89	26.	1031.88	5.2284E-06
BR-90	95.	513.99	2.2240E-08
BR-89M	86.	231.69	4.7806E-08
BR-91	27.	1024.30	7.5295E-08
BR-92	21.	1383.94	4.2874E-08
Y-88	18.	1836.01	2.7446E-08
Y-91	24.	1204.90	7.6204E-06
Y-91MD	59.	555.57	2.2144E-08
Y-92	32.	934.46	2.2495E-07
Y-93	82.	266.90	2.3513E-07
ZR-95	36.	756.72	3.3962E-08
ZR-97	40.	743.36	2.2580E-08
NB-94	51.	702.63	2.0639E-08
NB-95	52.	765.79	2.2906E-08
NB-97D	31.	1024.50	2.2893E-06
MO-90	73.	257.34	2.1201E-08
MO-99	28.	739.58	1.2874E-07
TC-99MD	116.	140.51	1.4061E-08
RU-103	53.	497.08	1.8101E-08
RU-105	32.	724.50	4.6012E-08
RU-106	48.	621.84	1.8337E-07
105	70.	318.90	7.6637E-08
110M	49.	657.75	2.0069E-08
09	83.	88.03	3.8173E-07

NUCLIDE	BKG	ENERGY	MINIMUM UCI /GRAM
113	55.	391.69	2.1241E-08
122	50.	563.93	2.4745E-08
SB-124	47.	602.71	1.7799E-08
SB-125	72.	427.89	5.7178E-08
TE-123M	92.	158.99	1.3290E-08
TE-132	69.	228.16	1.3284E-08
I-131	68.	364.48	1.8264E-08
I-132	37.	667.69	2.9463E-08
I-133	49.	529.37	1.9958E-08
I-134	37.	847.03	9.6286E-08
I-135	17.	1260.41	8.5071E-08
XE-131M	116.	163.93	6.3891E-07
XE-133	67.	80.99	4.1147E-08
XE-133M	85.	233.22	1.2977E-07
XE-135	89.	249.79	1.8106E-08
XE-135M	42.	526.56	2.7167E-06
XE-138	65.	258.31	2.0033E-06
CS-134	39.	604.70	1.6282E-08
CS-134M	120.	127.42	1.5287E-07
CS-136	35.	818.50	2.0169E-08
CS-138	20.	1435.86	3.4210E-07
BA-133	84.	356.00	2.6996E-08
BA-139	116.	165.85	1.8437E-07
BA-140	55.	537.32	6.9638E-08
141	112.	190.22	1.7171E-06
140	10.	1596.49	1.9883E-08
CE-139	116.	165.85	1.5508E-08
CE-141	98.	145.44	2.4423E-08
CE-143	77.	293.26	3.5862E-08
CE-144	136.	133.54	1.2762E-07
ND-147	98.	91.11	5.2310E-08
EU-152	52.	344.27	4.7420E-08
EU-154	22.	1274.45	6.4937E-08
HF-181	53.	482.03	1.9032E-08
W-187	47.	479.53	6.6577E-08
HG-203	74.	279.19	1.8022E-08
RA-226	73.	609.31	4.7197E-08
TH-232	61.	2614.66	0.0000E+00
U-235	153.	185.72	2.5229E-08
U-238	121.	131.20	6.3237E-08
NP-239	109.	106.13	5.7276E-08
AM-241	64.	59.54	1.0946E-07

 ***** 27-FEB-94 02:33:26 *****

FERMI 2/NRC SPLIT: MONROE WATER INTAKE, SAMPLE #7.

STRAL FILE NAME: L940581.FEV
 SAMPLE DATE: 26-FEB-94 19:30:00
 SAMPLE IDENTIFICATION: L940581.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 544.8000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 26-FEB-94 20:05:07 * FWHM(133) 1.300
 COUNT TIME(LIVE): 3600 SEC * EFFICIENCY: 1.000
 UNCORRECTED REAL TIME: 3600 SEC * GROSS PARAMETER: 0.0
 UNCORRECTED LIVE TIME: 3600 SEC * GROSS COUNT RATE: 2.0

FOR OTHER * LIBRARY: MASTER
 ENERGY TOLERANCE: 100 KEV
 HALF LIFE RATIO: 1.00
 ABUNDANCE: 1.00

ENERGY (KEV) 40.27

IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	RIGHT	CTS/SEC	%ERR
1	238.50	85.	69.	1.91	423.00	420	7	2.35E-02	20.6
2	352.04	89	79.	1.73	664.72	659	13	2.48E-01	25.4
3	511.54	143.	131.	2.10	1004.27	997	16	3.98E-02	15.9
4	609.31	85.	51.	1.31	1212.44	1208	11	2.37E-02	19.1
5	634.98	31.	19.	1.34	1267.09	1262	10	8.62E-03	42.6
6	1120.84	46.	21.	1.35	2301.49	2295	12	1.28E-02	27.1
7	1377.52	24.	4.	1.82	2847.96	2843	11	6.53E-03	30.3
8	1460.97	213.	21.	1.77	3025.64	3018	17	5.92E-02	9.6
9	1764.77	54.	11.	1.90	3672.44	3661	22	1.50E-02	18.1

PEAK SEARCH COMPLETED (REV 15.6 - MD PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	RIGHT	CTS/SEC	%ERR
1	0	238.50	85.	69.	1.91	423.00	420	7	2.35E-02	20.6
2	0	352.04	89	79.	1.73	664.72	659	13	2.48E-02	25.4
3	0	511.54	143.	131.	2.10	1004.27	997	16	3.98E-02	15.9
4	0	609.31	85.	51.	1.31	1212.44	1208	11	2.37E-02	19.1
5	0	634.98	31.	19.	1.34	1267.09	1262	10	8.62E-03	42.6
6	0	1120.84	46.	21.	1.35	2301.49	2295	12	1.28E-02	27.1
7	0	1377.52	24.	4.	1.82	2847.96	2843	11	6.53E-03	30.3
8	0	1460.97	213.	21.	1.77	3025.64	3018	17	5.92E-02	9.6
9	0	1764.77	54.	11.	1.90	3672.44	3661	22	1.50E-02	18.1

PILE-UP CORRECTION COMPLETED.

ELAPSED LIVE TIME: 3500. (PILE-UP CORRECTED)

ION GAS		NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
Xe-135	FG			249.79	0.	0.	89.90*	0.000E+00	.000E 0	.000E 0
				608.18	85.	51.	2.89	2.567E+00	1.704E -6	3.255E -7

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
Am-241	AP	511.00	143.	131.	96.73*	3.941E+00	1.042E -7	2.078E -8
U-235	AP	897.25	0.	0.	99.98	0.000E+00	.000E 0	.000E 0
		1120.51	0.	21.	99.99*	1.654E+00	3.352E -8	1.344E -8

FITS TO PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
Am-241	FG	497.08	0.	0.	89.00*	0.000E+00	.000E 0	.000E 0
		610.33	85.	51.	9.60	2.567E+00	3.100E -7	1.540E -7
Pu-239	FG	176.53	0.	0.	6.89	0.000E+00	.000E 0	.000E 0
		427.89	0.	0.	29.33*	0.000E+00	.000E 0	.000E 0
		463.38	0.	0.	10.35	0.000E+00	.000E 0	.000E 0
		600.56	0.	0.	17.80	0.000E+00	.000E 0	.000E 0
		635.90	31.	19.	11.32	2.510E+00	1.505E -7	6.415E -8

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
Am-241	AP	1460.81	213.	21.	10.67*	1.362E+00	7.022E -6	1.731E -7
		186.21	0.	0.	3.28	0.000E+00	.000E 0	.000E 0
		241.98	0.	0.	7.47	0.000E+00	.000E 0	.000E 0
		295.21	0.	0.	19.20	0.000E+00	.000E 0	.000E 0
		351.92	89.	79.	37.20	3.856E+00	8.594E -8	2.184E -8
		609.31	85.	51.	46.30*	2.587E+00	9.798E -8	1.871E -8
		1120.29	46.	21.	15.10	1.654E+00	2.550E -7	6.912E -8
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	54.	11.	15.80	1.135E+00	3.973E -7	7.181E -8
		2204.22	0.	0.	4.98	0.000E+00	.000E 0	.000E 0
Th-232	NP	238.63	85.	69.	44.60	5.041E+00	5.191E -8	1.063E -8
		538.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0	.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	0.	0.	35.86*	0.000E+00	.000E 0	.000E 0

IDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1	0 238.50	85.	69.	.91	423.00	420	7	2.35E-02	20.5	5.04E+00
5	0 634.98	31.	19.	1.34	1267.09	1152	10	8.62E-03	42.6	2.51E+00
7	0 1377.52	24.	4.	1.82	2047.96	2843	11	6.53E-03	30.3	1.42E+00

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /gram	CONDENSE	FAILED
1	Th-232	238.07	1.00E+10	1.000E-0	5.171E-01	21.000	ABN
4	U-103	610.10	7.15E-01	1.000E-0	3.103E-01	1.000	ABN
4	U-133	602.20	7.15E-01	1.000E-0	1.704E-01	1.000	ABN
4	U-129	634.90	2.15E-01	1.000E-0	1.505E-01	1.000	ABN
6	U-46	1120.51	9.3E-01	1.000E-0	3.852E-01	30.000	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

ND PC VERSION

DEC 88)

PAGE 3

TOTAL LINES IN SPECTRUM 9
UNIDENTIFIED PEAKS 3
IDENTIFIED IN SUMMARY REPORT 6 66.67%

ACTIVATION PRODUCT

NUCLIDE	CBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	SERR
AMIL-111	AP	109.70M	1.500	1.042E -7	2.078E -8	19.25

ACTIVATION PRODUCT

NUCLIDE	CBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	SERR
10	NP	1.28E+04Y	1.000	2.022E -6	1.031E -7	9.55
220	NP	1600.00Y	1.000	2.778E -8	1.871E -8	19.10

MINIMUM DETECTABLE ACTIVITY REPORT (NO PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

LIDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	49.	477.59	1.3184E-07
NA-22	21.	1274.54	2.0586E-08
NA-24	13.	1368.53	1.8053E-08
CL-38	12.	2167.51	0.0000E+00
AR-41	16.	1223.64	2.7718E-08
SC-46	66.	1120.51	3.2676E-08
CR-51	75.	320.08	1.3681E-07
MN-54	37.	834.81	1.9228E-08
MN-56	33.	846.79	2.4950E-08
FE-59	38.	1099.21	4.3287E-08
CO-57	136.	122.06	1.4268E-08
CO-58	47.	816.76	2.1146E-08
CO-60	45.	1032.49	3.1325E-08
NI-65	8.	1481.84	8.1721E-08
CU-64	10.	1345.90	3.2221E-06
ZN-65	27.	1113.51	4.1035E-08
ZN-69M	51.	438.57	1.5994E-08
AS-76	49.	559.10	3.5428E-08
SE-75	75.	264.61	2.0777E-08
BR-82	54.	554.32	2.3230E-08
BR-84	39.	881.50	2.0583E-07
KR-85	116.	513.99	5.1778E-06
KR-85M	102.	151.18	1.7106E-08
87	64.	402.58	1.0438E-08
88	132.	196.32	6.3996E-08
RE-86	19.	1836.01	1.4690E-06
RB-89	27.	1031.88	6.3016E-07
SR-85	116.	513.99	2.2439E-08
SR-85M	72.	231.69	2.5059E-08
SR-91	26.	1024.30	6.3851E-08
SR-92	17.	1383.94	2.9017E-08
Y-88	18.	1836.01	2.5063E-08
Y-91	27.	1204.90	7.3796E-06
Y-91MD	42.	555.57	1.6146E-08
Y-92	37.	934.46	1.9042E-07
Y-93	85.	266.90	2.0755E-07
ZR-95	33.	756.72	3.7625E-08
ZR-97	40.	743.36	1.9991E-08
NB-94	38.	702.63	1.6272E-08
NB-95	43.	765.79	1.9013E-08
NB-97D	26.	1024.50	1.0562E-06
MO-90	93.	257.34	1.9920E-08
MO-99	48.	739.58	1.5274E-07
TC-99MD	110.	140.51	1.2407E-08
RU-103	66.	497.03	1.8439E-08
RU-105	30.	724.50	3.6145E-08
RU-106	47.	621.84	1.6572E-07
105	76.	318.90	7.1859E-08
110M	40.	657.75	1.6560E-08
109	101.	88.03	3.8459E-07

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
113	64.	391.69	2.0924E-08
122	50.	563.93	2.2418E-08
SB-124	50.	602.71	1.6762E-08
SB-125	62.	427.89	4.8461E-08
TE-123M	104.	158.99	1.2904E-08
TE-132	75.	228.16	1.2565E-08
1-131	69.	364.48	1.6753E-08
1-132	47.	667.69	2.4129E-08
1-133	47.	529.37	1.7407E-08
1-134	35.	847.07	4.6941E-08
1-135	19.	1260.41	7.5861E-08
1-131M	120.	163.77	3.9244E-07
1-133	85.	80.77	4.4154E-08
1-133M	82.	233.27	1.1526E-07
1-135	88.	249.79	1.5590E-08
1-135M	44.	526.57	3.2540E-07
1-138	88.	258.31	1.0251E-06
1-134	42.	604.70	1.5432E-08
1-134M	123.	127.42	1.1735E-07
1-136	47.	818.50	2.1333E-08
1-137	37.	661.44	2.7222E-08
1-138	28.	1435.86	1.3873E-07
SB-133	71.	356.00	2.2669E-08
SB-139	128.	165.85	1.2101E-07
1-140	43.	857.32	5.6143E-08
1-141	109.	170.23	2.7499E-07
1-140	11.	1996.49	1.8799E-08
1-139	128.	165.85	1.4676E-08
1-141	106.	145.94	2.3184E-08
1-143	67.	273.24	3.0516E-08
1-144	133.	132.54	1.1526E-07
1-147	92.	91.11	4.6200E-08
1-152	72.	344.27	3.0064E-08
1-154	21.	1274.45	5.7947E-08
1-181	43.	482.03	1.5649E-08
W-187	50.	479.53	6.1351E-08
1-203	88.	279.19	1.7942E-08
1-232	51.	2614.66	0.0000E+00
U-235	144.	135.72	2.3977E-08
U-238	140.	131.20	6.2127E-08
1-239	118.	106.13	5.3927E-08
1-241	71.	89.54	1.0530E-07

 ***** 27-FEB-94 02:35:01 *****

PMI 2/NRC SPLIT: MONROE WATER INTAKE, SAMPLE #7.

CTRAL FILE NAME: L940581.FEV
 SAMPLE DATE: 26-FEB-94 19:30:00
 SAMPLE IDENTIFICATION: L940581.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 344.8000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ADJUSTRE DATE: 26-FEB-94 20:25:00 * FWHM(1332) 1.884
 PRESET TIME(LIVE): 3600 SEC * SENSITIVITY: 3.000
 ELAPSED REAL TIME: 3600 SEC * SHAPE PARAMETER: 5.000
 ELAPSED LIVE TIME: 3600 SEC * NBR ITERATIONS: 20

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 02:16:01 * ENERGY TOLERANCE: 0.500 KEV
 KEV CHNL: 4697016 * HALF LIFE RATIO: 8.00
 OFFSET: 29.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.05

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	238.50	85.	69.	.91	423.00	420	7	2.35E-02	20.6	
2	0	352.04	89.	79.	1.73	664.72	659	13	2.48E-02	25.4	
3	0	511.54	143.	131.	2.10	1004.29	997	16	3.08E-02	19.9	
4	0	609.31	85.	51.	1.31	1212.44	1208	11	2.37E-02	19.1	
5	0	634.98	31.	19.	1.34	1267.09	1262	10	8.62E-03	42.6	
6	0	1120.84	46.	21.	1.35	2301.49	2295	12	1.28E-02	27.1	
7	0	1377.52	24.	4.	1.82	2847.96	2843	11	6.53E-03	30.3	
8	0	1460.97	213.	21.	1.77	3025.64	3018	17	5.92E-02	9.6	
9	0	1764.77	54.	11.	1.90	3672.44	3661	22	1.50E-02	18.1	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND
 * AFTER ENERGY INDICATES CORRECTED PEAK

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
0	0	238.50*	17.	69.	.91	423.00	420	7	4.83E-03	****	
0	0	352.04	89.	79.	1.73	664.72	659	13	2.48E-02	25.4	
		511.54 KEV PEAK DELETED									
4	0	609.31*	43.	51.	1.31	1212.44	1208	11	1.20E-02	51.5	
5	0	634.98	31.	19.	1.34	1267.09	1262	10	8.62E-03	42.6	
6	0	1120.84	46.	21.	1.35	2301.49	2295	12	1.28E-02	27.1	
7	0	1377.52	24.	4.	1.82	2847.96	2843	11	6.53E-03	30.3	
		1460.97 KEV PEAK DELETED									
9	0	1764.77*	7.	11.	1.90	3672.44	3661	22	2.06E-03	****	

UNIDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1	0 238.50	17.	69.	.91	423.00	420	7	4.83E-03	****	5.04E+00
5	0 634.98	31.	19.	1.34	1267.09	1262	10	8.62E-03	42.6	2.51E+00
7	0 1377.52	24.	4.	1.82	2847.96	2843	11	6.53E-03	30.3	1.42E+00

LINEs NOT MEETING SUMMARY CRITERIA

PE	NUCLIDE	ENERGY	HL-L	DECAY	CGT /gram	ABNDIFF	FAILED
1	TH-232	238.63	1.00E+10Y	1.000E 0	1.967E -8	25.03%	ABN
4	RU-106	640.33	39.25D	1.001E 0	1.116E -7	5.92%	ABN
4	XE-135	608.18	9.11H	1.085E 0	1.653E -7	3.11%	ABN
2	SB-125	633.90	2.77Y	1.000E 0	1.305E -7	14.26%	ABN
6	SO-46	1120.51	82.23D	1.000E 0	3.852E -8	50.00%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(NO PC VERSION DEC 88)

PAGE 2

TOTAL LINES IN SPECTRUM 7
UNIDENTIFIED PEAKS 3
IDENTIFIED IN SUMMARY REPORT 4 57.14%

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	ERR
RA-226	NP	1600.00Y	1.000	4.974E -8	2.560E -3	51.47

 ***** 27-FEB-94 12:00:48 *****

FERMI 2: MONROE WATER INTAKE SAMPLE # 8

DIGITAL FILE NAME: L940591.FEV
 FILE DATE: 27-FEB-94 03:25:00
 SAMPLE IDENTIFICATION: L940591.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 533.100 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQ. RUN DATE: 27-FEB-94 03:45:08 * FWHM(1332) 1.886
 PREL. LIVE TIME: 3600. SEC * SENSITIVITY 1.000
 ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER 5.0 %
 ELAPSED LIVE TIME: 3600. SEC * NUR ITERATIONS 10.

