GE Nuclear Energy

Morris Operation
General Electric Company
7555 East Collins Road, Morris, IL 60450-9748
815 942-5580

PRIORITY ROUTING

December 3, 1992

Mr. A. Bert Davis
U.S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

Subject: Morris Operation Groundwater Monitoring

Ref: (1) NRC letter (Grobe to Ellis) 9/28/92

Attachments: (1) Water Analyses
(2) LAW Vault Leak Detection
(3) Fuel Storage Basin Leak Detection

Dear Mr. Davis:

This letter is intended to provide an update and requested amplifying information on three key points addressed in Ref (1):

(1) Description of Existing Well Functional Capabilities:

Dames and Moore has been retained to study and make recommendations concerning MO wells. Specifically they will:

- Examine existing wells for physical condition, depth, and location.
- Determine adequacy of existing wells as monitoring points in the event of a vault or basin leak detection system failure.
- Use historical water depth data in existing wells and geologic data from previous site studies to construct a mathematical model that describes groundwater migration under the site.
- Draw conclusions from the model and make recommendations for new wells (if any) in order to effectively detect a basin or vault leak.

Dames and Moore visited the site the week of November 16, 1992 to study existing wells and to take water depth measurements. A mathematical model is now being developed using this information. We expect to be able to communicate with you again on this subject in early 1993.

(2) Drinking Water Analysis, Aquifer Performance:

It is not clear what concern is being addressed in the first part of paragraph 2 of Ref (1). If the concern is whether basin or vault leakage from their respective leak detection systems could/would be detected by drinking water analyses, the answer is yes. If the concern is whether MO personnel are protected from ingesting water potentially contaminated by basin or vault leakage, the answer is still yes.

Historical basin and vault leak detection data indicate no leakage to the environs from these sources has ever occurred. If a leak did occur, we believe the presence and magnitude of a leak would be best characterized by radiocesium migration. Attachment (1) provides information on major vault, basin, and drinking water constituents.

(3) Description of Vault and Basin Leak Detection Systems:

Contained in Attachments (2) and (3).

Sincerely,

J. G. Ellis

J. E. Ellis
Manager, Morris Operation

JEE:tlt

cc:
L. L. Denio
J. D. Kesman
G. R. France (NRC)

## WATER ANALYSES

| | LAW Vault[1] (11/23/92) | Basin[2] (11/23/92) | Well[3] (10/92) |
|---|---|---|---|
| Alpha | N/A | N/A | $<7 \times 10^{-7}$ µCi/ml[4] |
| Cs-137 | 1.2 µCi/ml | $2 \times 10^{-4}$ µCi/ml | $<4.4 \times 10^{-6}$ µCi/ml[4] |
| H-3 | N/A | $1.6 \times 10^{-4}$ µCi/ml | $<1 \times 10^{-6}$ µCi/ml[4] |
| $Cl^-$ | 100 ppm | <0.1 ppm | N/A |
| $NO_3^-$ | 13,000 ppm | <0.8 ppm | 1.1 ppm |
| pH | 13.1 | 5.1 | 8.3 |

(1) LAW Vault sample analyzed quarterly.

(2) Basin water analysis performed weekly.

(3) Well water analysis for $NO_3^-$ and pH performed monthly. Radiochemical analysis performed quarterly.

(4) Lower limit of detection.

ARRO
Laboratory, Inc.
Est. 1965
P.O. Box 686 Caton Farm Road
Joliet, Illinois 60434
Phone: 815-727-5436
FAX 815-740-3238

Attention of: MR. JOHN E. McGRATH
Company GENERAL ELECTRIC COMPANY
Address MORRIS OPER. 7555 E COLLINS RD
City/State/Zip MORRIS,IL,60450

P.O.Number 284-91L474X
Date Received 03/30/92
Date Completed 05/20/92

| ARRO NO. | SAMPLE DESCRIPTION | DATE |
|---|---|---|
| 146830 | JANITOR'S ROOM - MORRIS OPERATION | 03/30/92 |
| 146831 | TRAINING CENTER - MEN'S ROOM | 03/30/92 |

| ANALYSIS | 146830 | 146831 |
|---|---|---|
| LEAD | <0.010 | <0.010 |
| NITRATE AS N | 0.47 | 0.61 |
| SULFIDE (AS S) | <0.02 | <0.02 |
| RADIUM 226 PCI/LITER | 1.7 | 1.3 |
| RADIUM 228 PCI/LITER | 2. | 8. |
| GROSS ALPHA PCI/LITER | 4.2 | 5.6 |
| GROSS BETA PCI/LITER | 14.8 | 17.2 |
| VOC | .ATTACHED | .ATTACHED |

RESULTS IN ppm UNLESS OTHERWISE INDICATED

* SEE ATTACHMENT FOR COMMENTS

I CERTIFY THAT I AM FAMILIAR WITH THE INFORMATION CONTAINED IN THIS REPORT AND THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF SUCH INFORMATION IS TRUE, COMPLETE AND ACCURATE.