DETECTOR: ORTEC * LIBRARY: MASTER.LAB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE 1.500 KEV
 NEW CHANNEL: 1460.016 * HALF LIFE RATIO 1.00
 OFFSET: 39.8232305 KEV * ABUNDANCE LIMIT 70.002

ENERGY WINDOW 40.29 TO 2858.33

PK	IT	ENERGY	AREA	BKND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	3SIG	FL1
1	0	62.76	35.	31.	.31	48.83	46	7	9.83E-03	47.4	
2	0	74.55	44.	106.	1.20	73.94	72	6	1.21E-02	43.3	
3	0	92.33	73.	94.	1.27	111.78	108	3	2.02E-02	28.6	
4	0	238.50	48.	102.	.93	422.98	421	8	1.34E-02	41.3	
5	0	510.86	185.	106.	2.60	1002.85	994	20	5.14E-02	16.6	
6	0	608.96	53.	50.	1.30	1211.69	1209	11	1.47E-02	29.8	
7	0	661.79	47.	27.	1.18	1324.18	1320	10	1.30E-02	29.1	
8	0	1332.48	27.	14.	1.76	2752.07	2747	9	7.36E-03	31.7	
9	0	1460.82	207.	23.	1.65	3025.32	3018	18	5.74E-02	8.8	
10	0	1764.01	43.	0	2.41	3670.81	3660	21	1.19E-02	23.0	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	3SIG
1	0	62.76	35.	31.	.31	48.83	46	7	9.83E-03	47.4
2	0	74.55	44.	106.	1.20	73.94	72	6	1.21E-02	43.3
3	0	92.33	73.	94.	1.27	111.78	108	3	2.02E-02	28.6
4	0	238.50	48.	102.	.93	422.9	421	8	1.34E-02	41.3
5	0	510.86	185.	106.	2.60	1002.85	994	20	5.14E-02	16.6
6	0	608.96	53.	50.	1.30	1211.69	1209	11	1.47E-02	29.8
7	0	661.79	47.	27.	1.18	1324.18	1320	10	1.30E-02	29.1
8	0	1332.48	27.	14.	1.76	2752.07	2747	9	7.36E-03	31.7
9	0	1460.82	207.	23.	1.85	3025.32	3018	18	5.74E-02	8.8
10	0	1764.01	43.	0	2.41	3670.81	3660	21	1.19E-02	23.0

ION GAS								UCI /	1-SIGMA
NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	gram		ERROR
XE-135	FG	249.79	0.	0.	89.90*	0.000E+00	.000E 0		.000E 0
		608.18	53.	50.	2.89	2.598E+00	1.058E -6		3.150E -7

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	gram	UCI /	1-SIGMA
									ERROR
ANIL 311 MP		511.00	185.	106.	96.73*	2.945E+00	1.248E -7		2.070E -8
PO-66	BY	1173.72	0.	0.	100.00	0.000E+00	.000E 0		.000E 0
		1332.19	27.	14.	100.00*	1.457E+00	2.561E -8		8.108E -9

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	gram	UCI /	1-SIGMA
									ERROR
U-235		49.08		0.	89.00*	0.000E+00	.000E 0		.000E 0
		610.33		50.	5.61	2.588E+00	5.127E -7		1.527E -7
U-238		661.45	47.	27.	85.12*	2.435E+00	3.185E -8		9.278E -9
U-235	FF	9.11	73.	94.	28.00*	4.558E+00	8.054E -8		2.307E -8
		531.02	0.	0.	13.10	0.000E+00	.000E 0		.000E 0

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	gram	UCI /	1-SIGMA
									ERROR
K-40	FF	1460.81	207.	23.	10.67*	1.362E+00	2.004E -6		1.764E -7
U-238	FF	186.21	0.	0.	3.28	0.000E+00	.000E 0		.000E 0
		241.98	0.	0.	7.49	0.000E+00	.000E 0		.000E 0
		295.21	0.	0.	19.20	0.000E+00	.000E 0		.000E 0
		351.92	0.	0.	37.20	0.000E+00	.000E 0		.000E 0
		609.31	53.	50.	46.30*	2.588E+00	6.198E -8		1.846E -8
		1120.29	0.	0.	15.10	0.000E+00	.000E 0		.000E 0
		1238.11	0.	0.	5.94	0.000E+00	.000E 0		.000E 0
		1764.49	43.	0.	15.30	1.186E+00	3.232E -7		7.446E -8
		2204.22	0.	0.	4.98	0.000E+00	.000E 0		.000E 0
Th-232	FF	238.63	48.	102.	44.60	5.041E+00	3.026E -8		1.250E -8
		338.32	0.	0.	11.40	0.000E+00	.000E 0		.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0		.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0		.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0		.000E 0
		967.11	0.	0.	16.60	0.000E+00	.000E 0		.000E 0
		2614.66	0.	0.	35.86*	0.000E+00	.000E 0		.000E 0

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

IDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1	0	62.76	35.	81.	.81	48.83	46	7 9.83E-03	47.4	1.82E+00
2	0	74.55	44.	106.	1.20	73.94	72	6 1.21E-02	43.3	2.92E+00
3	0	92.33	73.	94.	1.27	111.78	108	8 2.02E-02	28.6	4.56E+00
4	0	238.50	48.	102.	.93	422.98	421	8 1.34E-02	41.3	5.04E+00
5	0	608.96	53.	50.	1.30	1211.69	1209	11 1.47E-02	29.8	2.59E+00
6	0	1332.48	27.	14.	1.76	2752.07	2747	9 7.36E-03	31.2	1.46E+00
7	0	1764.01	43.	0.	2.81	3670.81	3660	21 1.19E-02	23.0	1.19E+00

LINES NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /gram	ABNDIFF	FAILED
3	ND-147	91.11	10.98D	1.002E 0	8.054E -8	68.13%	ABN
4	TH-232	238.63	1.00E+10Y	1.000E 0	3.026E -8	75.03%	ABN
6	RU-103	610.33	39.35D	1.001E 0	5.127E -7	5.92%	ABN
5	XE-135	608.18	9.11H	1.065E 0	1.058E -6	3.13%	ABN
7	RA-226	609.31	1600.00Y	1.000E 0	6.198E -8	39.97%	ABN
3	CO-60	1332.49	1925.00D	1.000E 0	2.561E -8	50.00%	ABN
1	RA-226	1764.49	1600.00Y	1.000E 0	3.232E -7	39.99%	ABN

TOTAL LINES IN SPECTRUM 10
UNIDENTIFIED PEAKS 7
IDENTIFIED IN SUMMARY REPORT 3 30.00%

ACTIVATION PRODUCT

NUCLIDE	SDHE	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	107.70M	1.365	1.248E -7	2.070E -8	16.59

FUSION PRODUCT

NUCLIDE	SDHE	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
CS-137	CP	3.17Y	1.000	3.185E -8	2.278E -9	29.15

NATURAL PRODUCT

NUCLIDE	SDHE	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	MP	1.20E 09Y	1.000	2.004E -6	1.764E -7	3.00

MINIMUM DETECTABLE ACTIVITY REPORT (NO PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

ISIDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	51.	477.59	1.3744E-07
NA-22	19.	1274.54	2.0010E-08
NA-24	20.	1368.53	2.2620E-08
CL-38	5.	2167.51	0.0000E+00
AR-41	15.	1293.64	2.4948E-08
SC-46	50.	1120.51	2.9063E-08
CR-51	52.	320.08	1.4638E-07
MA-54	39.	834.82	2.0173E-08
MN-56	52.	846.75	2.2928E-08
FE-59	39.	1099.27	4.4808E-08
CO-57	115.	122.06	1.5408E-08
NI-58	60.	810.78	2.4415E-08
CU-60	46.	1332.47	3.2366E-08
NI-63	10.	1481.84	8.7173E-08
CU-64	23.	1345.90	4.9263E-06
CF-63	37.	1115.51	4.9090E-08
IN-69M	68.	438.62	1.7041E-08
AL-76	64.	559.10	4.1107E-08
SE-75	37.	264.61	2.2367E-08
DE-82	45.	554.32	2.1566E-08
BR-84	35.	381.50	1.4375E-07
KR-85	97.	513.99	4.8387E-06
KR-85M	96.	151.18	1.6317E-08
SR-87	77.	402.50	4.2344E-08
SR-88	83.	194.32	4.3793E-08
RD-88	10.	1836.01	6.2436E-07
RB-89	35.	1031.88	3.7420E-07
SR-85	97.	513.99	2.0967E-08
SR-85M	95.	231.69	2.9230E-08
SR-91	31.	1024.30	6.9964E-08
SR-92	13.	1383.94	2.8626E-08
Y-98	10.	1836.01	1.9090E-08
Y-91	29.	1204.90	7.3150E-06
Y-91MD	45.	555.57	1.6771E-08
Y-92	29.	934.46	1.6406E-07
Y-93	74.	266.90	1.9454E-07
ZR-95	50.	756.72	3.7342E-08
ZR-97	38.	743.36	1.9710E-08
NB-94	52.	702.63	1.9453E-08
NE-95	51.	765.79	2.0948E-08
NE-97D	21.	1024.50	1.9830E-06
MO-90	90.	257.34	1.9424E-08
MO-99	31.	739.58	1.2511E-07
TC-99MD	111.	140.51	1.2703E-08
RU-103	59.	497.08	1.7813E-08
RU-105	35.	724.50	3.8373E-08
RU-106	42.	621.84	1.6010E-07
RU-105	59.	318.90	6.4387E-08
RU-10M	36.	657.75	1.6055E-08
RU-109	78.	88.03	3.4539E-07

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
113	74.	391.69	2.2992E-08
122	49.	563.93	2.2620E-08
SB-124	46.	602.71	1.6428E-08
SB-125	71.	427.89	5.2997E-08
TE-123M	110.	158.79	1.3561E-08
TE-132	97.	228.16	1.4571E-08
I-131	71.	364.48	1.7357E-08
I-132	44.	667.69	2.2129E-08
I-133	50.	529.87	1.3176E-08
I-134	50.	347.03	4.7063E-08
I-137	15.	1260.41	6.7103E-08
KE-131M	104.	163.77	5.6329E-07
KE-133	76.	30.97	4.0679E-08
AE-133M	95.	233.21	1.2637E-07
KE-135	61.	249.77	1.3015E-08
KE-135M	44.	526.51	1.6912E-07
KE-138	39.	258.31	5.0518E-07
CS-134	57.	604.70	1.8372E-08
CS-137M	113.	127.47	1.0870E-07
CS-136	55.	818.50	2.3571E-08
CS-138	7.	1435.35	5.1346E-08
BA-133	75.	336.90	2.3810E-08
BA-139	121.	165.85	1.0611E-07
BA-140	57.	537.32	6.6021E-08
141	122.	190.22	1.6840E-07
140	16.	1598.47	2.3071E-08
CE-139	121.	165.85	1.4731E-08
CE-141	96.	145.44	2.2542E-08
CE-143	77.	223.20	3.2773E-08
CE-144	134.	133.54	1.1823E-07
ND-147	88.	91.11	4.6146E-08
EU-152	67.	344.27	5.0242E-08
EU-154	19.	1274.41	5.6329E-08
HF-181	47.	482.03	1.6717E-08
W-187	56.	479.53	6.5872E-08
HG-203	76.	279.19	1.7037E-08
RA-226	93.	609.31	4.9724E-08
TH-232	58.	2614.66	0.0000E+00
U-235	134.	185.72	2.3637E-08
U-238	131.	131.20	6.1416E-08
NP-239	132.	106.13	5.8110E-08
AM-241	54.	59.54	9.3348E-08

 ***** 27-FEB-94 12:05:25 *****

RPT BKG

MI 2: MONROE WATER INTAKE SAMPLE # 8

CONTROL FILE NAME: L940591.FEV
 SAMPLE DATE: 27-FEB-94 03:25:00
 SAMPLE IDENTIFICATION: L940591.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 533.1000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 27-FEB-94 03:45:08 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 3600 SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3600 SEC * SHAPE PARAMETER: 5.0 %
 ELAPSED LIVE TIME: 3600 SEC * NBR ITERATIONS: 10

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:01:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHNL: 4627016 * HALF LIFE RATIO: 8.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 70.062

ENERGY WINDOW 40.29 TO 2858.03

PK	CH	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	62.76	35.	81.	.81	48.83	46	7	9.83E-03	47.4	
2	0	74.55	44.	106.	1.20	73.94	72	6	1.21E-02	43.3	
3	0	92.33	73.	94.	1.27	111.78	108	8	2.02E-02	28.6	
4	0	238.50	48.	102.	.93	422.98	421	8	1.34E-02	41.3	
5	0	510.86	185.	106.	2.60	1002.85	994	20	5.14E-02	16.6	
6	0	608.96	53.	50.	1.30	1211.69	1209	11	1.47E-02	29.8	
7	0	661.79	47.	27.	1.18	1324.18	1320	10	1.30E-02	29.1	
8	0	1332.48	27.	14.	1.76	2752.07	2747	9	7.36E-03	31.7	
9	0	1460.32	207.	23.	1.85	3025.32	3018	13	5.74E-02	8.8	
10	0	1764.01	43.	0.	2.41	3670.91	3660	21	1.19E-02	23.0	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND

* AFTER ENERGY INDICATES CORRECTED PEAK

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT	
1	0	62.76	35.	81.	.81	48.83	46	7	9.83E-03	47.4	
2	0	74.55	44.	106.	1.20	73.94	72	6	1.21E-02	43.3	
3	0	92.33*	42.	94.	1.27	111.78	108	8	1.15E-02	78.1	
		238.50 KEV PEAK DELETED									
		510.86 KEV PEAK DELETED									
6	0	608.96*	11.	50.	1.30	1211.69	1209	11	3.00E-03	****	
		661.79 KEV PEAK DELETED									
		1332.48 KEV PEAK DELETED									

1460.82 KEV PEAK DELETED
1764.01 KEV PEAK DELETED

UNIDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1 0	62.76	35.	81.	.81	48.83	46	7	9.83E-03	47.4	1.82E+00
2 0	74.55	44.	106.	1.20	73.94	72	6	1.21E-02	43.3	2.92E+00
3 0	92.33	42.	94.	1.27	111.78	108	8	1.15E-02	78.1	4.56E+00
6 0	608.96	11.	50.	1.30	1211.69	1209	11	3.00E-03	***	2.59E+00

LINEs NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	H-PE	DECAY	MOI /gram	ABNDIF	FAILED
3	ND-147	91.11	10.98	1.002E 0	4.595E -8	60.13%	ABN
6	RU-103	610.33	37.350	1.001E 0	1.050E -7	6.77%	ABN
6	XE-135	608.18	9.118	1.005E 0	2.167E -7	3.11%	ABN
6	RA-226	609.31	1600.00Y	1.000E 0	1.270E -8	29.32%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(ND PC VERSION DEC 88)

PAGE 2

TOTAL LINES IN SPECTRUM	4	
UNIDENTIFIED PEAKS	4	
IDENTIFIED IN SUMMARY REPORT	0	.00%

MINIMUM DETECTABLE ACTIVITY REPORT (ND PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

IDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	51.	477.59	1.3744E-07
ANIL-511	217.	511.00	4.3977E-08
NA-22	19.	1274.54	2.0010E-08
NA-24	20.	1368.83	2.2620E-08
CL-38	5.	2167.51	9.0000E+00
AR-41	15.	1293.64	2.4948E-08
K-40	219.	1460.71	7.0673E-07
SC-46	50.	1120.51	2.9063E-08
CR-51	52.	320.08	1.1638E-07
MN-54	39.	834.21	2.0173E-08
MN-55	52.	840.71	2.9928E-08
FE-59	39.	1099.21	4.4808E-08
CO-57	115.	122.06	1.3403E-08
CO-58	60.	810.21	2.4415E-08
CO-60	46.	1332.43	3.2366E-08
NI-63	10.	1481.81	8.7173E-08
CU-64	23.	1345.71	4.9263E-06
ZN-65	37.	1111.71	4.9090E-08
ZN-67M	63.	438.71	1.7041E-08
AS-76	64.	559.11	4.1107E-08
SE-78	87.	264.71	2.2867E-08
BR-82	45.	554.32	2.1566E-08
BR-84	35.	881.50	1.4375E-07
BR-85	97.	513.71	4.8387E-06
BR-85M	95.	131.18	1.6317E-08
KR-87	77.	405.51	4.9344E-08
KR-88	83.	126.31	4.8723E-08
RE-96	16.	1836.01	6.2436E-07
RE-97	35.	1031.33	3.7420E-07
SR-99	97.	513.71	2.0967E-08
SR-99M	95.	231.50	2.5230E-08
SR-91	31.	1024.30	6.9964E-08
SR-92	18.	1383.94	2.8626E-08
Y-88	10.	1836.01	1.9090E-08
Y-91	29.	1204.90	7.8150E-06
Y-91MD	45.	555.57	1.6771E-08
Y-92	29.	934.46	1.6406E-07
Y-93	74.	266.90	1.9454E-07
ZR-95	50.	756.72	3.7342E-08
ZR-97	38.	743.36	1.9710E-08
NB-94	52.	702.63	1.9453E-08
NB-95	50.	765.79	2.0948E-08
NB-97D	29.	1024.50	1.9830E-06
MO-90	90.	257.34	1.9424E-08
MO-99	31.	739.53	1.2511E-07
TC-99MD	111.	140.51	1.2703E-08
RU-103	59.	497.08	1.7813E-08
RU-105	35.	724.50	3.8373E-08
RU-106	42.	621.34	1.6010E-07
RU-105	59.	318.90	6.4387E-08

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
110M	36.	657.75	1.6055E-08
109	78.	88.03	3.4539E-07
GN-113	74.	391.67	2.2992E-08
SB-122	49.	563.93	2.2620E-08
GB-124	46.	602.71	1.6428E-08
SD-125	71.	427.87	5.2997E-08
TE-123M	110.	158.92	1.3561E-08
TE-132	97.	228.16	1.4571E-08
T-131	71.	364.40	1.7357E-08
T-132	44.	667.67	2.2129E-08
T-137	50.	529.87	1.8196E-08
T-138	50.	847.0	4.7063E-08
T-139	13.	1240.41	6.7103E-07
XE-131M	104.	163.95	5.6329E-07
XE-133	76.	30.99	4.0679E-08
XE-133M	95.	233.22	1.2637E-07
XE-135	61.	249.79	1.3015E-08
XE-135M	44.	526.55	1.6912E-07
XE-138	89.	258.32	5.0518E-07
CS-134	57.	604.70	1.3372E-08
CS-134M	113.	127.47	1.0878E-07
CS-136	55.	818.50	2.3571E-08
CS-137	71.	661.65	2.5131E-08
CS-138	7.	1435.86	5.1346E-08
CS-139	75.	356.00	2.3810E-08
CS-139	121.	165.85	1.0611E-07
CS-140	57.	537.32	6.6021E-08
BA-141	122.	190.22	1.6840E-07
LA-140	16.	1596.47	2.5071E-08
CE-139	121.	165.85	1.4781E-08
CE-141	96.	145.44	2.2542E-08
CE-143	77.	293.26	3.2772E-08
CE-144	134.	133.54	1.1823E-07
ND-147	88.	91.11	4.6146E-08
EU-152	67.	344.27	5.0242E-08
EU-154	19.	1274.45	5.6329E-08
HF-181	47.	482.03	1.6717E-08
W-187	56.	479.53	6.5872E-08
HG-203	76.	279.19	1.7037E-08
RA-226	93.	609.31	4.9724E-08
TH-232	58.	2614.66	0.0000E+00
U-235	134.	185.72	2.3637E-08
U-238	131.	131.20	6.1416E-08
NP-239	132.	106.13	5.8110E-08
AM-241	54.	59.54	9.3848E-08

 ***** 27-FEB-94 17:44:43 *****

FERMI 2/NRC SPLIT: MONROE WATER INTAKE, SAMPLE #9.

STRAL FILE NAME: L940601.FEV

PLE DATE: 27-FEB-94 11:30:00

SAMPLE IDENTIFICATION: L940601.FEV

TYPE OF SAMPLE: WATER

SAMPLE QUANTITY: 511.7000 UNITS: gram

SAMPLE GEOMETRY: LMAR500

EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE 27-FEB-94 13:14:16 * FWHM(1332) 1.88
 PRESET TIME 3600. SEC * SENSITIVITY: 3.000
 LABEL REAL TIME 3600. SEC * SHAPE PARAMETER: 5.0
 ELAPSED LIVE TIME 3600. SEC * NBR ITERATIONS: 10

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHL: 4627016 * HALF LIFE RATIO: 8.00
 PEST: 29 3232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2838.03

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	ERR	FIT
1	0	74.89	55.	105.	.89	74.65	72	6	1.54E-02	35.4	
2	0	135.72	39.	83.	.84	310.62	308	7	1.08E-02	42.6	
3	0	238.70	69.	150.	.60	423.41	418	12	1.90E-02	37.0	
4	0	510.59	186.	66.	3.18	1002.26	995	14	5.16E-02	12.3	
5	0	609.30	54.	19.	1.40	1212.42	1209	9	1.51E-02	25.1	
6	0	662.54	45.	41.	3.03	1325.78	1320	13	1.25E-02	36.1	
7	0	1120.12	45.	18.	1.77	2299.96	2291	14	1.25E-02	29.3	
8	0	1332.50	26.	24.	1.59	2752.12	2744	16	7.22E-03	51.3	
9	0	1460.39	169.	24.	1.68	3025.46	3017	16	4.69E-02	10.9	
10	0	1764.74	24.	10.	1.03	3672.37	3667	12	6.73E-03	34.5	
11	0	2614.02	73.	0.	1.89	5481.77	5472	19	2.03E-02	13.4	

PEAK SEARCH COMPLETED (REV 15.8 - ND PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	ERR
1	0	74.89	55.	105.	.89	74.65	72	6	1.54E-02	35.4
2	0	135.72	39.	83.	.84	310.62	308	7	1.08E-02	42.6
3	0	238.70	69.	150.	.60	423.41	418	12	1.90E-02	37.0
4	0	510.59	186.	66.	3.18	1002.26	995	14	5.16E-02	12.3
5	0	609.30	54.	19.	1.40	1212.42	1209	9	1.51E-02	25.1
6	0	662.54	45.	41.	3.03	1325.78	1320	13	1.25E-02	36.1
7	0	1120.12	45.	18.	1.77	2299.96	2291	14	1.25E-02	29.3
8	0	1332.50	26.	24.	1.59	2752.12	2744	16	7.22E-03	51.3
9	0	1460.39	169.	24.	1.68	3025.46	3017	16	4.69E-02	10.9

11 0 2614.62 73. 0. 1.89 5481.77 5472 19 2.03E-02 13.4

PILE-UP CORRECTION COMPLETED

NUCLIDE IDENTIFICATION SYSTEM (NO PC VERSION DEC 88)
 NUCLIDE LINE ACTIVITY REPORT
 ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

PAGE 1

FISSION GAS

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
XE-135	FG	249.79	0.	0.	89.90*	0.000E+00	.000E 0	.000E 0
		608.18	54.	19.	2.89	2.587E+00	1.260E -6	3.158E -7

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
ANIL-511	AP	511.00	136.	66.	76.73*	2.945E+00	2.222E -7	2.731E -8
IO-46	AP	889.25	0.	0.	99.98	0.000E+00	.000E 0	.000E 0
		1120.51	45.	18.	99.99*	1.655E+00	3.988E -8	1.168E -8
IO-60	AP	1173.52	0.	0.	100.00	0.000E+00	.000E 0	.000E 0
		1332.49	16.	24.	100.00*	1.457E+00	2.618E -8	1.344E -8

FUSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
RU-103	FP	497.08	0.	0.	39.00*	0.000E+00	.000E 0	.000E 0
		610.33	34.	19.	5.60	2.587E+00	5.496E -7	1.377E -7
SS-137	FP	661.65	5.	41.	85.12*	2.433E+00	5.194E -8	1.154E -8

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
K-40	NP	1460.81	112.	24.	10.67*	1.362E+00	1.706E -6	1.854E -7
RA-226	NP	186.21	37.	83.	3.28	5.815E+00	2.993E -7	1.276E -7
		241.98	0.	0.	7.49	0.000E+00	.000E 0	.000E 0
		295.21	0.	0.	19.20	0.000E+00	.000E 0	.000E 0
		351.92	0.	0.	37.20	0.000E+00	.000E 0	.000E 0
		609.31	34.	19.	46.30*	2.587E+00	6.636E -8	1.603E -8
		1120.29	45.	18.	15.10	1.655E+00	2.638E -7	7.727E -8
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	24.	10.	15.80	1.185E+00	1.899E -7	6.554E -8
		2204.22	0.	0.	4.98	0.000E+00	.000E 0	.000E 0
TH-232	NP	238.63	69.	150.	44.60	5.038E+00	4.475E -8	1.654E -8
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0	.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	73.	0.	35.86*	8.882E-01	3.363E -7	4.503E -8
U-235	NP	143.76	0.	0.	10.50	0.000E+00	.000E 0	.000E 0
		185.72	39.	83.	54.00*	5.815E+00	1.818E -8	7.750E -9

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

UNIDENTIFIED PEAKS

	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1	0	74.89	55.	105.	.89	74.65	72	6	1.54E-02	35.4	2.95E+00
3	0	238.70	69.	150.	.60	423.41	418	12	1.90E-02	37.0	5.04E+00
5	0	609.30	54.	19.	1.40	1212.42	1209	9	1.51E-02	25.1	2.59E+00
7	0	1120.12	45.	18.	1.77	2299.96	2291	14	1.25E-02	29.3	1.66E+00
8	0	1332.50	26.	24.	1.59	2752.12	2744	16	7.22E-03	51.3	1.46E+00
10	0	1764.74	24.	10.	1.03	3672.37	3667	12	6.73E-03	34.5	1.19E+00
11		2614.62	73.	0.	1.85	5481.77	5472	19	2.03E-02	13.4	8.88E-01

LINES NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFL	DECAY	UCI /gram	ABNDIFF	FAILED
2	RA-226	186.21	1600.00Y	1.000E 0	2.993E -7	51.83%	ABN
3	TH-232	238.63	1.00E+10Y	1.000E 0	4.475E -8	45.15%	ABN
5	RA-103	610.33	39.35D	1.002E 0	5.496E -7	5.92%	ABN
5	AC-135	608.18	2.11H	1.185E 0	1.260E -6	3.11%	ABN
3	RA-226	609.31	1600.00Y	1.000E 0	6.636E -8	51.83%	ABN
7	AC-46	1120.51	35.83D	1.001E 0	3.988E -8	50.00%	ABN
7	RA-226	1120.29	1600.00Y	1.000E 0	2.638E -7	51.83%	ABN
8	CL-60	1332.49	1925.00D	1.000E 0	2.618E -8	50.00%	ABN
10	RA-226	1764.49	1600.00Y	1.000E 0	1.899E -7	51.83%	ABN
11	TH-232	2614.66	1.00E+10Y	1.000E 0	3.363E -7	45.15%	ABN

TOTAL LINES IN SPECTRUM 11
UNIDENTIFIED PEAKS 7
IDENTIFIED IN SUMMARY REPORT 4 36.36%

ACTIVATION PRODUCT

NUCLIDE	SEHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	2.322	2.222E -7	2.731E -8	12.29

FISSION PRODUCT

NUCLIDE	SEHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
CS-137	FP	30.17Y	1.000	3.194E -8	1.154E -8	36.14

NATURAL PRODUCT

NUCLIDE	SEHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	NP	1.23E+09Y	1.000	1.706E -6	1.851E -7	10.87
U-235	NP	7.04E+08Y	1.000	1.818E -8	7.750E -9	42.64

MINIMUM DETECTABLE ACTIVITY REPORT (NO PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

LIDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	53.	477.59	1.4608E-07
NA-22	19.	1274.54	2.0848E-08
NA-24	17.	1368.53	2.3182E-08
CL-38	4.	2167.51	0.0000E+00
AR-41	16.	1293.64	4.5700E-08
SC-46	55.	1120.51	3.1771E-08
CR-51	57.	320.03	1.2713E-07
MN-54	42.	834.62	2.1813E-08
MN-56	41.	846.73	4.0363E-08
FE-59	34.	1099.22	4.3627E-08
CO-57	110.	122.00	1.3663E-08
CO-58	28.	810.70	1.7386E-08
CO-60	46.	1332.47	3.3721E-08
NI-65	11.	1481.8	1.4008E-07
CU-64	24.	1345.90	5.6596E-06
ZN-65	31.	1115.52	4.6820E-08
ZN-69M	56.	438.62	1.7271E-08
AS-76	65.	559.12	4.4783E-08
SE-75	34.	264.83	2.3417E-08
BR-82	54.	550.32	2.5292E-08
CR-84	44.	881.80	1.0508E-06
KR-85	108.	513.99	5.3193E-06
KR-85M	124.	151.18	2.4001E-08
87	61.	402.58	9.8261E-08
88	101.	196.32	7.8960E-08
RE-88	15.	1836.01	2.1092E-05
RB-89	33.	1031.83	HALF LIFE TOO SHORT
SR-85	108.	513.99	2.3064E-08
SR-85M	37.	251.67	5.9557E-08
SR-91	34.	1024.30	8.4559E-08
SR-92	20.	1333.94	4.4998E-08
Y-88	15.	1836.01	2.4367E-08
Y-91	37.	1204.90	9.2029E-06
Y-91MD	58.	555.57	2.1973E-08
Y-92	30.	934.46	2.2877E-07
Y-93	82.	266.90	2.3491E-07
ZR-95	44.	756.72	3.6518E-08
ZR-97	36.	743.36	2.1170E-08
NB-94	42.	702.63	1.8214E-08
NB-95	45.	765.79	2.0728E-08
NB-97D	35.	1024.50	2.4040E-06
MO-90	70.	257.34	2.1184E-08
MO-99	45.	739.58	1.5937E-07
TC-99MD	98.	140.51	1.2620E-08
RU-103	34.	497.08	1.7772E-08
RU-105	45.	724.50	5.6423E-08
RU-106	46.	621.84	1.7457E-07
105	59.	318.90	6.8950E-08
110M	40.	657.75	1.7634E-08
109	100.	88.03	4.0746E-07

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66. PAGE 2

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
113	71.	391.69	2.3471E-08
122	56.	563.93	2.5573E-08
SB-124	35.	602.71	1.4939E-08
SB-125	70.	427.89	5.4825E-08
TE-123M	128.	158.97	1.5246E-08
TE-132	102.	228.16	1.5761E-08
I-131	61.	364.48	1.6345E-08
I-132	29.	667.69	2.8560E-08
I-133	46.	522.87	1.9053E-08
I-134	41.	847.03	1.3455E-07
I-135	19.	1260.41	9.1143E-08
XB-134M	120.	163.93	6.3254E-07
XB-135	79.	80.97	4.3543E-08
XB-135M	96.	233.22	1.3053E-07
XB-135	102.	249.79	1.2508E-08
XB-135M	52.	526.56	HALF LIFE TOO SHORT
XE-135	73.	258.31	HALF LIFE TOO SHORT
CS-134	46.	604.70	1.7196E-08
CS-134M	120.	127.42	1.6323E-07
CS-136	32.	818.50	1.8789E-08
CS-138	23.	1435.86	5.9314E-07
BA-135	69.	356.00	2.3793E-08
BA-139	113.	165.85	2.1551E-07
BA-140	50.	537.32	6.4625E-08
141	105.	190.22	3.9608E-06
140	9.	1596.49	1.8468E-08
CE-140	113.	165.85	1.4835E-08
CE-141	114.	145.44	2.5624E-08
CE-142	62.	293.26	3.1553E-08
CE-144	104.	133.54	1.0853E-07
ND-147	83.	91.11	4.6862E-08
EU-152	59.	344.27	4.9119E-08
EU-154	19.	1274.45	5.8635E-08
HF-181	54.	482.03	1.8686E-08
W-187	48.	479.53	6.6181E-08
HG-203	69.	279.19	1.6927E-08
RA-226	75.	609.31	4.6521E-08
TH-232	73.	2614.66	0.0000E+00
U-238	124.	131.20	6.2252E-08
NP-239	116.	106.13	5.7737E-08
AM-241	63.	59.54	1.0561E-07

 ***** 27-FEB-94 17:46:31 *****

PMI 2/NRC SPLIT: MONROE WATER INTAKE, SAMPLE #9.

SPECTRAL FILE NAME: L940601.FEV
 SAMPLE DATE: 27-FEB-94 11:30:00
 SAMPLE IDENTIFICATION: L940601.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 511.7000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

 ACQUIRE DATE: 27-FEB-94 13:14:16 * FWHM(1332) 1.880
 PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER : 5.0
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS 10.

 DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHNL: 4697010 * HALF LIFE RATIO: 8.00
 OFFSET: 19.3232300 KEV * ABUNDANCE LIMIT: 70.000

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	74.89	55.	105.	.89	74.65	72	6	1.54E-02	35.4	
2	0	185.72	39.	83.	.84	310.62	308	7	1.08E-02	42.6	
3	0	238.70	69.	150.	.60	423.41	418	12	1.90E-02	37.0	
4	0	510.59	186.	66.	3.18	1002.26	995	14	5.16E-02	12.3	
5	0	609.30	54.	19.	1.40	1212.42	1209	9	1.51E-02	25.1	
6	0	662.54	45.	41.	3.03	1325.78	1320	13	1.25E-02	36.1	
7	0	1120.12	45.	18.	1.77	2299.96	2291	14	1.25E-02	29.3	
8	0	1332.50	26.	24.	1.59	2752.12	2744	16	7.22E-03	51.3	
9	0	1460.89	169.	24.	1.68	3025.46	3017	16	4.69E-02	10.9	
10	0	1764.74	24.	10.	1.03	3672.37	3667	12	6.73E-03	34.5	
11	0	2614.62	73.	0.	1.89	5481.77	5472	19	2.03E-02	13.4	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND
 * AFTER ENERGY INDICATES CORRECTED PEAK

IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT	
1	0	74.89	55.	105.	.89	74.65	72	6	1.54E-02	35.4	
2	0	185.72	39.	83.	.84	310.62	308	7	1.08E-02	42.6	
3	0	238.70*	1.	150.	.60	423.41	418	12	3.44E-04	****	
		510.59 KEV PEAK DELETED									
5	0	609.30*	12.	19.	1.40	1212.42	1209	9	3.40E-03	****	
		662.54 KEV PEAK DELETED									
7	0	1120.12	45.	18	1.77	2299.96	2291	14	1.25E-02	29.3	

1460.89 KEV PEAK DELETED

1764.74 KEV PEAK DELETED

11 0 2614.62* 14. 0. 1.89 5481.77 5472 19 3.89E-03 ****

NUCLIDE IDENTIFICATION SYSTEM
UNKNOWN LINE REPORT

(NO PC VERSION DEC 88)

PAGE 1

UNIDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1 0	74.89	55.	105.	.89	74.65	72	6	1.54E-02	35.4	2.95E+00
3 0	238.70	1.	150.	.60	423.41	418	12	3.44E-04	****	5.04E+00
5 0	609.30	12.	19.	1.40	1212.42	1209	9	3.40E-03	****	2.59E+00
7 0	1120.12	45.	18.	1.77	2299.96	2291	14	1.25E-02	29.3	1.66E+00
11 0	2614.62	14.	0.	1.89	5481.77	5472	19	3.89E-03	****	8.88E-01

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	DCI	/gram	ABNDIFF	FAILED
2	RA-226	186.21	1600.00Y	1.000E 0	2.993E	-7	41.65%	ABN
3	TH-232	238.43	1.00E+10Y	1.000E 0	3.092E	-10	45.15%	ABN
5	RU-103	610.33	39.35D	1.002E 0	1.242E	-7	5.92%	ABN
3	XE-135	608.18	9.11H	1.185E 0	2.349E	-7	3.11%	ABN
5	RA-226	609.31	1600.00Y	1.000E 0	1.500E	-8	41.65%	ABN
7	SC-46	1120.31	83.33D	1.001E 0	3.987E	-8	50.00%	ABN
7	RA-226	1120.29	1600.00Y	1.000E 0	2.638E	-7	41.65%	ABN
11	TH-232	2614.66	1.00E+10Y	1.000E 0	6.454E	-8	45.15%	ABN

TOTAL LINES IN SPECTRUM 6
 UNIDENTIFIED PEAKS 5
 IDENTIFIED IN SUMMARY REPORT 1 16.67%

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
U-235	NP	7.04E+08Y	1.000	1.813E -8	7.750E -9	42.04

MINIMUM DETECTABLE ACTIVITY REPORT (ND PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

SLIDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	53.	477.59	1.4608E-07
ANIL-511	215.	511.00	7.7604E-08
NA-22	19.	1274.54	2.0848E-08
NA-24	17.	1368.53	2.3182E-08
CL-38	4.	2167.51	0.0000E+00
AR-41	16.	1293.64	4.5700E-08
K-40	191.	1460.81	6.8761E-07
SC-46	55.	1120.51	3.1771E-08
CR-51	57.	320.08	1.2713E-07
HN-54	42.	834.83	2.1813E-08
MN-56	41.	846.71	4.0363E-08
FE-59	34.	1099.22	4.3627E-08
CO-57	110.	122.06	1.1663E-08
CO-58	28.	810.76	1.7386E-08
CO-60	46.	1332.49	3.3721E-08
NI-63	11.	1481.84	1.4008E-07
CU-64	24.	1745.90	5.6596E-06
ZN-65	31.	1115.52	4.6820E-08
ZN-69M	56.	438.63	1.7291E-08
AS-76	65.	559.10	4.4783E-08
SE-75	84.	364.65	2.3417E-08
BR-82	54.	554.32	2.5299E-08
BR-84	44.	881.50	1.0508E-06
BR-85	108.	513.99	5.3193E-06
BR-85M	124.	151.13	2.4001E-08
KR-87	61.	402.58	9.8261E-08
KR-88	101.	196.32	7.8960E-08
RL-88	15.	1836.01	2.1092E-03
RB-89	33.	1031.38	HALF LIFE TOO SHORT
SR-85	108.	513.99	2.3064E-08
SR-85M	87.	231.69	5.9857E-08
SR-91	34.	1024.30	8.4559E-08
SR-92	20.	1383.94	4.4998E-08
Y-88	15.	1836.01	2.4367E-08
Y-91	37.	1204.90	9.2029E-06
Y-91MD	58.	555.57	2.1973E-08
Y-92	30.	934.46	2.2877E-07
Y-93	82.	266.90	2.3491E-07
ZR-95	44.	756.72	3.6518E-08
ZR-97	36.	743.36	2.1170E-08
NB-94	42.	702.63	1.8214E-08
NB-95	45.	765.79	2.0728E-08
NB-97D	35.	1024.50	2.4040E-06
MO-90	70.	257.34	2.1184E-08
MO-99	45.	739.58	1.5937E-07
TC-99MD	98.	140.51	1.2620E-08
RU-103	54.	497.08	1.7772E-08
RU-105	45.	724.50	5.6423E-08
RU-106	46.	621.84	1.7457E-07
RU-105	59.	318.90	6.8950E-08

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

PAGE 2

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
10M	40.	657.75	1.7634E-08
109	100.	88.03	4.0746E-07
SN-113	71.	391.69	2.3471E-08
SB-122	56.	563.93	2.5573E-08
SB-124	35.	602.71	1.4939E-08
SB-125	70.	427.89	5.4825E-08
TE-123M	128.	158.99	1.5246E-08
TE-132	102.	228.16	1.5761E-08
I-131	61.	364.48	1.6845E-08
I-132	29.	667.69	2.8560E-08
I-133	46.	529.87	1.9053E-08
I-134	41.	847.03	1.3455E-07
-135	19.	1260.41	2.1143E-08
XE-131M	120.	163.93	6.3254E-07
XE-133	79.	80.99	4.3543E-08
XE-133M	90.	233.22	1.3053E-07
XE-135	102.	249.79	1.9508E-08
XE-135M	52.	526.56	HALF LIFE TOO SHORT
XE-138	73.	258.31	HALF LIFE TOO SHORT
CS-134	46.	604.70	1.7196E-08
CS-134M	120.	127.42	1.6328E-07
CS-136	32.	818.50	1.8789E-08
CS-137	64.	661.65	2.4858E-08
CS-138	23.	1435.86	5.9314E-07
133	69.	356.00	2.3793E-08
139	113.	165.85	2.1551E-07
BA-140	50.	537.32	6.4625E-08
BA-141	105.	190.22	3.9608E-06
LA-140	9.	1576.49	1.8468E-08
CE-139	113.	165.85	1.4885E-08
CE-141	114.	145.44	2.5624E-08
CE-143	62.	293.26	3.1553E-08
CE-144	104.	133.54	1.0853E-07
ND-147	83.	91.11	4.6862E-08
EU-152	59.	344.27	4.9119E-08
EU-154	19.	1274.45	5.8685E-08
HF-181	54.	482.03	1.8686E-08
W-187	48.	479.53	6.6181E-08
HG-203	69.	279.19	1.6927E-08
RA-226	75.	609.31	4.6521E-08
TH-232	73.	2614.66	0.0000E+00
U-238	124.	131.20	6.2252E-08
NP-239	116.	106.13	5.7737E-08
AM-241	63.	59.54	1.0561E-07

 27-FEB-94 20:17:59 *****

FERMI 2/NRC SPLIT: MONROE WATER INTAKE, SAMPLE #10.