APPROVED BY..... DATE : 05/20/92
Joan Rolih, Director
Environmental Services

TESTING IS IN ACCORDANCE WITH PROCEDURES OUTLINED IN THE NEWEST EDITIONS OF:
STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER
ASTM STANDARDS, PART 31, 'WATER, ATMOSPHERIC ANALYSIS'
METHODS FOR CHEMICAL ANALYSIS OF WATER WASTES, EPA WATER QUALITY OFFICE

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VOLATILE ORGANIC COMPOUND (524.2)

GENERAL ELECTRIC COMPANY
JANITOR'S ROOM - MORRIS OPERATION
146830

ALL RESULTS EXPRESSED IN PPB UNLESS OTHERWISE INDICATED.

| REGULATED VOC'S | |
|---|---|
| BENZENE | <0.5 |
| CARBON TETRACHLORIDE | <0.5 |
| 1,2 DICHLOROETHANE | <0.5 |
| 1,1-DICHLOROETHENE | <0.5 |
| 1,1,1 TRICHLOROETHANE | <0.5 |
| TRICHLOROETHENE | <0.5 |
| VINYL CHLORIDE | <0.5 |
| p-DICHLOROBENZENE | <0.5 |

| REGULATED VOC'S | | | |
|---|---|---|---|
| BROMOFORM | <1.0 | 1,3-DICHLOROPROPANE | <1.0 |
| CHLOROBENZENE | <1.0 | STYRENE | <1.0 |
| DIBROMOCHLOROMETHANE | <0.5 | CHLOROMETHANE | <1.0 |
| CHLOROETHANE | <1.0 | BROMOMETHANE | <1.0 |
| CHLOROFORM | <0.5 | BROMOCHLOROMETHANE | <0.5 |
| BROMODICHLOROMETHANE | <0.5 | 1,2,3-TRICHLOROPROPANE | <2.0 |
| DICHLORODIFLUOROMETHANE | <1.0 | 1,2,3-TRICHLOROBENZENE | <3.0 |
| 1,1-DICHLOROETHANE | <0.5 | n-PROPYLBENZENE | <1.0 |
| 1,2-DICHLOROPROPANE | <0.5 | 1,1,1,2-TETRACHLOROETHANE | <0.5 |
| ETHYL BENZENE | <1.0 | TETRACHLOROETHENE | <0.5 |
| 1,1,2,2-TETRACHLOROETHANE | <1.0 | 1,3 DICHLOROPROPENE | <1.0 |
| TOLUENE | <0.5 | 2,2-DICHLOROPROPANE | <1.0 |
| trans-1,2-DICHLOROETHENE | <0.5 | 1,2,4-TRIMETHYLBENZENE | <2.0 |
| 1,1,2-TRICHLOROETHANE | <0.5 | n-BUTYLBENZENE | <1.0 |
| TRICHLOROFLUOROMETHANE | <1.0 | NAPHTHALENE | <2.0 |
| m-DICHLOROBENZENE | <1.0 | HEXACHLOROBUTADIENE | <2.0 |
| METHYLENE CHLORIDE | <1.0 | o-CHLOROTOLUENE | <1.0 |
| cis-1,2-DICHLOROETHYLENE | <0.5 | p-CHLOROTOLUENE | <1.0 |
| o-DICHLOROBENZENE | <1.0 | 1,3,5-TRIMETHYLBENZENE | <2.0 |
| 1,2,4-TRICHLOROBENZENE | <2.0 | p-ISOPROPYLTOLUENE | <1.0 |
| DIBROMOMETHANE | <1.0 | 1,1-DICHLOROPROPENE | <1.0 |
| 1,2-DIBROMOETHANE (EDB) | <0.1 | iso-PROPYLBENZENE | <1.0 |
| 1,2-DIBROMO-3-CHLOROPROPANE | <0.1 | tert-BUTYLBENZENE | <2.0 |
| p-XYLENE | <1.0 | sec-BUTYLBENZENE | <2.0 |
| o-XYLENE | <1.0 | BROMOBENZENE | <1.0 |
| | | m-XYLENE | <1.0 |

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GENERAL ELECTRIC COMPANY
TRAINING CENTER - MEN'S ROOM
146831

ALL RESULTS EXPRESSED IN PPB UNLESS OTHERWISE INDICATED.

| | |
|---|---|
| REGULATED VOC'S | |
| BENZENE | <0.5 |
| CARBON TETRACHLORIDE | <0.5 |
| 1,2 DICHLOROETHANE | <0.5 |
| 1,1-DICHLOROETHENE | <0.5 |
| 1,1,1 TRICHLOROETHANE | <0.5 |
| TRICHLOROETHENE | <0.5 |
| VINYL CHLORIDE | <0.5 |
| p-DICHLOROBENZENE | <0.5 |

| | | | |
|---|---|---|---|
| REGULATED VOC'S | | 1,3-DICHLOROPROPANE | <1.0 |
| BROMOFORM | <1.0 | STYRENE | <1.0 |
| CHLOROBENZENE | <1.0 | CHLOROMETHANE | <1.0 |
| DIBROMOCHLOROMETHANE | <0.5 | BROMOMETHANE | <1.0 |
| CHLOROETHANE | <1.0 | BROMOCHLOROMETHANE | <0.5 |
| CHLOROFORM | <0.5 | 1,2,3-TRICHLOROPROPANE | <2.0 |
| BROMODICHLOROMETHANE | <0.5 | 1,2,3-TRICHLOROBENZENE | <3.0 |
| DICHLORODIFLUOROMETHANE | <1.0 | n-PROPYLBENZENE | <1.0 |
| 1,1-DICHLOROETHANE | <0.5 | 1,1,1,2-TETRACHLOROETHANE | <0.5 |
| 1,2-DICHLOROPROPANE | <0.5 | TETRACHLOROETHENE | <0.5 |
| ETHYL BENZENE | <1.0 | 1,3 DICHLOROPROPENE | <1.0 |
| 1,1,2,2-TETRACHLOROETHANE | <1.0 | 2,2-DICHLOROPROPANE | <1.0 |
| TOLUENE | <0.5 | 1,2,4-TRIMETHYLBENZENE | <2.0 |
| trans-1,2-DICHLOROETHENE | <0.5 | n-BUTYLBENZENE | <1.0 |
| 1,1,2-TRICHLOROETHANE | <0.5 | NAPHTHALENE | <2.0 |
| TRICHLOROFLUOROMETHANE | <1.0 | HEXACHLOROBUTADIENE | <2.0 |
| m-DICHLOROBENZENE | <1.0 | o-CHLOROTOLUENE | <1.0 |
| METHYLENE CHLORIDE | <1.0 | p-CHLOROTOLUENE | <1.0 |
| cis-1,2-DICHLOROETHYLENE | <0.5 | 1,3,5-TRIMETHYLBENZENE | <2.0 |
| o-DICHLOROBENZENE | <1.0 | p-ISOPROPYLTOLUENE | <1.0 |
| 1,2,4-TRICHLOROBENZENE | <2.0 | 1,1-DICHLOROPROPENE | <1.0 |
| DIBROMOMETHANE | <1.0 | iso-PROPYLBENZENE | <1.0 |
| 1,2-DIBROMOETHANE (EDB) | <0.1 | tert-BUTYLBENZENE | <2.0 |
| 1,2-DIBROMO-3-CHLOROPROPANE | <0.1 | sec-BUTYLBENZENE | <2.0 |
| p-XYLENE | <1.0 | BROMOBENZENE | <1.0 |
| o-XYLENE | <1.0 | m-XYLENE | <1.0 |

# LAW VAULT LEAK DETECTION

Separate systems exist for detection of liquid build-up in the annular region surrounding the LAW tank proper, and for groundwater intrusion through the concrete vault structure.

The intrusion system collects liquid seepage into the space between the vault bottom liner and the concrete walls and floor. The intrusion stand-pipe penetrates the vault bottom liner and is seal welded to the liner. Above the bottom liner, the stand-pipe has a hole to prevent intrusion water from getting too high behind the liner in the event of a pump failure.