CONTROL FILE NAME: L940611.FEV
 SAMPLE DATE: 27-FEB-94 18:30:00
 SAMPLE IDENTIFICATION: L940611.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 455.6000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUR DATE: 27-FEB-94 19:17:13 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 3.000
 ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER: 5.0 %
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10

DETECTOR: DRTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:21:01 * ENERGY TOLERANCE: 1.500 KEV
 REV/CHNL: 14647016 * HALF LIFE RATIO: 1.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	74.69	53.	107.	.62	74.24	71	6	1.46E-02	35.3	
2	0	238.88	33.	116.	.96	423.79	420	8	9.06E-03	60.5	
3	0	352.64	75.	90.	1.37	666.00	660	14	2.10E-02	29.5	
4	0	511.45	192.	128.	2.42	1004.10	995	20	5.33E-02	17.6	
5	0	609.71	46.	105.	3.87	1213.30	1207	16	1.28E-02	51.9	
6	0	661.43	28.	38.	.93	1323.41	1319	10	7.81E-03	49.1	
7	0	1119.09	19.	44.	1.95	2297.78	2296	14	5.14E-03	78.3	
8	0	1377.82	19.	10.	1.63	2848.62	2839	17	5.34E-03	56.9	
9	0	1415.76	13.	3.	1.39	2929.38	2925	10	3.50E-03	42.4	
10	0	1460.85	208.	22.	1.76	3025.39	3016	16	5.79E-02	8.0	
11	0	1764.50	46.	11.	1.06	3671.86	3664	15	1.28E-02	21.7	
12	0	1836.62	15.	3.	1.26	3925.40	3823	7	4.24E-03	32.2	
13	0	2204.18	20.	6.	1.34	4607.94	4603	11	5.68E-03	28.3	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR
1	0	74.69	53.	107.	.62	74.24	71	6	1.46E-02	35.3
2	0	238.88	33.	116.	.96	423.79	420	8	9.06E-03	60.5
3	0	352.64	75.	90.	1.37	666.00	660	14	2.10E-02	29.5
4	0	511.45	192.	128.	2.42	1004.10	995	20	5.33E-02	17.6
5	0	609.71	46.	105.	3.87	1213.30	1207	16	1.28E-02	51.9
6	0	661.43	28.	38.	.93	1323.41	1319	10	7.81E-03	49.1
7	0	1119.09	19.	44.	1.95	2297.78	2296	14	5.14E-03	78.3

9	0	1415.76	13.	3.	1.39	2929.38	2925	10	3.50E-03	42.4
10	0	1460.85	208.	22.	1.76	3025.39	3016	16	5.79E-02	8.0
11	0	1764.50	46.	11.	1.06	3671.86	3664	15	1.28E-02	21.7
12	0	1836.62	15.	3.	1.26	3825.40	3823	7	4.24E-03	32.2
13	0	2204.18	20.	6.	1.34	4607.94	4603	11	5.68E-03	28.3

DE-UP CORRECTION COMPLETED

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
ANIL-511	AP	511.00	192.	128.	96.73*	2.941E+00	1.801E -7	3.174E -8
SC-46	AP	889.25	0.	0.	99.98	0.000E+00	.000E 0	.000E 0
		1120.51	19.	44.	99.99*	1.656E+00	1.342E -8	1.443E -8

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
RS-88	FP	898.02	0.	0.	14.00	0.000E+00	.000E 0	.000E 0
		1836.01	15.	3.	21.40*	1.151E+00	1.660E -6	3.344E -7
		2677.36	0.	0.	1.96	0.000E+00	.000E 0	.000E 0
RS-88	FP	898.02	0.	0.	93.10	0.000E+00	.000E 0	.000E 0
		1836.01	15.	3.	99.38*	1.151E+00	2.199E -8	7.077E -9
RU-103	FP	497.08	0.	0.	89.00*	0.000E+00	.000E 0	.000E 0
		610.33	0.	0.05	9.60	2.336E+00	2.229E -7	2.712E -7
RU-103	FP	661.65	25.	36.	85.19*	2.436E+00	2.235E -8	1.078E -8

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
K-40	NP	1460.81	208.	22.	10.67*	1.362E+00	2.364E -6	1.891E -7
U-226	NP	186.21	0.	0.	3.28	0.000E+00	.000E 0	.000E 0
		241.71	0.	0.	7.49	0.000E+00	.000E 0	.000E 0
		295.21	0.	0.	19.30	0.000E+00	.000E 0	.000E 0
		351.92	75.	90.	57.20	3.351E+00	8.677E -8	2.561E -8
		609.31	46.	105.	46.30*	2.586E+00	2.319E -8	3.277E -8
		1120.29	19.	44.	15.10	1.656E+00	1.219E -7	2.548E -8
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	46.	11.	13.80	1.186E+00	4.043E -7	8.761E -8
		2204.22	20.	6.	4.98	1.007E+00	6.725E -7	1.94E -7
TH-232	NP	238.63	33.	116.	44.60	5.036E+00	2.392E -8	1.447E -8
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.30	0.000E+00	.000E 0	.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	0.	0.	35.86*	0.000E+00	.000E 0	.000E 0

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

IDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1	0	74.69	53.	107.	.62	74.24	71	6	1.46E-02	35.3	2.93E+00
2	0	238.88	33.	116.	.96	423.79	420	8	9.06E-03	60.5	5.04E+00
3	0	1377.82	19.	10.	1.63	2848.62	2839	17	5.34E-03	56.9	1.42E+00
9	0	1415.76	13.	3.	1.39	2929.38	2925	10	3.50E-03	42.4	1.39E+00
12	0	1836.62	15.	5.	1.26	3825.40	3823	7	4.24E-03	32.2	1.15E+00

LINEs NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	TYPE	DECAY	UCI /gram	ABNDIFF	FAILED
2	Th-232	238.63	1.00E+10Y	1.000E 0	2.392E -8	25.03%	ABN
3	RU-103	610.53	57.35D	1.001E 0	5.229E -7	5.92%	ABN
7	SC-46	1120.53	83.83D	1.000E 0	1.842E -3	50.00%	ABN
12	RB-88	1836.01	17.80M	1.626E 1	1.660E -6	57.28%	ABN
12	R-88	1836.01	106.60D	1.000E 0	2.199E -8	51.55%	ABN

TOTAL LINES IN SPECTRUM 13
UNIDENTIFIED PEAKS 5
IDENTIFIED IN SUMMARY REPORT 8 61.54%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	1.612	1.301E -7	3.174E -8	17.62

FUSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
CE-137	FP	50.17Y	1.000	2.235E -8	1.098E -8	19.15

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	NP	1.238E+09Y	1.000	2.364E -6	1.891E -7	8.00
RA-226	NP	1600.00Y	1.000	6.319E -8	2.477E -8	51.86

MINIMUM DETECTABLE ACTIVITY REPORT (ND PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

SLIDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	56.	477.59	1.6856E-07
NA-22	24.	1274.54	2.6316E-08
NA-24	14.	1368.53	2.2612E-08
CL-38	5.	2167.51	0.0000E+00
AR-41	20.	1293.64	4.0005E-08
SC-46	56.	1120.51	3.5995E-08
CR-51	65.	320.08	1.5233E-07
MN-54	44.	834.85	2.5073E-08
MN-56	39.	846.75	3.4240E-08
FE-59	23.	1099.22	4.0276E-08
CO-57	115.	122.56	1.5609E-08
CO-58	51.	810.76	2.6343E-08
CO-60	44.	1332.49	3.7040E-08
NI-63	8.	1481.84	1.0329E-07
CU-64	19.	1345.90	5.3698E-06
ZN-65	25.	1115.52	4.7218E-08
ZN-67M	58.	438.65	1.8840E-08
AC-76	60.	559.10	4.7129E-08
SS-75	93.	264.65	2.7667E-08
BR-82	60.	554.32	2.9397E-08
BR-84	43.	361.50	3.3644E-07
KR-85	137.	513.99	6.7287E-06
KR-85M	106.	151.18	2.1513E-08
87	69.	402.50	6.7902E-08
88	108.	196.32	7.2712E-08
RE-88	25.	1836.01	3.3163E-06
RE-89	30.	1031.88	1.3674E-06
SR-85	137.	513.99	2.9163E-08
SR-85M	84.	231.69	3.8637E-08
SR-91	29.	1024.30	8.1832E-08
SR-92	15.	1383.94	3.4319E-08
Y-98	25.	1836.01	3.5322E-08
Y-91	23.	1204.90	8.1454E-06
Y-91MD	52.	555.57	2.1801E-08
Y-92	40.	934.46	2.4629E-07
Y-93	70.	266.90	2.2837E-07
ZR-95	49.	756.72	4.3264E-08
ZP-97	43.	743.36	2.4992E-08
NB-94	40.	702.63	1.9964E-08
NE-95	46.	765.79	2.3520E-08
NB-97D	28.	1024.50	2.3226E-06
MO-90	76.	257.34	2.2071E-08
MO-99	47.	739.58	1.8111E-07
TC-99MD	121.	140.51	1.5593E-08
RU-103	57.	497.08	2.0494E-08
RU-105	46.	724.50	5.5232E-08
RU-106	41.	621.84	1.8509E-07
105	71.	318.90	8.3382E-08
110M	37.	657.75	1.9046E-08
109	100.	88.03	4.5761E-07

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
113	56.	391.69	2.3406E-08
122	51.	563.93	2.7133E-08
SB-124	44.	602.71	1.8804E-08
SB-125	66.	427.89	5.9789E-08
TE-123M	130.	158.22	1.7252E-08
TE-132	76.	228.16	1.5152E-08
I-131	70.	364.48	2.0198E-08
I-132	48.	667.62	3.0986E-08
I-133	49.	522.37	2.1377E-08
I-134	59.	847.03	6.9495E-08
I-135	13.	1260.41	7.6632E-08
XE-131M	94.	163.93	6.2731E-07
XE-133	72.	30.72	4.3619E-08
XE-133M	72.	233.22	1.3564E-07
XE-135	82.	242.22	1.8274E-08
XE-135M	57.	526.56	7.6457E-07
XE-138	80.	258.51	2.1100E-06
CS-134	49.	604.70	1.2232E-08
CS-134M	112.	127.43	1.4115E-07
CS-136	32.	818.50	2.3248E-08
CS-138	21.	1435.86	1.8642E-07
BA-133	56.	356.60	2.4074E-08
BA-139	98.	165.35	1.4006E-07
BA-140	47.	537.32	7.0221E-08
141	97.	190.22	4.9092E-07
140	10.	1596.42	2.1508E-08
La-139	98.	165.85	1.5566E-08
CE-141	115.	145.44	2.8851E-08
CE-143	70.	293.26	5.6510E-08
CE-144	123.	133.54	1.5255E-07
147	87.	91.11	5.3751E-08
EU-152	62.	344.27	5.6552E-08
EU-154	24.	1274.45	7.4077E-08
HF-181	66.	482.03	2.3187E-08
W-187	63.	479.53	8.2833E-08
HG-203	81.	279.19	2.0586E-08
TH-232	50.	2614.66	0.0000E+00
U-233	127.	185.72	2.6926E-08
U-238	119.	131.20	6.8493E-08
NP-239	124.	106.13	6.6268E-08
AM-241	76.	59.54	1.3027E-07

 ***** 27-FEB-94 20:20:13 *****

PMI 2/NRC SPLIT: MONROE WATER INTAKE, SAMPLE #10.

SPECTRAL FILE NAME: L940611.FEV
 SAMPLE DATE: 27-FEB-94 18:30:00
 SAMPLE IDENTIFICATION: L940611.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 455.6000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 27-FEB-94 19:17:13 * FWHM(1332) 1.386
 PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER 0.0 %
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS 1

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 28-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHNL: 4897016 * HALF LIFE RATIO: 5.00
 OFFSET: 19.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.22 TO 2858.03

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	74.69	53.	107.	.62	74.24	71	6	1.46E-02	35.3	
2	0	238.88	33.	116.	.96	423.79	420	8	9.06E-03	60.5	
3	0	352.64	75.	90.	1.37	666.00	660	14	2.10E-02	29.5	
4	0	511.45	192.	128.	2.42	1004.10	995	20	5.33E-02	17.6	
5	0	609.71	46.	105.	3.87	1213.30	1207	16	1.28E-02	51.9	
6	0	661.43	28.	38.	.93	1323.41	1319	10	7.81E-03	49.1	
7	0	1119.09	19.	44.	1.95	2297.78	2296	14	5.14E-03	78.3	
8	0	1377.82	19.	10.	1.63	2848.62	2839	17	5.34E-03	56.9	
9	0	1415.76	13.	3.	1.39	2929.38	2925	10	3.50E-03	42.4	
10	0	1460.85	208.	22.	1.76	3025.39	3016	16	5.79E-02	8.0	
11	0	1764.50	46.	11.	1.06	3671.36	3664	15	1.28E-02	21.7	
12	0	1836.62	15.	3.	1.26	3825.40	3823	7	4.24E-03	32.2	
13	0	2204.18	20.	6.	1.34	4607.94	4603	11	5.68E-03	28.3	

PEAK SEARCH COMPLETED (REV 15.8 - ND PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND

* AFTER ENERGY INDICATES CORRECTED PEAK

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	74.69	53.	107.	.62	74.24	71	6	1.46E-02	35.3	
		238.88 KEV PEAK DELETED									
3	0	352.64	75.	90.	1.37	666.00	660	14	2.10E-02	29.5	
		511.45 KEV PEAK DELETED									
5	0	609.71*	4.	105.	3.87	1213.30	1207	16	1.10E-03	****	

7	0	1119.09	19.	44.	1.95	2297.78	2296	14	5.14E-03	78.3
8	0	1377.82	19.	10.	1.63	2848.62	2839	17	5.34E-03	56.9
9	0	1415.76	13.	3.	1.39	2929.38	2925	10	3.50E-03	42.4

1460.85 KEV PEAK DELETED

1764.50 KEV PEAK DELETED

12	0	1836.62	15.	3.	1.26	3825.40	3823	7	4.24E-03	32.2
13	0	2204.18	20.	6.	1.34	4607.94	4603	11	5.68E-03	28.3

UNIDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF	
1	0	74.69	53.	107.	.62	74.24	71	6	1.46E-02	35.3	2.93E+00
3	0	352.64	75.	90.	1.37	666.00	660	14	2.10E-02	29.5	3.85E+00
5	0	609.71	4.	105.	3.87	1213.30	1207	16	1.10E-03	****	2.59E+00
7	0	1119.09	19.	44.	1.95	2297.73	2296	14	5.14E-03	78.3	1.66E+00
8	0	1377.82	19.	10.	1.63	2848.62	2839	17	5.34E-03	56.9	1.42E+00
9	0	1415.76	13.	5.	1.37	2929.38	2925	10	3.50E-03	42.4	1.39E+00
12	0	1836.62	15.	31	1.26	3825.40	3823	7	4.24E-03	32.2	1.15E+00
13	0	2204.18	20.	6.	1.34	4607.94	4603	11	5.68E-03	28.3	1.01E+00

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFC	DECAY	UCI /gram	ABNDIFF	FAILED
3	U-238	351.92	1600.00Y	1.000E 0	8.677E -8	66.70%	ABN
5	U-103	610.33	39.35D	1.001E 0	4.530E -8	5.92%	ABN
5	U-226	609.31	1600.00Y	1.000E 0	5.473E -9	66.70%	ABN
7	U-46	1120.51	85.33D	1.000E 0	1.842E -8	90.00%	ABN
7	U-226	1120.29	1600.00Y	1.000E 0	1.219E -7	66.70%	ABN
12	U-88	1836.01	17.30M	1.626E 1	1.660E -6	57.28%	ABN
12	88	1836.01	103.60M	1.000E 0	2.199E -8	51.55%	ABN
13	U-226	2204.22	1600.00Y	1.000E 0	6.728E -7	66.70%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(NO PC VERSION DEC 88)

PAGE 2

TOTAL LINES IN SPECTRUM

8

UNIDENTIFIED PEAKS

8

IDENTIFIED IN SUMMARY REPORT

0

.00%

MINIMUM DETECTABLE ACTIVITY REPORT (ND PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

LIDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	56.	477.59	1.6856E-07
ANIL-511	227.	511.00	6.2454E-08
NA-22	24.	1274.54	2.6316E-08
NI-2	14.	1368.53	2.2612E-08
CL-36	5.	2167.51	0.0000E+00
AI-4	20.	1273.64	4.0005E-08
K-40	225.	1460.81	8.3820E-07
Sc-40	56.	1120.51	3.5995E-08
Ca-45	65.	320.08	1.5233E-07
Th-54	44.	834.35	2.5073E-08
Th-56	39.	846.75	3.4240E-08
Pa-57	23.	1099.21	4.0276E-08
U-57	115.	122.06	1.5689E-08
Th-58	51.	810.74	2.6343E-08
Th-60	44.	1332.45	3.7040E-08
Th-62	5.	1491.84	1.0329E-07
Th-64	19.	1545.90	5.3678E-06
Th-66	25.	1115.52	4.7218E-08
Th-68	58.	438.62	1.8840E-08
Th-71	60.	559.16	4.7129E-08
Th-73	93.	264.63	2.7667E-08
Th-82	60.	554.32	2.9397E-08
Pa-84	43.	881.50	3.3644E-07
Pa-86	137.	513.99	6.7287E-06
Pa-88	106.	151.18	2.1513E-08
Pa-91	69.	402.36	6.9902E-08
Pa-93	108.	196.32	7.2712E-08
Pa-95	25.	1836.01	3.3163E-06
Pa-97	50.	1031.54	1.3674E-06
Pa-99	137.	513.99	2.9163E-08
Pa-101	44.	231.69	3.6637E-08
Pa-103	29.	1024.30	8.1832E-08
Pa-105	15.	1383.94	3.4319E-08
Y-88	25.	1836.01	3.5322E-08
Y-91	23.	1204.90	8.1454E-06
Y-91MD	52.	555.57	2.1801E-08
Y-92	40.	934.46	2.4629E-07
Y-93	70.	266.90	2.2837E-07
R-93	49.	756.72	4.3264E-08
Th-93	43.	743.36	2.4992E-08
Th-94	40.	702.63	1.9964E-08
Th-95	46.	765.79	2.3520E-08
Th-97B	28.	1024.50	2.3226E-06
MO-98	76.	257.34	2.2071E-08
MO-99	47.	739.58	1.8111E-07
TC-99MD	121.	140.51	1.5593E-08
RU-103	57.	497.08	2.0494E-08
RU-105	46.	724.50	5.5232E-08
RU-106	41.	521.84	1.3509E-07
RU-108	71.	318.90	8.3382E-08

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

WAVELENGTH	BKG	ENERGY	MINIMUM UCI /gram
110M	37.	657.75	1.7046E-08
109	100.	88.03	4.5761E-07
113	56.	391.65	2.5406E-08
112	31.	563.23	2.7133E-08
111	46.	602.71	1.5804E-08
110	56.	657.75	5.2782E-09
109	70.	110.03	1.1152E-08
108	75.	125.03	1.1152E-08
107	75.	141.03	1.1152E-08
106	81.	167.03	3.0986E-08
105	81.	202.03	1.1152E-08
104	81.	218.03	5.2492E-08
103	81.	234.03	1.1152E-08
102	81.	250.03	2.7721E-07
101	81.	266.03	1.1152E-08
100	81.	282.03	1.1152E-08
99	81.	298.03	1.1152E-08
98	81.	314.03	1.1152E-08
97	81.	330.03	1.1152E-08
96	81.	346.03	1.1152E-08
95	81.	362.03	1.1152E-08
94	81.	378.03	1.1152E-08
93	81.	394.03	1.1152E-08
92	81.	410.03	1.1152E-08
91	81.	426.03	1.1152E-08
90	81.	442.03	1.1152E-08
89	81.	458.03	1.1152E-08
88	81.	474.03	1.1152E-08
87	81.	490.03	1.1152E-08
86	81.	506.03	1.1152E-08
85	81.	522.03	1.1152E-08
84	81.	538.03	1.1152E-08
83	81.	554.03	1.1152E-08
82	81.	570.03	1.1152E-08
81	81.	586.03	1.1152E-08
80	81.	602.03	1.1152E-08
79	81.	618.03	1.1152E-08
78	81.	634.03	1.1152E-08
77	81.	650.03	1.1152E-08
76	81.	666.03	1.1152E-08
75	81.	682.03	1.1152E-08
74	81.	698.03	1.1152E-08
73	81.	714.03	1.1152E-08
72	81.	730.03	1.1152E-08
71	81.	746.03	1.1152E-08
70	81.	762.03	1.1152E-08
69	81.	778.03	1.1152E-08
68	81.	794.03	1.1152E-08
67	81.	810.03	1.1152E-08
66	81.	826.03	1.1152E-08
65	81.	842.03	1.1152E-08
64	81.	858.03	1.1152E-08
63	81.	874.03	1.1152E-08
62	81.	890.03	1.1152E-08
61	81.	906.03	1.1152E-08
60	81.	922.03	1.1152E-08
59	81.	938.03	1.1152E-08
58	81.	954.03	1.1152E-08
57	81.	970.03	1.1152E-08
56	81.	986.03	1.1152E-08
55	81.	1002.03	1.1152E-08
54	81.	1018.03	1.1152E-08
53	81.	1034.03	1.1152E-08
52	81.	1050.03	1.1152E-08
51	81.	1066.03	1.1152E-08
50	81.	1082.03	1.1152E-08
49	81.	1098.03	1.1152E-08
48	81.	1114.03	1.1152E-08
47	81.	1130.03	1.1152E-08
46	81.	1146.03	1.1152E-08
45	81.	1162.03	1.1152E-08
44	81.	1178.03	1.1152E-08
43	81.	1194.03	1.1152E-08
42	81.	1210.03	1.1152E-08
41	81.	1226.03	1.1152E-08
40	81.	1242.03	1.1152E-08
39	81.	1258.03	1.1152E-08
38	81.	1274.03	1.1152E-08
37	81.	1290.03	1.1152E-08
36	81.	1306.03	1.1152E-08
35	81.	1322.03	1.1152E-08
34	81.	1338.03	1.1152E-08
33	81.	1354.03	1.1152E-08
32	81.	1370.03	1.1152E-08
31	81.	1386.03	1.1152E-08
30	81.	1402.03	1.1152E-08
29	81.	1418.03	1.1152E-08
28	81.	1434.03	1.1152E-08
27	81.	1450.03	1.1152E-08
26	81.	1466.03	1.1152E-08
25	81.	1482.03	1.1152E-08
24	81.	1498.03	1.1152E-08
23	81.	1514.03	1.1152E-08
22	81.	1530.03	1.1152E-08
21	81.	1546.03	1.1152E-08
20	81.	1562.03	1.1152E-08
19	81.	1578.03	1.1152E-08
18	81.	1594.03	1.1152E-08
17	81.	1610.03	1.1152E-08
16	81.	1626.03	1.1152E-08
15	81.	1642.03	1.1152E-08
14	81.	1658.03	1.1152E-08
13	81.	1674.03	1.1152E-08
12	81.	1690.03	1.1152E-08
11	81.	1706.03	1.1152E-08
10	81.	1722.03	1.1152E-08
9	81.	1738.03	1.1152E-08
8	81.	1754.03	1.1152E-08
7	81.	1770.03	1.1152E-08
6	81.	1786.03	1.1152E-08
5	81.	1802.03	1.1152E-08
4	81.	1818.03	1.1152E-08
3	81.	1834.03	1.1152E-08
2	81.	1850.03	1.1152E-08
1	81.	1866.03	1.1152E-08

 ***** 24-FEB-94 20:55:57 *****

6

CIRC WATER PUMP HOUSE (DECANT LINE) SAMPLE, PRE-DISCHARGE.

CENTRAL FILE NAME: L940441.FEV
 SAMPLE DATE: 24-FEB-94 13:40:00
 SAMPLE IDENTIFICATION: L940441.FEV
 TYPE OF SAMPLE: WATER
 SAMPLE QUANTITY: 722.6000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 24-FEB-94 17:24:36 * FWHM(1332) 1.686
 PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER: 5.0 2
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:21:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHNL: 4697016 * HALF LIFE RATIO: 8.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	92.74	44.	98.	1.14	112.67	110	7	1.22E-02	43.7	
2	0	238.38	39.	129.	.67	422.72	420	9	1.08E-02	56.1	
3	0	511.62	208.	125	3.01	1004.47	997	24	5.77E-02	17.6	
4	0	582.68	27.	61.	1.33	1155.75	1152	12	7.37E-03	71.3	
5	0	661.85	47.	33.	2.04	1324.30	1320	10	1.30E-02	29.7	
6	0	1461.00	207.	9.	1.95	3025.70	3019	14	5.75E-02	8.4	
7	0	1765.57	52.	8.	1.26	3674.13	3666	16	1.46E-02	19.8	
8	0	2614.83	44.	12.	1.31	5482.21	5474	14	1.23E-02	20.3	

PEAK SEARCH COMPLETED (REV 15.3 - NO PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR
1	0	92.74	44.	98.	1.14	112.67	110	7	1.22E-02	43.7
2	0	238.38	39.	129.	.67	422.72	420	9	1.08E-02	56.1
3	0	511.62	208.	125.	3.01	1004.47	997	24	5.77E-02	17.6
4	0	582.68	27.	61.	1.33	1155.75	1152	12	7.37E-03	71.3
5	0	661.85	47.	33.	2.04	1324.30	1320	10	1.30E-02	29.7
6	0	1461.00	207.	9.	1.95	3025.70	3019	14	5.75E-02	8.4
7	0	1765.57	52.	8.	1.26	3674.13	3666	16	1.46E-02	19.8
8	0	2614.83	44.	12.	1.31	5482.21	5474	14	1.23E-02	20.3

PULSE-UP CORRECTION COMPLETED

D-6

ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
ANIL-511	AP	511.00	208.	125.	96.73*	2.940E+00	3.767E -7	6.644E -8

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
CS-137	AP	661.65	47.	33.	85.12*	2.46E+00	2.342E -8	6.954E -9

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
K-40	NP	1460.81	207.	9.	10.67*	1.362E+00	1.480E -6	1.242E -7
RA-226	NP	186.21	0.	0.	3.28	0.000E+00	000E 0	.000E 0
		241.98	0.	0.	7.42	0.000E+00	000E 0	.000E 0
		295.21	0.	0.	19.20	0.000E+00	000E 0	.000E 0
		351.92	0.	0.	37.20	0.000E+00	000E 0	.000E 0
		609.31	0.	0.	46.30*	0.000E+00	000E 0	.000E 0
		1120.22	0.	0.	15.10	0.000E+00	000E 0	.000E 0
		1239.11	0.	0.	5.94	0.000E+00	000E 0	.000E 0
		1764.49	52.	8.	15.80	1.185E+00	2.908E -7	5.767E -8
		2204.22	0.	0.	4.98	0.000E+00	000E 0	.000E 0
232	NP	238.63	39.	129.	44.60	5.647E+00	1.797E -3	1.009E -3
		338.32	0.	0.	11.40	0.000E+00	000E 0	.000E 0
		427.17	0.	0.	11.80	0.000E+00	000E 0	.000E 0
		583.14	27.	61.	30.25	2.673E+00	3.410E -8	2.431E -8
		811.07	0.	0.	27.70	0.000E+00	000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	000E 0	.000E 0
		2614.66	44.	12.	35.86*	3.891E -01	1.139E -7	2.727E -8

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

UNIDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1 0	92.74	44.	98.	1.14	112.67	110	7	1.22E-02	43.7	4.59E+00
2 0	238.38	39.	129.	.67	422.72	420	9	1.08E-02	56.1	5.04E+00
4 0	582.68	27.	61.	1.33	1155.75	1152	12	7.37E-03	71.3	2.67E+00
7 0	1765.57	52.	8.	1.26	3674.13	3666	16	1.46E-02	19.3	1.18E+00
8 0	2614.83	44.	12.	1.31	5482.21	5474	14	1.23E-02	20.3	8.88E-01

LINES NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /gram	ABNDIFF	FAILED
2	TH-232	238.63	1.00E+10Y	1.000E 0	1.797E -8	62.12%	ABN
4	TH-232	583.14	1.00E+10Y	1.000E 0	3.410E -8	62.12%	ABN
7	RA-226	1764.49	1600.00Y	1.000E 0	2.908E -7	10.17%	ABN
8	TH-232	2614.66	1.00E+10Y	1.000E 0	1.439E -7	62.12%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(NO PC VERSION DEC 88)

PAGE 3

TOTAL LINES IN SPECTRUM	8	
IDENTIFIED PEAKS	5	
IDENTIFIED IN SUMMARY REPORT	3	37.50%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	4.967	3.767E -7	6.644E -8	17.64

FUSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
CS-137	FP	30.17Y	1.000	2.542E -8	6.954E -9	29.69

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	NP	1.23E+09Y	1.000	1.180E -6	1.242E -7	8.79

MINIMUM DETECTABLE ACTIVITY REPORT (NO PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
NA-22	51.	477.59	1.0158E-07
NA-22	19.	1274.54	1.4764E-08
NA-24	21.	1368.53	2.0017E-08
CL-38	8.	2167.51	0.0000E+00
AR-41	20.	1293.64	7.7447E-08
SC-46	60.	1120.51	2.3515E-08
CR-51	64.	320.03	9.5595E-08
MN-54	47.	834.83	1.6343E-08
MN-56	39.	846.75	4.7796E-08
FE-59	37.	1099.22	3.2270E-08
CO-57	108.	122.64	9.5892E-09
CO-58	51.	810.71	1.6629E-08
CO-60	47.	1332.49	2.4138E-08
NI-55	13.	1481.84	1.8722E-07
CU-64	18.	1345.90	3.8723E-08
ZN-65	32.	1115.51	3.3694E-08
ZN-69M	67.	438.63	1.4817E-08
AS-76	67.	589.10	3.3943E-08
SE-78	66.	264.65	1.4706E-08
BR-82	61.	554.32	1.9806E-08
BR-84	48.	381.50	HALF LIFE TOO SHORT
KR-85	121.	513.99	3.9871E-06
KR-85M	120.	151.18	2.2803E-08
87	72.	402.58	2.2556E-07
88	112.	196.32	9.6062E-08
RE-88	22.	1836.01	HALF LIFE TOO SHORT
RE-89	30.	1031.88	HALF LIFE TOO SHORT
SR-85	121.	513.99	1.7303E-08
SR-85M	88.	231.69	1.4552E-07
SR-91	30.	1024.30	6.5110E-08
SR-92	21.	1383.94	5.4536E-08
Y-88	22.	1836.01	2.0909E-08
Y-91	26.	1204.90	5.4683E-06
Y-91MD	58.	555.57	1.8012E-08
Y-92	36.	934.46	2.6282E-07
Y-93	80.	266.90	1.8855E-07
ZR-95	47.	756.72	2.6751E-08
ZR-97	49.	743.36	1.8989E-08
NB-94	56.	702.63	1.4893E-08
NB-95	49.	765.79	1.5342E-08
NB-97D	32.	1024.50	1.7673E-06
MO-90	96.	257.34	2.2449E-08
MO-99	33.	739.58	9.8701E-08
TC-99MD	131.	140.51	1.0552E-08
RU-103	66.	497.08	1.3934E-08
RU-105	45.	724.50	5.4645E-08
RU-106	43.	621.84	1.1954E-07
RH-105	64.	318.90	5.2892E-08
110M	57.	657.75	1.4910E-08
109	92.	88.03	2.7679E-07

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66. PAGE 2

ISOTOPE	BKG	ENERGY	MINIMUM UCI /gram
SB-113	75.	391.69	1.7091E-08
SB-122	54.	563.93	1.8169E-08
SB-124	53.	602.71	1.3031E-08
SB-125	72.	427.89	3.9377E-08
TE-123M	98.	158.99	9.4511E-09
TE-132	102.	228.16	1.1361E-08
I-131	75.	564.43	1.3323E-08
I-133	35.	667.69	4.0664E-08
I-135	49.	529.37	1.4885E-08
I-137	38.	847.03	4.4788E-07
I-139	28.	1260.41	9.6690E-08
XE-131M	117.	163.93	4.4446E-07
XE-133	75.	30.79	3.0377E-08
XE-135M	100.	233.22	1.0300E-07
XE-137	78.	249.79	1.4072E-08
XE-139M	41.	526.56	HALF LIFE TOO SHORT
XE-141	104.	258.31	HALF LIFE TOO SHORT
CS-134	45.	604.70	1.2045E-08
CS-134M	127.	127.42	1.9211E-07
CS-136	44.	318.30	1.5670E-08
CS-138	11.	1435.36	3.8732E-06
BA-133	78.	356.00	1.7914E-08
BA-139	105.	165.85	4.0138E-07
BA-140	59.	537.32	4.9938E-08
BA-141	95.	190.22	HALF LIFE TOO SHORT
BA-140	14.	1596.49	1.6884E-08
CE-139	103.	165.85	1.0165E-08
CE-141	122.	145.44	1.8805E-08
CE-143	60.	293.23	2.6473E-08
CE-145	129.	133.84	8.5611E-08
ND-147	76.	91.11	3.1923E-08
EU-152	54.	344.27	3.3277E-08
EU-154	19.	1274.45	4.1558E-03
HF-181	50.	482.03	1.2750E-08
W-187	56.	479.53	5.3661E-08
HG-203	76.	279.19	1.2596E-08
RA-226	67.	609.31	3.1136E-08
TH-232	56.	2614.66	0.0000E+00
U-235	130.	185.72	1.7176E-08
U-238	144.	131.20	4.7505E-08
NP-239	106.	106.13	4.0057E-08
AM-241	58.	59.54	7.1755E-08

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	92.74	44.	98.	1.14	112.67	110	7	1.22E-02	43.7	
		238.38 KEV PEAK DELETED									
	0	511.62*	15.	125.	3.01	1004.47	997	24	4.16E-03	****	
	0	582.68	27.	61.	1.33	1155.75	1152	12	7.37E-03	71.3	
	0	661.85	47.	33.	2.04	1324.30	1320	10	1.30E-02	29.7	
	0	1461.00*	4.	9.	1.95	3025.70	3019	14	1.13E-03	****	
		1765.57 KEV PEAK DELETED									
		2614.83 KEV PEAK DELETED									

UNIDENTIFIED PEAKS

	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%FF
1	0	92.74	44.	98.	1.14	112.67	110	7	1.22E-02	43.7	4.59E+00
4	0	582.68	27.	61.	1.33	1155.75	1152	12	7.37E-03	71.3	2.67E+00

LINES NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DELAY	UC1 /gram	ABNDIFF	FAILED
4	232	583.14	1.00E-10Y	0.00E-0	3.410E-8	16.97%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(ND PC VERSION DEC 88).

PAGE 2

TOTAL LINES IN SPECTRUM	5	
UNIDENTIFIED PEAKS	2	
IDENTIFIED IN SUMMARY REPORT	3	60.00%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	4.967	2.714E -8	8.973E -8	326.95

FUSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
CO-137	FP	30.17Y	1.000	2.342E -8	6.954E -9	29.69

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	1.000	2.912E -8	1.710E -7	587.12

 ***** 24-FEB-94 23:59:20 *****

FERMI 2/NRC SPLIT, DECANT #1, DISCHARGE IN PROGRESS.

CENTRAL FILE NAME: L940451.FEV
 FILE DATE: 24-FEB-94 22:30:00
 SAMPLE IDENTIFICATION: L940451.FEV
 TYPE OF SAMPLE: CST WATER DILUTE
 SAMPLE QUANTITY: 521.0000 UNITS: gram
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

 ACQUIRE DATE 24-FEB-94 22:55:07 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 3600. SEC * SENSITIVITY 1.000
 ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER 5.0 3
 ELAPSED LIVE TIME: 3600. SEC * NGR ITERATIONS 10

 DETECTOR: ORTEC * LIBRARY:MASTER.LTH
 CALIB DATE: 23-FEB-94 17:06:01 * ENERGY TOLERANCE 1.500 KEV
 KEV/CHNL: 4627016 * HALF LIFE RATIO 8.00
 OFFSET: 39.8232300 N/A * ABUNDANCE LIMIT 70.00%

ENERGY WINDOW 40.29 TO 2853.45

PK	IT	ENERGY	AREA	BKND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	75.28	58.	170	.72	75.48	72	9	1.62E-02	42.6	
2	0	92.35	53.	89.	1.06	111.82	108	7	1.47E-02	34.6	
3	0	511.28	259.	68.	3.05	1003.75	993	21	7.19E-02	12.3	
4	0	609.20	75.	29.	1.25	1212.22	1208	9	2.08E-02	19.4	
5	0	845.15	22.	38.	.84	1714.55	1708	12	6.03E-03	68.7	
6	0	1460.96	231.	0.	1.81	3025.61	3017	20	6.42E-02	7.9	
7	0	1592.43	11.	6.	.74	3305.51	3299	11	2.97E-03	64.4	
8	0	1764.53	55.	12.	2.37	3671.92	3665	16	1.52E-02	19.6	
9	0	2614.60	54.	0.	2.85	5481.72	5471	20	1.50E-02	13.6	

PEAK SEARCH COMPLETED (REV 15.8 - ND PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR
1	0	75.28	58.	170	.72	75.48	72	9	1.62E-02	42.6
2	0	92.35	53.	89.	1.06	111.82	108	7	1.47E-02	34.6
3	0	511.28	259.	68.	3.05	1003.75	993	21	7.19E-02	12.3
4	0	609.20	75.	29.	1.25	1212.22	1208	9	2.08E-02	19.4
5	0	845.15	22.	38.	.84	1714.55	1708	12	6.03E-03	68.7
6	0	1460.96	231.	0.	1.81	3025.61	3017	20	6.42E-02	7.9
7	0	1592.43	11.	6.	.74	3305.51	3299	11	2.97E-03	64.4
8	0	1764.53	55.	12.	2.37	3671.92	3665	16	1.52E-02	19.6
9	0	2614.60	54.	0.	2.85	5481.72	5471	20	1.50E-02	13.6

PILE-UP CORRECTION COMPLETED.

NUCLIDE IDENTIFICATION SYSTEM (NO PC VERSION DEC 88)
 NUCLIDE LINE ACTIVITY REPORT
 ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

PAGE 1

FISSION GAS

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
KR-87	FG	402.58	0.	0.	49.50*	0.000E+00	.000E 0	.000E 0
		845.43	22.	38.	7.30	2.035E+00	3.430E -7	2.355E -7
		2554.80	0.	0.	9.30	0.000E+00	.000E 0	.000E 0
XF-135	FG	249.70	0.	0.	89.90*	0.000E+00	.000E 0	.000E 0
		608.18	75.	29.	2.39	2.588E+00	1.543E -6	2.796E -7

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
AP-511 AP		511.00	277.	68	96.73*	2.73E+00	1.047E -7	2.273E -8

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
RU-103	FP	99.90	0.	0.	92.00*	0.000E+00	.000E 0	.000E 0
		410.40	0.	29.	5.60	2.588E+00	7.457E -7	1.443E -7
MO-97	FP	91.10	0.	89	28.00*	4.350E+00	5.281E -8	2.071E -8
		530.00	0.	0.	13.10	0.000E+00	.000E 0	.000E 0

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
X-40	NP	1460.01	271.	0	9.50*	1.73E+00	2.291E -6	1.804E -7
		176.50	0.	0.	0.00	0.000E+00	.000E 0	.000E 0
		141.00	0.	0.	7.49	0.000E+00	.000E 0	.000E 0
		177.00	0.	0.	19.20	0.000E+00	.000E 0	.000E 0
		151.00	0.	0.	57.20	0.000E+00	.000E 0	.000E 0
		609.31	75.	29.	46.30*	2.588E+00	9.014E -8	1.744E -8
		1120.29	0.	0.	15.10	0.000E+00	.000E 0	.000E 0
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	55.	12.	15.80	1.185E+00	4.202E -7	3.250E -8
		2204.22	0.	0.	4.98	0.000E+00	.000E 0	.000E 0
TH-232	NP	238.63	0.	0.	44.60	0.000E+00	.000E 0	.000E 0
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0	.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	54.	0.	35.36*	3.882E-01	2.443E -7	3.325E -8

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

IDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR
1	0	75.28	58.	170.	.72	75.48	72	9	1.62E-02	42.6
2	0	92.35	53.	89.	1.06	111.82	108	7	1.47E-02	34.6
4	0	609.20	75.	29.	1.25	1212.22	1208	9	2.08E-02	19.4
5	0	845.15	22.	38.	.84	1714.55	1708	12	6.03E-03	68.7
7	0	1592.43	11.	6.	.74	3305.51	3299	11	2.97E-03	64.4
8	0	1764.53	55.	12.	2.37	3671.92	3665	16	1.52E-02	19.6
9	0	2614.60	54.	0.	2.85	5481.72	5471	20	1.50E-02	13.6

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /gram	ABNDIF
2	ND-147	91.11	10.98D	1.002E 0	5.981E	68.13
4	RU-103	610.33	59.35D	1.001E 0	7.457E	5.92
4	XE-135	608.18	9.11H	1.072E 0	1.548E	3.11
4	BA-226	609.31	1600.00Y	1.000E 0	9.014E	39.91
5	KR-87	845.43	76.30H	1.630E 0	3.430E	11.04
8	BA-226	1764.49	1600.00Y	1.000E 0	4.202E	39.99
9	TH-232	2614.60	1.00E+10Y	1.000E 0	2.443E	20.12

NUCLIDE
SUMMARY

TOTAL LIT
UNIDENTIF
IDENTIFIE

%EF

ACTIVATIO

NUCLIDE
ANIL-511

NATURAL P

NUCLIDE
K-40

TOTAL LINES IN SPECTRUM	9	
UNIDENTIFIED PEAKS	7	
IDENTIFIED IN SUMMARY REPORT	2	22.22%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	1.403	1.847E -7	2.273E -8	12.31

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	1.000	2.291E -6	1.304E -7	7.83

MINIMUM DETECTABLE ACTIVITY REPORT (ND PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

PEAK WIDTH

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram	NUCLIDE
BE-7	64.	477.59	1.5755E-07	113
NA-22	23.	1274.54	2.2528E-08	122
NA-24	21.	1368.53	2.3809E-08	SB-124
CL-38	8.	2167.51	0.0000E+00	SB-125
AR-41	18.	1293.64	2.3859E-08	TE-123M
SC-46	54.	1120.51	3.0905E-08	TE-132
CR-51	78.	320.08	1.4586E-07	I-131
MN-54	56.	834.83	2.4735E-08	I-132
MN-56	56.	846.75	3.2477E-08	I-133
FE-59	37.	1099.22	4.4660E-08	I-134
CO-57	131.	122.06	1.4642E-08	I-135
CO-58	44.	810.76	2.1394E-08	XE-131M
CO-60	43.	1332.42	3.2020E-08	XE-133
NI-63	14.	1481.84	1.0798E-07	XE-133M
CU-64	29.	1345.90	5.6858E-06	XE-135
ZN-66	29.	1115.52	4.4470E-08	XE-135M
ZN-68	57.	438.63	1.6032E-08	XE-138
AS-74	48.	559.10	3.6506E-08	CS-134
SE-76	78.	264.65	2.2155E-08	CS-134M
BR-81	48.	554.32	2.2827E-08	CS-136
BR-82	48.	581.50	1.7201E-07	CS-137
KR-83	127.	513.99	5.6652E-06	CS-138
KR-85M	120.	151.18	1.8908E-08	BA-133
87	70.	402.58	5.0369E-08	BA-139
89	100.	196.32	5.5924E-08	140
RB-88	21.	1836.01	1.1241E-06	141
RB-90	31.	1031.88	4.5069E-07	140
SR-89	127.	513.99	2.4549E-08	CE-139
SR-90	94.	231.69	2.7025E-08	CE-141
SR-91	38.	1024.30	7.9743E-08	CE-143
SR-92	28.	1383.94	3.7316E-08	CE-144
Y-88	21.	1836.01	2.8307E-08	ND-147
Y-91	21.	1204.90	6.8050E-06	EU-152
Y-91M	52.	555.57	1.8559E-08	EU-154
Y-92	48.	934.46	2.1952E-07	HF-181
Y-93	102.	266.90	2.3504E-07	W-187
ZR-95	43.	756.72	3.5435E-08	HG-203
ZR-97	42.	743.36	2.1275E-08	RA-226
NB-94	35.	702.63	1.6330E-08	TH-232
NB-95	54.	765.79	2.2277E-08	U-235
NB-97D	42.	1024.50	2.4502E-06	U-238
MO-99	68.	257.34	1.7452E-08	NP-239
MO-99	52.	739.58	1.6595E-07	AM-241
TC-99MD	132.	140.51	1.4187E-08	
RU-103	52.	497.03	1.7112E-08	
RU-105	36.	724.50	4.0340E-08	
RU-106	56.	621.84	1.8916E-07	
105	73.	318.90	7.3403E-08	
110M	46.	657.75	1.8570E-08	
109	110.	88.03	4.1969E-07	

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
113	76.	391.69	2.3842E-08
122	67.	563.93	2.7088E-08
SB-124	48.	602.71	1.7172E-08
SB-125	51.	427.89	4.5960E-08
TE-123M	112.	158.99	1.4002E-08
TE-132	79.	228.16	1.3465E-08
I-131	85.	364.48	1.9438E-08
I-132	49.	667.69	2.4501E-08
I-133	58.	529.87	2.0109E-08
I-134	51.	847.03	5.1936E-08
I-135	29.	1260.41	2.6305E-08
XE-131M	128.	163.93	6.3956E-07
XE-133	73.	80.99	4.0812E-08
XE-133M	82.	233.22	1.2026E-07
XE-135	36.	249.79	1.5913E-08
XE-135M	59.	526.56	2.5092E-07
XE-138	85.	258.31	6.4506E-07
CS-134	53.	604.79	1.8127E-08
CS-134M	133.	127.42	1.2317E-07
CS-136	36.	818.50	1.9516E-08
CS-137	83.	661.65	2.7803E-08
CS-138	19.	1435.86	9.6359E-08
BA-133	75.	356.00	2.4363E-08
BA-139	113.	165.85	1.0938E-07
140	53.	537.32	6.5154E-08
141	116.	190.22	2.0298E-07
140	13.	1596.49	2.1309E-08
CE-139	113.	165.35	1.4616E-08
CE-141	118.	145.44	2.5575E-08
CE-143	71.	293.26	3.2256E-08
CE-144	119.	133.54	1.1400E-07
ND-147	83.	91.11	4.5866E-08
EU-152	63.	344.27	4.9850E-08
EU-154	23.	1274.45	6.3414E-08
HF-181	63.	482.03	1.9805E-08
W-187	59.	479.53	6.9351E-08
HG-203	76.	279.19	1.7433E-08
RA-226	104.	609.31	5.3803E-08
TH-232	54.	2614.66	0.0000E+00
U-235	137.	185.72	2.4455E-08
U-238	112.	131.20	5.8107E-08
NP-239	118.	106.13	5.6275E-08
AM-241	68.	59.54	1.0776E-07

25-FEB-94 07:28:19

FERM1 2: CPH DECANT LINE

ORIGINAL FILE NAME: L940481.FEV
 FILE DATE: 25-FEB-94 06:10:00
 SAMPLE IDENTIFICATION: L940481.FEV
 TYPE OF SAMPLE: LIQUID
 SAMPLE QUANTITY: 458.3000 UNITS GRAMS
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 25-FEB-94 06:27:42 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER : 5.0 %
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHNL: .4677016 * HALF LIFE RATIO: 8.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	RET
1	0	92.63	42.	69.	.95	112.43	110	5	1.18E-02	34.1	
2	0	238.36	128.	137.	1.27	422.69	416	14	3.56E-02	23.1	
3	0	351.37	27.	69.	.62	663.29	662	8	7.45E-03	62.4	
4	0	510.92	221.	117.	2.54	1002.98	994	21	6.13E-02	13.9	
5	0	609.01	54.	60.	1.37	1211.80	1205	15	1.50E-02	38.7	
6	0	1173.75	54.	8.	1.76	2414.15	2408	16	1.50E-02	22.1	
7	0	1332.96	41.	5.	1.61	2753.10	2748	12	1.14E-02	20.8	
8	0	1460.72	206.	19.	1.93	3025.10	3018	14	5.73E-02	8.0	
9	0	1764.38	45.	7.	1.00	3671.60	3663	16	1.26E-02	20.2	
10	0	2203.62	23.	5.	2.64	4606.75	4601	11	6.41E-03	22.9	

PEAK SEARCH COMPLETED (REV 15.8 - ND 90 VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
 UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR
1	0	92.63	42.	69.	.95	112.43	110	5	1.18E-02	34.1
2	0	238.36	128.	137.	1.27	422.69	416	14	3.56E-02	23.1
3	0	351.37	27.	69.	.62	663.29	662	8	7.45E-03	62.4
4	0	510.92	221.	117.	2.54	1002.98	994	21	6.13E-02	13.9
5	0	609.01	54.	60.	1.37	1211.80	1205	15	1.50E-02	38.7
6	0	1173.75	54.	8.	1.76	2414.15	2408	16	1.50E-02	22.1
7	0	1332.96	41.	5.	1.61	2753.10	2748	12	1.14E-02	20.8
8	0	1460.72	206.	19.	1.93	3025.10	3018	14	5.73E-02	8.0
9	0	1764.38	45.	7.	1.00	3671.60	3663	16	1.26E-02	20.2
10	0	2203.62	23.	5.	2.64	4606.75	4601	11	6.41E-03	22.9

PILE-UP CORRECTION COMPLETED

ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

FISSION GAS

NUCLIDE	SBHR	ENERGY	AREA	BKGD	%ABN	%EFF	UCI / GRAMS	1-SIGMA ERROR
XE-135	FG	249.79	0.	0.	89.90*	0.000E+00	.000E 0	.000E 0
		608.18	54.	60.	2.89	2.188E+00	1.255E -6	4.859E -7

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGD	%ABN	%EFF	UCI / GRAMS	1-SIGMA ERROR
ANIL-511	AP	511.00	221.	117.	96.73*	2.043E+00	1.705E -7	2.373E -7
CE-60	AP	1173.22	54.	8.	100.00	1.599E+00	5.525E -8	1.219E -7
		1332.49	41.	5.	100.00*	1.437E+00	4.625E -8	2.590E -7

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGD	%ABN	%EFF	UCI / GRAMS	1-SIGMA ERROR
RU-103	FP	497.08	0.	0.	89.00*	0.000E+00	.000E 0	.000E 0
		610.33	54.	60.	5.60	2.588E+00	6.100E -7	2.363E -7

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGD	%ABN	%EFF	UCI / GRAMS	1-SIGMA ERROR
U	NP	1460.81	206.	19.	10.67*	1.362E+00	2.325E -6	1.564E -7
236	NP	186.21	0.	0.	3.28	0.000E+00	.000E 0	.000E 0
		241.98	0.	0.	7.49	0.000E+00	.000E 0	.000E 0
		295.21	0.	0.	19.20	0.000E+00	.000E 0	.000E 0
		351.92	27.	69.	37.20	3.861E+00	3.056E -8	1.906E -8
		609.31	54.	60.	46.30*	2.588E+00	7.374E -8	2.856E -7
		1120.29	0.	0.	15.10	0.000E+00	.000E 0	.000E 0
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	45.	7.	15.80	1.146E+00	3.955E -7	8.000E -7
		2704.22	23.	5.	4.98	1.007E+00	7.528E -7	1.727E -7
TH-232	NP	238.63	28.	157.	44.60	5.043E+00	2.316E -8	2.155E -8
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0	.000E 0
		583.14	0.	0.	30.25	0.000E+00	.000E 0	.000E 0
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	0.	0.	35.86*	0.000E+00	.000E 0	.000E 0

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

IDENTIFIED PEAKS

K	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1	0	92.63	42.	69.	.95	111.43	110	5	1.18E-02	34.1	4.58E+00
2	0	238.36	128.	137.	1.27	422.69	416	14	3.56E-02	23.1	5.04E+00
3	0	351.37	21.	69.	.62	663.29	662	8	7.45E-03	62.4	3.86E+00
5	0	609.01	84.	60.	1.37	1211.80	1205	15	1.50E-02	38.7	2.59E+00
9	0	1764.38	45.	7.	1.00	3671.1	3663	16	1.26E-02	20.2	1.19E+00
10	0	2203.62	73.	5.	2.64	4606.73	4601	11	6.41E-03	22.9	1.01E+00

LINES NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UC1	/GRAMS	ABNDIFF	FAILED
2	TH-232	238.63	1.00E+10Y	1.000E	0	9.316E -8	25.03%	ABN
3	RA-226	351.92	1600.00Y	1.000E	0	3.056E -8	67.15%	ABN
5	RU-103	610.33	39.35D	1.001E	0	6.100E -7	5.92%	ABN
5	XE-135	608.18	9.11H	1.062E	0	1.255E -6	3.11%	ABN
5	RA-226	609.31	1600.00Y	1.000E	0	7.374E -8	67.15%	ABN
9	RA-226	1764.49	1600.00Y	1.000E	0	3.255E -7	67.15%	ABN
10	RA-226	2204.22	1600.00Y	1.000E	0	7.528E -7	67.15%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(NO PC VERSION

DEC 88)

PAGE 3

TOTAL LINES IN SPECTRUM	10	
UNIDENTIFIED PEAKS	6	
IDENTIFIED IN SUMMARY REPORT	4	40.00%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GRAMS	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	1.344	1.705E -7	2.373E -8	13.92
CO-60	AP	1925.00D	1.000	4.625E -8	9.598E -9	20.75

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GRAMS	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	1.000	2.325E -6	1.864E -7	3.02

MINIMUM DETECTABLE ACTIVITY REPORT (NO PC VERSION 6EP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

LIDE	BKG	ENERGY	MINIMUM UCI /GRAMS
BE-7	61.	477.59	1.7465E-07
BA-22	19.	1274.54	2.3251E-08
NA-24	28.	1368.53	3.1041E-08
CL-38	6.	2167.51	0.0000E+00
AR-41	30.	1293.64	4.0369E-08
SC-46	52.	1120.51	3.4438E-08
CR-51	68.	320.08	1.5464E-07
MN-54	47.	834.83	2.5732E-08
MN-56	50.	846.75	3.3730E-08
FE-59	34.	1099.22	4.8612E-08
CO-57	136.	122.06	1.6942E-08
CO-58	47.	810.76	2.5107E-08
NI-65	15.	1481.84	1.2268E-07
CU-64	18.	1345.90	5.0526E-06
ZN-65	36.	1115.52	5.6263E-08
ZN-69M	72.	438.63	2.0334E-08
AS-76	57.	559.10	4.5028E-08
SE-75	87.	264.65	2.6570E-08
CR-82	51.	554.32	2.6655E-08
BR-84	32.	881.50	1.5146E-07
KR-85	128.	513.99	6.4585E-06
KM-85M	104.	151.18	1.9610E-08
KR-87	83.	402.58	5.8225E-08
88	103.	196.32	6.2536E-08
88	14.	1836.01	7.8078E-07
RB-89	49.	1031.88	4.6122E-07
SR-85	128.	513.99	2.7986E-08
SR-85M	101.	231.69	2.9483E-08
SR-91	21.	1024.30	6.6712E-08
SR-92	28.	1393.94	4.1056E-08
Y-88	14.	1836.01	2.6245E-08
Y-91	30.	1204.70	9.2356E-06
Y-91MD	57.	555.57	2.1867E-08
Y-92	44.	934.46	2.3296E-07
Y-93	73.	266.90	2.2389E-07
ZR-95	47.	756.72	4.2067E-08
ZR-97	36.	743.36	2.2254E-08
NB-94	50.	702.63	2.2164E-08
NB-95	48.	765.79	2.3848E-08
NB-97D	21.	1024.30	1.9575E-06
MO-90	67.	257.54	1.9377E-08
MO-99	30.	739.58	1.4295E-07
TC-99MD	114.	140.51	1.4953E-08
RU-103	66.	497.03	2.1890E-08
RU-105	47.	724.50	5.1342E-08
RU-106	37.	621.84	1.7460E-07
RH-105	65.	318.90	7.8464E-08
109	44.	657.75	2.0624E-08
109	81.	88.03	4.0896E-07
113	59.	391.69	2.3854E-08

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.00.

NUCLIDE	BKG	ENERGY	MINIMUM UCI /GRAMS
122	51.	563.93	2.6802E-08
124	51.	602.71	2.0099E-08
SB-125	63.	427.89	5.8006E-08
TE-123M	108.	158.99	1.5613E-08
TE-132	94.	228.16	1.6660E-08
I-131	71.	364.48	2.0164E-08
I-132	48.	667.69	2.5330E-08
I-133	43.	529.87	1.9581E-08
I-134	45.	847.03	3.0241E-08
I-135	12.	1260.41	6.9442E-08
XE-131M	121.	163.93	7.0591E-07
XE-133	71.	80.99	4.5675E-08
XE-133M	101.	233.22	1.5131E-07
XE-135	81.	249.79	1.7373E-08
XE-135M	46.	526.56	1.8003E-07
XE-138	71.	258.31	4.6529E-07
CS-134	44.	604.70	1.8756E-08
CS-134M	89.	127.42	1.1109E-07
CS-136	42.	818.80	2.3731E-08
CS-137	74.	661.65	2.9812E-08
CS-138	15.	1435.86	8.2878E-08
BA-137	85.	356.00	2.9452E-08
BA-139	114.	165.85	1.1727E-07
BA-140	50.	537.32	7.1842E-08
141	72.	190.22	1.3706E-07
140	12.	1596.49	2.3199E-08
CE-139	114.	165.85	1.6670E-08
CE-141	129.	145.44	3.0362E-08
CE-143	57.	293.26	3.2735E-08
CF-144	96.	133.54	1.1628E-07
ND-147	75.	91.11	4.9495E-08
FU-152	66.	344.27	5.7941E-08
EU-154	19.	1274.45	6.5451E-08
HF-181	38.	482.03	1.7465E-08
W-187	49.	472.53	7.1512E-08
HG-203	81.	279.19	2.0436E-08
RA-226	91.	609.31	5.7151E-08
TH-232	59.	2614.66	0.0000E+00
U-235	148.	185.72	2.8364E-08
U-238	112.	131.20	6.5984E-08
NP-239	118.	106.15	6.3807E-08
AM-241	74.	59.54	1.2765E-07

25-FEB-94 07:30:01

TERMI 2: CPH DECANT LINE

SPECTRAL FILE NAME: L240481.FEV
 SAMPLE DATE: 25-FEB-94 06:10:00
 SAMPLE IDENTIFICATION: L240481.FEV
 TYPE OF SAMPLE: LIQUID
 SAMPLE QUANTITY: 458.3000 UNITS: GRAMS
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 25-FEB-94 06:27:42 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3600. SEC * CHAPE PARAMETER: 5.0 %
 ELAPSED LIVE TIME: 3600. SEC * NSR ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHNL: 4697016 * HALF LIFE RATIO: 8.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	92.63	42.	69	.95	112.43	110	5	1.18E-02	34.1	
2	0	238.36	125	137	1.27	422.69	416	14	3.56E-02	23.1	
3	0	351.37	27.	69.	.62	663.29	662	8	7.45E-03	62.4	
4	0	510.92	221	117.	2.54	1002.98	994	21	6.13E-02	13.9	
5	0	609.01	54.	60.	1.37	1211.80	1205	15	1.50E-02	38.7	
6	0	1173.75	54	8.	1.76	2414.15	2408	16	1.50E-02	22.1	
7	0	1332.96	41.	5.	1.61	2753.10	2743	12	1.14E-02	20.8	
8	0	1460.72	206.	19.	1.93	3025.10	3018	14	5.73E-02	8.0	
9	0	1764.38	49.	7.	1.00	3671.60	3663	16	1.26E-02	20.2	
10	0	2203.62	23	5.	2.64	4606.75	4601	11	6.41E-03	22.9	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND

* AFTER ENERGY INDICATES CORRECTED PEAK

IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	92.63*	11.	69.	.95	112.43	110	5	3.10E-03	****
2	0	238.36*	61.	137.	1.27	422.69	416	14	1.69E-02	62.2
3	0	351.37	27.	69.	.62	663.29	662	8	7.45E-03	62.4
4	0	510.92*	23.	117.	2.54	1002.98	994	21	6.50E-03	****
5	0	609.01*	12.	60.	1.37	1211.80	1205	15	3.35E-03	****
6	0	1173.75	54.	8.	1.76	2414.15	2408	16	1.50E-02	22.1

1332.96 KEV PEAK DELETED

1460.72 KEV PEAK DELETED

10 0 2203.62 23. 5. 2.64 4606.75 4601 *11 6.41E-03 22.9

NUCLIDE IDENTIFICATION SYSTEM
UNKNOWN LINE REPORT

(NO PC VERSION DEC 88)

PAGE 1

UNIDENTIFIED PEAKS

	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1	0	92.63	11.	69.	.95	112.43	110	5	3.10E-03	****	4.58E+00
2	0	238.36	61.	137.	1.27	422.69	416	14	1.69E-02	62.2	5.04E+00
3	0	351.37	27.	69.	.62	663.29	662	8	7.45E-03	62.4	3.86E+00
5	0	609.01	12.	60.	1.37	1211.80	1205	15	3.35E-03	****	2.59E+00
6	0	1173.75	54.	8.	1.76	2414.15	2408	16	1.50E-02	22.1	1.60E+00
10	0	2203.62	23.	5.	2.64	4606.75	4601	11	6.41E-03	22.2	1.01E+00

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /GRAMS	ABNDIFF	FAILED
2	TH-232	238.63	1.00E+10Y	1.000E 0	4.420E -8	25.03%	ABN
3	RA-226	351.92	1600.00Y	1.000E 0	3.056E -8	56.98%	ABN
5	RU-103	610.33	39.35D	1.001E 0	1.363E -7	5.92%	ABN
5	XE-135	608.18	9.11H	1.062E 0	2.803E -7	3.11%	ABN
5	RA-226	609.31	1600.00Y	1.000E 0	1.647E -8	56.98%	ABN
6	CO-60	1173.22	1925.00D	1.000E 0	5.525E -8	50.00%	ABN
10	RA-226	2204.22	1600.00Y	1.000E 0	7.528E -7	56.98%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(NO PC VERSION DEC 98)

PAGE 2

TOTAL LINES IN SPECTRUM	7	
UNIDENTIFIED PEAKS	6	
IDENTIFIED IN SUMMARY REPORT	1	14.29%

ACTIVATION PRODUCT

NUCLIDE	SEHR	HLIFE	DECAY	UCI /GRAMS	1-SIGMA ERROR	SERR
ANIL-511 AP		109.70M	1.344	1.806E -8	3.176E -8	175.82

25-FEB-94 17:36:39

PERM 2/NRC SPLIT: DECANT LINE, SAMPLE #3.

CENTRAL FILE NAME: L940531.FEV
FILE DATE: 25-FEB-94 14:00:00
SAMPLE IDENTIFICATION: L940531.FEV
TYPE OF SAMPLE: WATER
SAMPLE QUANTITY: 507.3000 UNITS: gram
SAMPLE GEOMETRY: LMAR500
EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 25-FEB-94 15:55:55 * FWHM(1332) 1.886
PRESENT TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER: 5.0 %
ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
KEV/CHNL: 4697016 * HALF LIFE RATIO: 8.00
OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2853.03

PK	LT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	92.49	67.	79.	1.63	112.13	109	7	1.86E-02	26.2	
2	0	239.41	61.	152.	1.39	424.92	420	11	1.70E-02	43.0	
3	0	511.43	194.	120.	2.68	1004.06	995	18	5.40E-02	16.1	
4	0	609.19	62.	63.	1.09	1212.18	1205	14	1.72E-02	32.0	
5	0	661.92	25.	37.	.95	1324.45	1321	9	7.06E-03	48.7	
6	0	1120.39	38.	35.	1.58	2300.53	2296	13	1.05E-02	34.2	
7	0	1239.37	49.	28.	1.66	2554.92	2546	18	1.35E-02	40.1	
8	0	1460.88	226.	10.	2.03	3025.44	3019	16	6.29E-02	7.9	
9	0	1764.13	64.	17.	1.67	3671.06	3662	19	1.77E-02	19.2	
10	0	2614.25	47.	5.	1.43	5480.99	5472	17	1.30E-02	17.9	

PEAK SEARCH COMPLETED (REV 15.8 - MD PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	LT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR
1	0	92.49	67.	79.	1.63	112.13	109	7	1.86E-02	26.2
2	0	239.41	61.	152.	1.39	424.92	420	11	1.70E-02	43.0
3	0	511.43	194.	120.	2.68	1004.06	995	18	5.40E-02	16.1
4	0	609.19	62.	63.	1.09	1212.18	1205	14	1.72E-02	32.0
5	0	661.92	25.	37.	.95	1324.45	1321	9	7.06E-03	48.7
6	0	1120.39	38.	35.	1.58	2300.53	2296	13	1.05E-02	34.2
7	0	1239.37	49.	28.	1.66	2554.92	2546	18	1.35E-02	40.1
8	0	1460.88	226.	10.	2.03	3025.44	3019	16	6.29E-02	7.9
9	0	1764.13	64.	17.	1.67	3671.06	3662	19	1.77E-02	19.2
10	0	2614.25	47.	5.	1.43	5480.99	5472	17	1.30E-02	17.9

FILE-UP CORRECTION COMPLETED

ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

FISSION GAS

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
XE-135	FG	249.79	0.	0.	89.90*	0.000E+00	0.000E 0	0.000E 0
		608.18	62.	63.	2.89	2.588E+00	1.275E -6	4.084E -7

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
ANIL-511	AP	511.00	194.	120.	96.73*	2.941E+00	2.182E -7	3.520E -8
SC-46	AP	889.25	0.	0.	99.98	0.000E+00	0.000E 0	0.000E 0
		1120.51	38.	35.	99.99*	1.655E+00	2.933E -8	1.002E -8

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
RU-103	FP	497.08	0.	0.	89.00*	0.000E+00	0.000E 0	0.000E 0
		610.33	62.	63.	5.60	2.588E+00	5.478E -7	1.755E -7
C3-137	FP	661.65	25.	37.	89.12*	2.435E+00	1.567E -8	7.632E -7
ND-147	FP	91.11	67.	79.	28.00*	4.371E+00	6.745E -8	1.765E -8
		531.02	0.	0.	13.10	0.000E+00	0.000E 0	0.000E 0

THERMAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / gram	1-SIGMA ERROR
K-40	NP	1460.81	226.	10.	10.67*	1.362E+00	1.992E -6	1.564E -7
RA-226	NP	186.21	0.	0.	3.28	0.000E+00	0.000E 0	0.000E 0
		241.98	0.	0.	7.49	0.000E+00	0.000E 0	0.000E 0
		295.21	0.	0.	19.20	0.000E+00	0.000E 0	0.000E 0
		351.92	0.	0.	37.20	0.000E+00	0.000E 0	0.000E 0
		609.31	62.	63.	46.30*	2.588E+00	6.614E -8	2.119E -8
		1120.29	38.	35.	15.10	1.655E+00	1.941E -7	6.632E -8
		1238.11	0.	0.	5.94	0.000E+00	0.000E 0	0.000E 0
		1764.49	64.	17.	15.80	1.186E+00	4.336E -7	8.310E -7
		2204.22	0.	0.	4.98	0.000E+00	0.000E 0	0.000E 0
TH-232	NP	238.63	61.	152.	44.60	1.029E+00	3.479E -8	1.497E -8
		338.32	0.	0.	11.40	0.000E+00	0.000E 0	0.000E 0
		727.17	0.	0.	11.80	0.000E+00	0.000E 0	0.000E 0
		583.14	0.	0.	30.25	0.000E+00	0.000E 0	0.000E 0
		911.07	0.	0.	27.70	0.000E+00	0.000E 0	0.000E 0
		969.11	0.	0.	16.60	0.000E+00	0.000E 0	0.000E 0
		2614.66	47.	5.	35.86*	3.882E-01	1.881E -7	3.339E -8

UNKNOWN LINE REPORT

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

IDENTIFIED PEAKS

IT	ENERGY	AREA	SKQND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	SEFF
1 0	92.49	67.	79.	1.63	112.13	109	7	1.86E-02	26.2	4.57E+00
2 0	239.41	61.	152.	1.39	424.92	420	11	1.70E-02	43.0	5.03E+00
4 0	609.19	62.	63.	1.09	1212.18	1205	14	1.72E-02	32.0	2.59E+00
6 0	1120.39	38.	35.	1.58	2300.53	2296	18	1.05E-02	34.2	1.65E+00
7 0	1239.87	49.	28.	1.66	2554.92	2546	18	1.35E-02	40.1	1.54E+00
9 0	1764.13	64.	17.	1.57	3671.06	3662	19	1.77E-02	19.2	1.19E+00
10 0	2614.25	47.	5.	1.43	5480.99	5472	17	1.30E-02	17.9	8.88E-01

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /gram	ABNDIFF	FAILED
1	ND-147	91.11	10.98D	1.006E 0	6.745E -8	68.13%	ABN
2	TH-232	238.63	1.00E+10Y	1.000E 0	3.479E -8	45.15%	ABN
4	RU-103	610.33	39.35D	1.002E 0	5.478E -7	5.22%	ABN
4	XE-135	608.18	9.11H	1.203E 0	1.275E -6	3.11%	ABN
4	RA-226	609.31	1600.00Y	1.000E 0	6.614E -8	49.71%	ABN
6	SC-46	1120.51	83.33D	1.001E 0	2.933E -8	50.00%	ABN
6	RA-226	1120.29	1600.00Y	1.000E 0	1.941E -7	49.71%	ABN
9	RA-226	1764.49	1600.00Y	1.000E 0	4.530E -8	49.71%	ABN
10	TH-232	2614.66	1.00E+10Y	1.000E 0	1.881E -8	45.15%	ABN

TOTAL LINES IN SPECTRUM 10
 UNIDENTIFIED PEAKS 7
 IDENTIFIED IN SUMMARY REPORT 3 30.00%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
ANIL 511	AP	109.70M	2.499	2.182E -7	3.520E -8	16.13

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
CS-137	EP	30.17Y	1.000	1.567E -8	7.632E -9	48.71

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	%ERR
K-40	NP	1.28E+09Y	1.000	1.992E -6	1.564E -7	7.83

MINIMUM DETECTABLE ACTIVITY REPORT (NO PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

SLIDE	BKG	ENERGY	MINIMUM UCI /gram
BE-7	59.	477.59	1.3430E-07
NA-22	26.	1274.54	2.1249E-08
NA-24	25.	1368.53	2.4714E-08
CL-38	9.	2167.51	0.0000E+00
AR-41	26.	1293.64	5.4639E-08
SC-46	70.	1120.51	3.1231E-08
CR-51	66.	320.08	1.1922E-07
MN-54	49.	834.83	2.0528E-08
MN-56	45.	846.75	3.8817E-08
FE-57	26.	1099.22	3.3244E-08
CO-57	145.	122.06	1.3668E-08
CO-58	40.	810.76	1.8106E-08
CO-60	47.	1332.49	2.9698E-08
NI-63	18.	1481.84	1.6469E-07
CU-64	24.	1345.90	4.9836E-06
ZN-65	41.	1115.52	4.6915E-08
ZN-69M	74.	438.63	1.7488E-08
AS-76	88.	559.10	4.5632E-08
SE-78	78.	264.65	1.9662E-08
BR-82	49.	554.32	2.1077E-08
BR-84	53.	881.50	1.2953E-06
KR-85	114.	513.99	4.7616E-06
KR-85M	122.	151.18	2.1375E-08
87	67.	402.58	9.9740E-08
88	112.	196.32	7.5961E-08
RE-88	20.	1836.01	HALF LIFE TOO SHORT
RB-89	33.	1031.88	HALF LIFE TOO SHORT
SR-85	114.	513.99	2.0647E-08
SR-85M	24.	231.69	6.0775E-08
SR-91	41.	1024.30	8.2058E-08
SR-92	24.	1383.24	4.5134E-08
Y-88	20.	1836.01	2.4516E-08
Y-91	30.	1204.90	7.2207E-06
Y-91MD	58.	555.57	1.9417E-08
Y-92	52.	934.46	2.7259E-07
Y-93	96.	266.90	2.2442E-07
ZR-95	53.	756.72	3.4923E-08
ZR-97	40.	743.36	1.9598E-08
NB-94	46.	702.63	1.6608E-08
NB-95	54.	765.79	1.9787E-08
NB-97D	43.	1024.50	2.3402E-06
MO-90	85.	257.34	2.0327E-08
MO-92	36.	739.58	1.2445E-07
TC-99MD	140.	140.51	1.3169E-08
RU-103	64.	497.08	1.6360E-08
RU-105	44.	724.57	5.0107E-08
RU-106	52.	621.84	1.6172E-07
105	65.	318.90	6.3295E-08
110M	50.	657.75	1.7178E-08
109	92.	88.03	3.4052E-07

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66. PAGE 2

NUCLIDE	BKG	ENERGY	MINIMUM UCI /gram
113	62.	391.69	1.9111E-08
122	69.	563.93	2.4784E-08
SB-124	62.	602.71	1.7326E-08
SB-125	74.	427.89	4.9114E-08
TE-123M	114.	158.99	1.2536E-08
TE-132	109.	228.16	1.4220E-08
I-131	80.	364.48	1.6820E-08
I-132	48.	667.69	3.3943E-08
I-133	66.	529.87	2.0013E-08
I-134	46.	847.03	1.4477E-07
I-135	32.	1260.41	1.0518E-07
KE-131M	114.	163.93	5.3741E-07
KE-133	76.	30.99	3.7250E-08
KE-133M	105.	233.22	1.2316E-07
KE-135	104.	242.79	1.7418E-08
KE-135M	54.	526.56	HALF LIFE TOO SHORT
KE-138	88.	258.31	HALF LIFE TOO SHORT
OS-134	51.	604.70	1.5776E-08
OS-134M	145.	127.42	1.6381E-07
OS-136	62.	818.50	2.2796E-08
OS-138	22.	1435.86	6.4949E-07
BA-133	71.	356.00	2.1028E-08
BA-139	106.	165.85	2.0042E-07
BA-140	58.	537.32	6.0670E-08
141	116.	190.22	5.6432E-06
140	16.	1596.49	2.1526E-08
139	106.	165.85	1.2562E-08
141	132.	145.44	2.4028E-08
143	98.	293.26	3.4704E-08
144	130.	133.54	1.0572E-07
147	90.	91.11	4.2539E-08
EU-152	77.	344.27	4.8890E-08
EU-154	26.	1274.45	5.9813E-08
HF-181	71.	482.03	1.8671E-08
W-187	62.	479.53	6.5905E-08
HO-203	92.	279.19	1.7032E-08
RA-226	97.	609.31	4.6095E-08
TH-232	51.	2614.66	0.0000E+00
U-235	152.	185.72	2.2351E-08
U-238	124.	131.20	5.4238E-08
NP-239	103.	106.13	4.7515E-08
AM-241	67.	59.54	9.4889E-08

25-FEB-94 17:30:29

FERMI 2/NRC SPLIT: DECANT LINE. SAMPLE #3.

CTRAL FILE NAME: L940331.FEV
PLD DATE: 25-FEB-94 14:00:00
SAMPLE IDENTIFICATION: L940531.FEV
TYPE OF SAMPLE: WATER
SAMPLE QUANTITY: 587.3000 UNITS: gram
SAMPLE GEOMETRY: LMAR500
EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 25-FEB-94 15:55:55 * FWHM(1332) 1.880
PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER: 5.0 %
ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
KEY/CHNL: .4697016 * HALF LIFE RATIO: 8.00
OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	92.49	67.	79.	1.63	112.13	109	7	1.86E-02	26.2	
2	0	239.41	61.	102.	1.39	424.92	420	11	1.70E-02	43.0	
3	0	511.43	194.	110.	2.68	1004.03	995	18	5.40E-02	16.1	
4	0	609.19	52.	63.	1.09	1212.18	1205	14	1.72E-02	32.0	
5	0	661.92	25.	37.	1.95	1324.45	1321	9	7.06E-03	48.7	
6	0	1120.39	38.	35.	1.58	2300.53	2296	13	1.05E-02	34.2	
7	0	1239.87	49.	28.	1.66	2554.92	2546	18	1.35E-02	40.1	
8	0	1460.88	226.	10.	2.03	3025.44	3019	16	6.29E-02	7.9	
9	0	1764.13	64.	17.	1.67	3671.06	3662	19	1.77E-02	19.2	
10	0	2614.25	47.	5.	1.43	5480.99	5472	17	1.30E-02	17.9	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND
* AFTER ENERGY INDICATES CORRECTED PEAK

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
0	0	92.49*	36.	79.	1.63	112.13	109	7	9.95E-03	85.0	
		239.41 KEV PEAK DELETED									
		511.43 KEV PEAK DELETED									
4	0	609.19*	20.	63.	1.09	1212.18	1205	14	5.57E-03	****	
		661.92 KEV PEAK DELETED									
6	0	1120.39	38.	35.	1.58	2300.53	2296	13	1.05E-02	34.2	
7	0	1239.87	49.	28.	1.66	2554.92	2546	18	1.35E-02	40.1	
8	0	1460.88*	10.	10.	2.03	3025.44	3019	16	2.75E-03	****	

2614.25 KEV PEAK DELETED

NUCLIDE IDENTIFICATION SYSTEM
UNKNOWN LINE REPORT

(NO PC VERSION DEC 88)

PAGE 1

UNIDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	ERR	EFF
1	0	92.49	36.	79.	1.63	112.13	109	7	9.95E-03	85.0	4.57E-00
4	0	609.19	20.	63.	1.09	1212.18	1205	14	5.57E-03	****	2.59E-00
6	0	1120.39	38.	35.	1.58	2300.53	2296	13	1.05E-02	34.2	1.65E+00
7	0	1239.87	49.	28.	1.66	2554.92	2546	18	1.35E-02	40.1	1.54E+00
9	0	1764.13	17.	17.	1.67	3671.06	3662	19	4.71E-03	89.4	1.19E+00

LINEs NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /gram	ABNDIFF	FACTOR
1	ND-147	91.11	10.98D	1.006E 0	3.602E -8	68.13%	ABN
4	RU-103	610.33	59.35D	1.002E 0	1.772E -7	5.92%	ABN
4	XE-135	608.18	9.11H	1.203E 0	4.124E -7	3.11%	ABN
4	RA-226	609.31	1600.00Y	1.000E 0	2.140E -8	49.71%	ABN
6	SC-46	1120.51	83.83D	1.001E 0	2.933E -8	50.00%	ABN
6	RA-226	1120.29	1600.00Y	1.000E 0	1.941E -7	49.71%	ABN
9	RA-226	1764.49	1600.00Y	1.000E 0	1.157E -7	49.71%	ABN

TOTAL LINES IN SPECTRUM 6
IDENTIFIED PEAKS 5
IDENTIFIED IN SUMMARY REPORT 1 16.67%

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /gram	1-SIGMA ERROR	SERR
K-40	NP	1.28E+09Y	1.000	8.699E -8	2.171E -7	242.57

26-FEB-94 19:55:25

FERMI 2 CPH DECANT LINE; POST CST DISCHARGE

CTRAL FILE NAME: L940571.FEV
PLE DATE: 26-FEB-94 12:05:00
SAMPLE IDENTIFICATION: L940571.FEV
TYPE OF SAMPLE: LIQUID
SAMPLE QUANTITY: 568.1000 UNITS: GRAM
SAMPLE GEOMETRY: LMAR500
EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 26-FEB-94 14:04:24 * FWHM(1332) 1.686
PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER: 5.0 %
ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
KEY/CHNL: .4697016 * HALF LIFE RATIO: 8.00
OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR	FIT
1	0	74.84	43.	127.	1.02	74.55	72	7	1.19E-02	49.7	
2	0	238.90	52.	74.	.78	423.83	421	7	1.46E-02	31.7	
3	0	511.06	166.	115.	1.95	1003.27	999	13	4.60E-02	16.1	
4	0	583.13	40.	39.	1.54	1156.75	1152	11	1.11E-02	35.3	
5	0	611.76	76.	103.	4.12	1217.65	1205	28	2.11E-02	49.2	
6	0	660.45	52.	45.	.76	1321.32	1314	13	1.44E-02	33.3	
7	0	1460.72	183.	14.	1.43	3025.11	3017	13	5.09E-02	9.3	
8	0	1764.56	64.	0.	2.68	3671.98	3664	17	1.78E-02	15.6	
9	0	2614.71	51.	5.	3.01	5481.97	5471	19	1.41E-02	17.5	

PEAK SEARCH COMPLETED (REV 15.8 - NO PC VERSION NOV 89)

PULSE-PILE-UP CORRECTED DATA. CORRECTION = 1.000
UNCORR. LIVE TIME: 3600. CORRECTED LIVE TIME: 3600.

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	SERR
1	0	74.84	43.	127.	1.02	74.55	72	7	1.19E-02	49.7
2	0	238.90	52.	74.	.78	423.83	421	7	1.46E-02	31.7
3	0	511.06	166.	115.	1.95	1003.27	999	13	4.60E-02	16.1
4	0	583.13	40.	39.	1.54	1156.75	1152	11	1.11E-02	35.3
5	0	611.76	76.	103.	4.12	1217.65	1205	28	2.11E-02	49.2
6	0	660.45	52.	45.	.76	1321.32	1314	13	1.44E-02	33.3
7	0	1460.72	183.	14.	1.43	3025.11	3017	13	5.09E-02	9.3
8	0	1764.56	64.	0.	2.68	3671.98	3664	17	1.78E-02	15.6
9	0	2614.71	51.	5.	3.01	5481.97	5471	19	1.41E-02	17.5

PILE-UP CORRECTION COMPLETED

ELAPSED LIVE TIME: 3600. (PILE-UP CORRECTED)

ACTIVATION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GRAM	1-SIGMA ERROR
ANIL-511	AP	511.00	166.	115.	26.73*	2.943E+00	1.964E -7	3.170E -8

FISSION PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GRAM	1-SIGMA ERROR
RU-103	FP	497.08	0.	0.	89.00*	0.000E+00	.000E 0	.000E 0
		610.33	76.	103.	5.60	2.580E+00	6.977E -7	3.434E -7
CS-137	FP	661.65	52.	45.	85.12*	2.439E+00	3.302E -8	1.098E -8

NATURAL PRODUCT

NUCLIDE	SBHR	ENERGY	AREA	BKGND	%ABN	%EFF	UCI / GRAM	1-SIGMA ERROR
K-40	NP	1460.81	103.	14.	10.67*	1.362E+00	1.666E -6	1.554E -7
RA-226	NP	186.21	0.	0.	3.28	0.000E+00	.000E 0	.000E 0
		241.78	0.	0.	7.49	0.000E+00	.000E 0	.000E 0
		295.21	0.	0.	19.20	0.000E+00	.000E 0	.000E 0
		351.92	0.	0.	57.20	0.000E+00	.000E 0	.000E 0
		609.31	0.	0.	46.30*	0.000E+00	.000E 0	.000E 0
		1120.79	0.	0.	15.10	0.000E+00	.000E 0	.000E 0
		1238.11	0.	0.	5.94	0.000E+00	.000E 0	.000E 0
		1764.49	64.	0.	15.80	1.185E+00	4.515E -7	7.066E -7
Th-232	NP	2204.22	0.	0.	4.98	0.000E+00	.000E 0	.000E 0
		238.63	52.	74.	44.60	5.035E+00	3.083E -8	9.777E -8
		338.32	0.	0.	11.40	0.000E+00	.000E 0	.000E 0
		727.17	0.	0.	11.80	0.000E+00	.000E 0	.000E 0
		583.14	40.	39.	30.25	2.672E+00	6.544E -8	2.312E -8
		911.07	0.	0.	27.70	0.000E+00	.000E 0	.000E 0
		969.11	0.	0.	16.60	0.000E+00	.000E 0	.000E 0
		2614.66	0.	5.	35.86*	8.881E-01	2.107E -7	3.677E -7

ELAPSED LIVE TIME 3600. (PILE-UP CORRECTED)

IDENTIFIED PEAKS

PK	IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1	0	74.84	43.	127.	1.02	74.55	72	7	1.19E-02	49.7	2.94E+00
2	0	238.90	52.	74.	.78	423.83	421	7	1.46E-02	31.7	5.04E+00
4	0	583.15	40.	39.	1.54	1156.75	1152	11	1.11E-02	35.3	2.67E+00
5	0	611.76	76.	103.	4.12	1217.65	1205	28	2.11E-02	49.2	2.58E+00
8	0	1764.56	64.	0.	2.68	3671.98	3664	17	1.78E-02	15.6	1.19E+00
9	0	2614.71	51.	5.	3.01	5481.97	5471	19	1.41E-02	17.5	8.88E-01

LINE# NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /GRAM	ABNDIFF	FAIL CD
2	TH-232	238.63	1.00E+10Y	1.000E 0	3.083E -8	62.12%	ABN
4	TH-232	583.14	1.00E+10Y	1.000E 0	6.544E -8	62.12%	ABN
5	RU-103	610.33	39.35D	1.002E 0	6.977E -7	5.92%	ABN
8	RA-226	1764.49	1600.00Y	1.000E 0	4.515E -7	10.17%	ABN
9	TH-232	2614.66	1.00E+10Y	1.000E 0	2.107E -7	62.12%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(NO PC VERSION

DEC 88)

PAGE 3

TOTAL LINES IN SPECTRUM	9	
UNIDENTIFIED PEAKS	6	
IDENTIFIED IN SUMMARY REPORT	3	33.33%

ACTIVATION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GRAM	1-SIGMA ERROR	%ERR
ANIL-511	AP	109.70M	2.555	1.964E -7	3.170E -8	16.14

FISSION PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GRAM	1-SIGMA ERROR	%ERR
CS-137	FP	30.17Y	1.000	3.302E -8	1.098E -8	33.27

NATURAL PRODUCT

NUCLIDE	SBHR	HLIFE	DECAY	UCI /GRAM	1-SIGMA ERROR	%ERR
K-40	NP	1.23E+09Y	1.000	1.666E -6	1.554E -7	9.33

MINIMUM DETECTABLE ACTIVITY REPORT (NO PC VERSION SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

LIDE	BKG	ENERGY	MINIMUM UCI /GRAM
BE-7	60.	477.59	1.4001E-07
NA-22	23.	1274.54	2.0661E-08
NA-24	16.	1368.53	2.0494E-08
CL-38	11.	2167.51	0.0000E+00
AR-41	20.	1293.64	5.0644E-08
SC-46	51.	1120.51	2.7559E-08
CR-51	72.	320.08	1.2873E-07
MN-54	29.	834.83	1.6326E-08
MN-56	39.	846.75	3.7945E-08
FE-59	27.	1099.22	3.5023E-08
CO-57	115.	122.06	1.2584E-08
CO-58	34.	810.76	1.7250E-08
CO-60	44.	1332.49	2.9705E-08
NI-65	16.	1481.84	1.6310E-07
CU-64	15.	1345.90	4.0860E-06
ZN-65	23.	1115.52	3.6326E-08
ZN-69M	63	438.63	1.6731E-08
AS-76	51.	559.10	3.5968E-08
SC-75	87.	264.65	2.1467E-08
BR-82	55.	554.32	2.3112E-08
BR-84	45	881.50	1.1740E-06
BR-85	115.	513.99	4.9440E-06
BR-85M	103.	151.18	2.0978E-08
BR-87	65.	462.58	1.0483E-07
BR-88	87.	196.82	7.0199E-08
RE-88	20.	1836.01	HALF LIFE TOO SHORT
RB-89	39.	1031.88	HALF LIFE TOO SHORT
SR-85	115.	513.99	2.1439E-08
SR-85M	103.	231.67	6.8816E-08
SR-91	29.	1026.70	7.1648E-08
SR-92	16.	1383.96	3.8667E-08
Y-88	20.	1836.01	2.5347E-08
Y-91	28.	1204.90	7.21E-06
Y-91MD	52.	555.57	1.9088E-08
Y-92	45.	934.46	2.6515E-07
Y-93	103.	266.90	2.4128E-07
ZR-95	33.	756.72	2.8489E-08
ZR-97	33.	743.36	1.8446E-08
IB-94	48.	702.63	1.7538E-08
NB-95	39.	765.72	1.7385E-08
NB-97D	30.	1024.50	2.0255E-06
MO-90	89.	257.34	2.2189E-08
MO-99	32.	739.56	1.2137E-07
TC-99MD	127.	140.51	1.2975E-08
RU-103	51.	497.08	1.5560E-08
RU-105	41.	724.50	5.0458E-08
RU-106	43.	621.84	1.5203E-07
RU-105	70.	318.90	6.7982E-08
RU-110M	43.	657.75	1.6469E-08
RU-109	81.	88.03	3.3031E-07

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

NUCLIDE	BKG	ENERGY	MINIMUM UC1 /GRAM
113	55.	391.69	1.3608E-08
122	42.	563.93	2.0002E-08
SB-124	50.	602.71	1.6085E-08
SB-125	51.	427.89	4.2151E-08
TE-123M	85.	158.99	1.1191E-08
TE-132	106.	228.16	1.4504E-08
I-131	65.	364.48	1.5677E-08
I-132	42.	667.69	3.3403E-08
I-133	52.	529.87	1.8400E-08
I-134	36.	847.03	1.3862E-07
I-135	21.	1260.41	8.8621E-08
XE-131M	89.	163.93	4.9096E-07
XE-133	66.	30.99	3.5898E-08
XE-133M	103.	233.22	1.2620E-07
XE-135	105.	249.79	1.8173E-08
XE-135M	51.	526.56	HALF LIFE TOO SHORT
XE-138	78.	253.31	HALF LIFE TOO SHORT
CS-134	45.	604.70	1.5319E-08
CS-134M	122.	127.42	1.5751E-07
CS-136	34.	818.50	1.7454E-08
CS-138	14.	1435.86	5.7733E-07
BA-137	64.	356.00	2.0640E-08
BA-139	106.	165.85	2.1330E-07
BA-140	47.	537.32	5.6468E-08
141	99.	190.22	HALF LIFE TOO SHORT
140	8.	1546.49	1.5751E-08
CE-139	106.	165.85	1.2986E-08
CE-141	103.	145.44	2.1943E-08
CE-143	69.	293.26	3.0141E-08
CE-144	124.	133.54	1.0674E-07
ND-147	31.	91.11	4.1726E-08
EU-152	58.	344.97	4.3866E-08
EU-154	23.	1274.45	5.8158E-08
HF-181	55.	482.07	1.6989E-08
W-187	47.	479.53	5.9421E-08
HG-203	68.	279.19	1.5138E-08
RA-226	79.	609.51	4.3005E-08
TH-232	55.	2614.66	0.0000E+00
U-235	119.	185.72	2.0902E-08
U-238	140.	131.20	5.9579E-08
NP-239	106.	106.13	4.9867E-08
AM-241	71.	59.54	1.0098E-07

26-FEB-94 19:58:17

RPTBKG

MI 2 CPH DECANT LINE; POST CST DISCHARGE

SPECTRAL FILE NAME: L940571.FEV
 SAMPLE DATE: 26-FEB-94 12:05:00
 SAMPLE IDENTIFICATION: L940571.FEV
 TYPE OF SAMPLE: LIQUID
 SAMPLE QUANTITY: 568.1000 UNITS: GRAM
 SAMPLE GEOMETRY: LMAR500
 EFFICIENCY FILE NAME: LMAR500.EFF

ACQUIRE DATE: 26-FEB-94 14:04:24 * FWHM(1332) 1.886
 PRESET TIME(LIVE): 3600. SEC * SENSITIVITY: 5.000
 ELAPSED REAL TIME: 3600. SEC * SHAPE PARAMETER: 5.0 %
 ELAPSED LIVE TIME: 3600. SEC * NBR ITERATIONS: 10.

DETECTOR: ORTEC * LIBRARY: MASTER.LIB
 CALIB DATE: 23-FEB-94 07:26:01 * ENERGY TOLERANCE: 1.500 KEV
 KEV/CHNL: 4697016 * HALF LIFE RATIO: 8.00
 OFFSET: 39.8232300 KEV * ABUNDANCE LIMIT: 70.00%

ENERGY WINDOW 40.29 TO 2858.03

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
1	0	74.84	43.	127.	1.02	74.55	72	7	1.19E-02	49.7	
2	0	238.90	52.	74.	.78	423.83	421	7	1.46E-02	31.7	
3	0	511.06	166.	115.	1.95	1003.27	999	13	4.60E-02	16.1	
4	0	583.15	40.	39.	1.54	1156.75	1152	11	1.11E-02	35.3	
5	0	611.76	76.	103.	4.12	1217.65	1205	28	2.11E-02	49.2	
6	0	660.45	52.	45.	.76	1321.32	1314	13	1.44E-02	33.3	
7	0	1460.72	183.	14.	1.43	3025.11	3017	13	5.09E-02	9.3	
8	0	1764.56	64.	0.	2.68	3671.98	3664	17	1.78E-02	15.6	
9	0	2614.71	51.	5.	3.01	5481.97	5471	19	1.41E-02	17.1	

PEAK SEARCH COMPLETED (REV 15.8 - NO P2 VERSION NOV 84)

PEAK DATA CORRECTED FOR ENVIRONMENTAL BACKGROUND

* AFTER ENERGY INDICATES CORRECTED PEAK

PK	IT	ENERGY	AREA	BKGD	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	FIT
0		74.84	43.	127.	1.02	74.55	72	7	1.19E-02	49.7	
		238.90 KEV PEAK DELETED									
		511.06 KEV PEAK DELETED									
4	0	583.15	40.	39.	1.54	1156.75	1152	11	1.11E-02	35.3	
5	0	611.76	76.	103.	4.12	1217.65	1205	28	2.11E-02	49.2	
		660.45 KEV PEAK DELETED									
		1460.72 KEV PEAK DELETED									
8	0	1764.56*	17.	0.	2.68	3671.98	3664	17	4.84E-03	77.3	
		2614.71 KEV PEAK DELETED									

*NUCLIDE IDENTIFICATION SYSTEM
UNKNOWN LINE REPORT

(NO PC VERSION DEC 88)

PAGE 1

UNIDENTIFIED PEAKS

IT	ENERGY	AREA	BKGND	FWHM	CHANNEL	LEFT	PW	CTS/SEC	%ERR	%EFF
1 0	74.84	43.	127.	1.02	74.55	72	7	1.17E-02	49.7	2.94E+00
4 0	583.15	40.	39.	1.54	1156.75	1152	11	1.11E-02	35.3	2.67E+00
5 0	611.76	76.	103.	4.12	1217.65	1205	28	2.11E-02	49.2	2.58E+00
8 0	1764.56	17.	0.	2.68	3671.98	3664	17	4.84E-03	77.3	1.19E+00

LINE NOT MEETING SUMMARY CRITERIA

PK	NUCLIDE	ENERGY	HLFE	DECAY	UCI /GRAM	ABNDIFF	FAILED
4	TH-232	583.14	1.00E+10Y	1.000E 0	6.544E -8	16.97%	ABN
5	RU-103	610.33	39.35D	1.002E 0	6.977E -7	5.92%	ABN
8	Rf-226	1764.49	1600.00Y	1.000E 0	1.229E -7	10.17%	ABN

NUCLIDE IDENTIFICATION SYSTEM
SUMMARY OF NUCLIDE ACTIVITY

(ND PC VERSION DEC 88)

PAGE 2

TOTAL LINES IN SPECTRUM	4	
UNIDENTIFIED PEAKS	4	
IDENTIFIED IN SUMMARY REPORT	0	.00%

MINIMUM DETECTABLE ACTIVITY REPORT (ND PC VERSION 1 SEP 89)

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

LIDE	BKG	ENERGY	MINIMUM UCI /GRAM
GE-7	60.	477.59	1.4001E-07
ANTL-511	246.	511.00	8.2272E-08
HA-22	23.	1274.54	2.0661E-08
HA-24	16.	1368.53	2.0494E-08
CL-38	11.	2167.51	0.0000E+00
AR-41	20.	1293.64	5.0644E-08
K-40	202.	1460.81	6.3693E-07
SC-46	51.	1120.51	2.7559E-08
CR-51	72.	320.08	1.2873E-07
HM-54	29.	834.83	1.6326E-08
MM-56	39.	846.75	3.7945E-08
FE-59	27.	1099.22	3.5023E-08
CO-57	115.	122.06	1.2584E-08
CO-58	34.	310.76	1.7258E-08
CO-60	44.	1332.49	2.9705E-08
NI-65	16.	1481.84	1.6310E-07
CU-64	15.	1345.90	4.0860E-06
ZN-65	23.	1115.52	3.6326E-08
ZN-69M	63.	438.63	1.6731E-08
CO-76	51.	559.10	3.5968E-08
CO-75	87.	264.65	2.1467E-08
CO-82	55.	554.32	2.3112E-08
CO-84	35.	831.50	1.1740E-06
CO-85	115.	513.99	6.9440E-06
CO-85M	108.	151.18	1.0978E-08
KR-87	65.	402.58	1.0483E-07
KR-88	87.	196.32	7.0199E-08
RR-88	20.	1836.01	HALF LIFE TOO SHORT
RB-89	39.	1031.88	HALF LIFE TOO SHORT
SR-85	115.	513.99	2.1439E-08
SR-85M	105.	731.69	6.8816E-08
SR-91	29.	1024.30	7.1648E-08
SR-92	16.	1383.94	3.8667E-08
Y-88	20.	1836.01	2.5345E-08
Y-91	28.	1204.90	7.2118E-06
Y-91MD	52.	555.57	1.9088E-08
Y-92	45.	934.46	2.6515E-07
Y-93	103.	266.90	2.4128E-07
ZR-95	33.	756.72	2.3489E-08
ZR-97	33.	743.36	1.8446E-08
NB-94	48.	702.63	1.7538E-08
NO-95	39.	765.79	1.7385E-08
NO-97D	30.	1024.50	2.0255E-06
MO-90	89.	257.34	2.2189E-08
MO-99	32.	739.58	1.2137E-07
TC-99MD	127.	140.51	1.2975E-08
RU-103	51.	497.08	1.5560E-08
RU-105	41.	724.50	5.0458E-08
RU-106	43.	621.84	1.5203E-07
RU-105	70.	318.90	6.7982E-08

PEAK WIDTH = 3.00 FWHM. CONFIDENCE LEVEL = 4.66.

NUCLIDE	BKG	ENERGY	MINIMUM UCI /GRAM
110M	43.	657.75	1.6469E-08
109	81.	88.03	3.3031E-07
SN-113	55.	391.69	1.8608E-08
SB-122	42.	563.93	2.0002E-08
SB-124	50.	602.71	1.6085E-08
SB-125	51.	427.89	4.2151E-08
TE-123M	85.	158.99	1.1191E-08
TE-132	106.	228.16	1.4504E-08
I-131	65.	364.48	1.5677E-08
I-132	42.	667.69	3.3403E-08
I-133	52.	529.87	1.8400E-08
I-134	36.	847.03	1.3862E-07
I-135	21.	1260.41	8.8621E-08
XE-131M	89.	163.93	4.9096E-07
XE-133	66.	80.99	3.5898E-08
XE-133M	103.	233.22	1.2620E-07
XE-135	105.	249.79	1.8173E-08
XE-135M	51.	526.56	HALF LIFE TOO SHORT
XE-138	78.	258.31	HALF LIFE TOO SHORT
CS-134	45.	604.70	1.5319E-08
CS-134M	122.	127.42	1.5751E-07
CS-136	34.	818.50	1.7454E-08
CS-137	76.	661.65	2.4399E-08
CS-138	14.	1435.86	5.7733E-07
133	64.	356.00	2.0640E-08
139	106.	165.85	2.1330E-07
BR-140	47.	537.32	5.6468E-08
BA-141	99.	190.22	HALF LIFE TOO SHORT
LA-140	8.	1596.49	1.5751E-08
CE-139	106.	165.85	1.2986E-08
CE-141	103.	145.44	2.1943E-08
CE-143	69.	293.26	3.0141E-08
CE-144	124.	133.54	1.0674E-07
ND-147	81.	91.11	4.1726E-08
EU-152	58.	344.27	4.3866E-08
EU-154	23.	1274.45	5.8158E-08
HF-181	55.	482.03	1.6989E-08
W-187	47.	479.53	5.9421E-08
HC-203	68.	279.19	1.5138E-08
RA-226	79.	609.31	4.3005E-08
TH-232	55.	2614.66	0.0000E+00
U-235	119.	185.72	2.0902E-08
U-238	140.	131.20	5.9579E-08
NP-239	106.	106.13	4.9867E-08
AM-241	71.	59.54	1.0098E-07

CST Batch #1 Total Activity Removed									
Vol discharged		480528	gals						
		1.82E+09	mls						
Activity start of Batch #1				Activity end of Batch #1		uCi discharged release #1		Total uCi removed	
Isotope	Conc	total uCi		Conc	total uCi				
Co-60	1.62E-06	2948.4		5.06E-07	921	920.92	Co-60	2027.48	
Cs-134	2.41E-05	43862		1.64E-07	298	298.48	Cs-134	43563.52	
Cs-137	2.12E-05	38584		1.11E-07	202	202.02	Cs-137	38381.98	
			liver	total body					
Estimated dose untreated				2.66	2				
Estimated dose treated				1.73E-02	1.32E-02				
CST Batch #2 Total Activity Removed									
Vol discharged		522850	gals						
		1.98E+09	mls						
Activity start of Batch #2				Activity end of Batch #2		uCi discharged		Total uCi removed	
Isotope	Conc	total uCi		Conc					
Co-60	7.65E-06	15147		8.11E-07	1606	1605.78	Co-60	13541.22	
Cs-134	5.63E-05	111474		2.73E-07	541	540.54	Cs-134	110933.5	
Cs-137	4.87E-05	96426		2.27E-07	449	449.46	Cs-137	95976.54	
			liver	total body					
Estimated dose untreated				6.71	5.07				
Estimated dose treated				3.16E-02	2.39E-02				
CST Batch #3 Total Activity Removed									
Vol discharged		558360	gals						
		2.11E+09	mls						
Activity start of Batch #3				Activity end of Batch #3		uCi discharged		Total uCi removed	
Isotope	Conc	total uCi		Conc					
Co-60	2.34E-06	4937.4		5.28E-07		1114.08	Co-60	3823.32	
Cs-134	2.01E-05	42411		2.62E-07		552.82	Cs-134	41858.18	
Cs-137	1.75E-05	36925		2.12E-07		447.32	Cs-137	36477.68	
			liver	total body					
Estimated dose untreated				2.59	1.96				
Estimated dose treated				3.61E-02	2.72E-02				
Dose evaluation summation									
Untreated water dose			Liver	Total body	total uCi/ discharged	Total uCi removed from 3 tanks			
Treated water dose			11.96	9.03	3640.78	Co-60	19392.02		23032.8
Plant Technical Specification limits		mrem/yr	8.50E-02	6.43E-02	1391.84	Cs-134	196355.2		197747
			10	3	1098.8	Cs-137	170836.2		171935
		Total dose saved =	1.19E+01	8.97E+00					
Total gallons discharged		1.56E+06							
Total mls discharged		5.91E+09							

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Guidelines for Evaluating Sampling and Monitoring Data For CST Release

Measurement	Expected Value and Ranges	Action Levels
Sample Gamma Spec Analysis	<p>Expected Total Activity 1.2E-06 $\mu\text{Ci/ml}$</p> <p>1σ upper value (67% confidence level) 1.5E-06 $\mu\text{Ci/ml}$</p> <p>2σ upper value (95% confidence level) 1.8E-06 $\mu\text{Ci/ml}$</p>	<p>If the total gamma activity measured in a sample exceeds the 2σ value (1.8E-06 $\mu\text{Ci/ml}$), contact Steve Bartman (pager# 457-1425).</p>
Station Monitor Response	<p>Expected Response 310 cpm</p> <p>2σ upper value (95% confidence level) 480 cpm</p> <p>2.6σ upper value (99% confidence level) 530 cpm</p>	<p>If monitor response exceeds the 2.6σ value (530 cpm), contact Steve Bartman (pager# 457-1425).</p> <p>If response exceeds 10 times the expected response, contact Steve Bartman (pager# 457-1425). Request Chemistry to collect sample.</p> <p>Upon receipt of any alarm, terminate release.</p>
Hot Line Gamma Spec Analysis	<p>No detectable activity is expected.</p> <p>Calculated activity levels are:</p> <p>(Co-60 @ 1E-08 $\mu\text{Ci/ml}$) (Cs-134 @ 4E-09 $\mu\text{Ci/ml}$) (Cs-137 @ 2E-09 $\mu\text{Ci/ml}$)</p>	<p>Any detectable activity, notify Steve Bartman (pager# 457-1425) and Ed Kokosky (pager# 243-1974).</p>
Water Intake Spec Analysis	<p>No detectable activity is expected.</p> <p>Calculated activity levels are:</p> <p>(Co-60 @ 1E-10 $\mu\text{Ci/ml}$) (Cs-134 @ 4E-11 $\mu\text{Ci/ml}$) (Cs-137 @ 2E-11 $\mu\text{Ci/ml}$) ~1 day transit time</p>	<p>Any detectable activity, notify Steve Bartman (pager# 457-1425) and Ed Kokosky (pager# 243-1974).</p>

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REQUIRED SAMPLE VOLUMES FOR CST SAMPLING DURING
RECIRC & PRE-DISCHARGE

<u>SAMPLE TIME</u>	<u>AMOUNT OF SAMPLE REQUIRED</u>
4-14-94 0319 6 HR. DURING RECIRC	1 LITER FOR CHEM ISOTOPIC
4-14-94 0919 12 HR. DURING RECIRC	1 LITER FOR CHEM ISOTOPIC
4-14-94 2119 *24 HR. DURING RECIRC	2.5 LITERS FOR NRC/CHEM TO SPLIT**
<i>Actual 2120 EDT</i>	1 LITER (not acidified) FOR NRC 200ML (not acidified) IN GLASS BOTTLE FOR NRC H-3 REMAINDER FOR CHEM ISOTOPIC AND TRITIUM

POST RECIRC AND PRE-DISCHARGE

*1st SAMPLE	1.0 GALLON FOR RP/NRC SPLIT**
4/15/94 0730 - 0800 <i>Actual 0740 EDT</i>	1 LITER (not acidified) FOR NRC 200ML (not acidified) IN GLASS BOTTLE FOR NRC H-3 1 LITER MARINELLI FOR RP TO COUNT 1 LITER BOTTLE (acidified for RP composite) 100 ML FOR CHEM-H-3 ALSO OBTAIN 2.0 LITERS FOR CHEM O/G, TSS.

2nd SAMPLE 2 HOURS AFTER 1st	2 LITERS FOR RP
4/15/94	1 LITER MARINELLI FOR RP TO COUNT 1 LITER BOTTLE (acidified for RP composite)

* THE NRC WILL OBSERVE THE SAMPLING AND SPLITTING WHEN THEIR SPLITS ARE DRAWN. CONTACT THEM BEFORE DRAWING THOSE SAMPLES @ 65380, 65381, & BEEPER# 457-1208

** THE DEFINITION OF A SPLIT SAMPLE IMPLIES THAT BOTH THE NRC AND CHEM/RP SAMPLES ARE PREPARED FROM THE SAME SAMPLE BOTTLE.

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