The level is continuously monitored in the Control Room, and audible/visual alarms alert the operator that the pump-out system has malfunctioned.

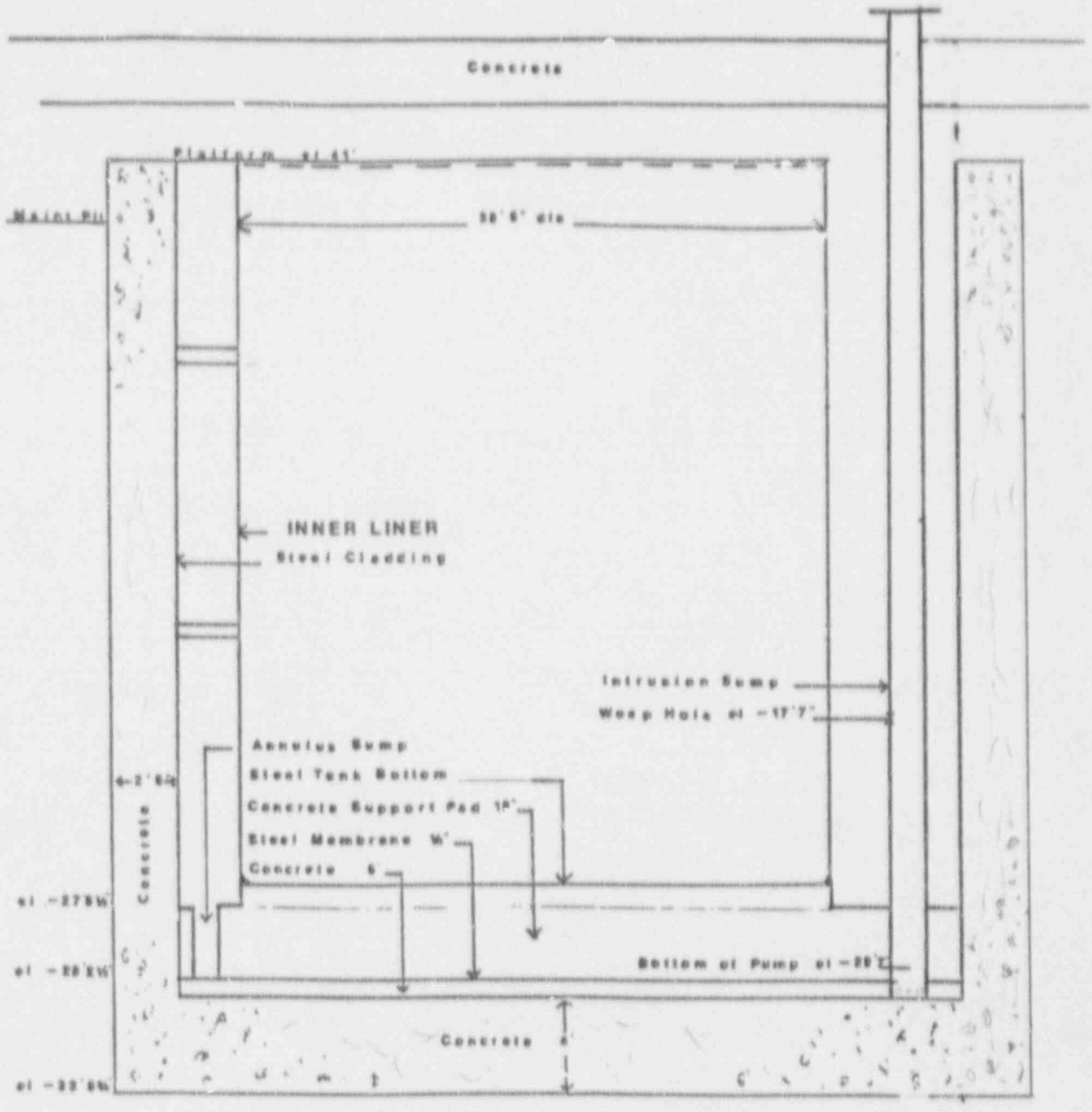
Intrusion liquid level is maintained by an automatic sump pump but can be manually controlled. Samples of discharge to sanitary waste treatment ponds are collected monthly.

The system is tested monthly according to Section 4.4 of license SNM-2500 to verify:

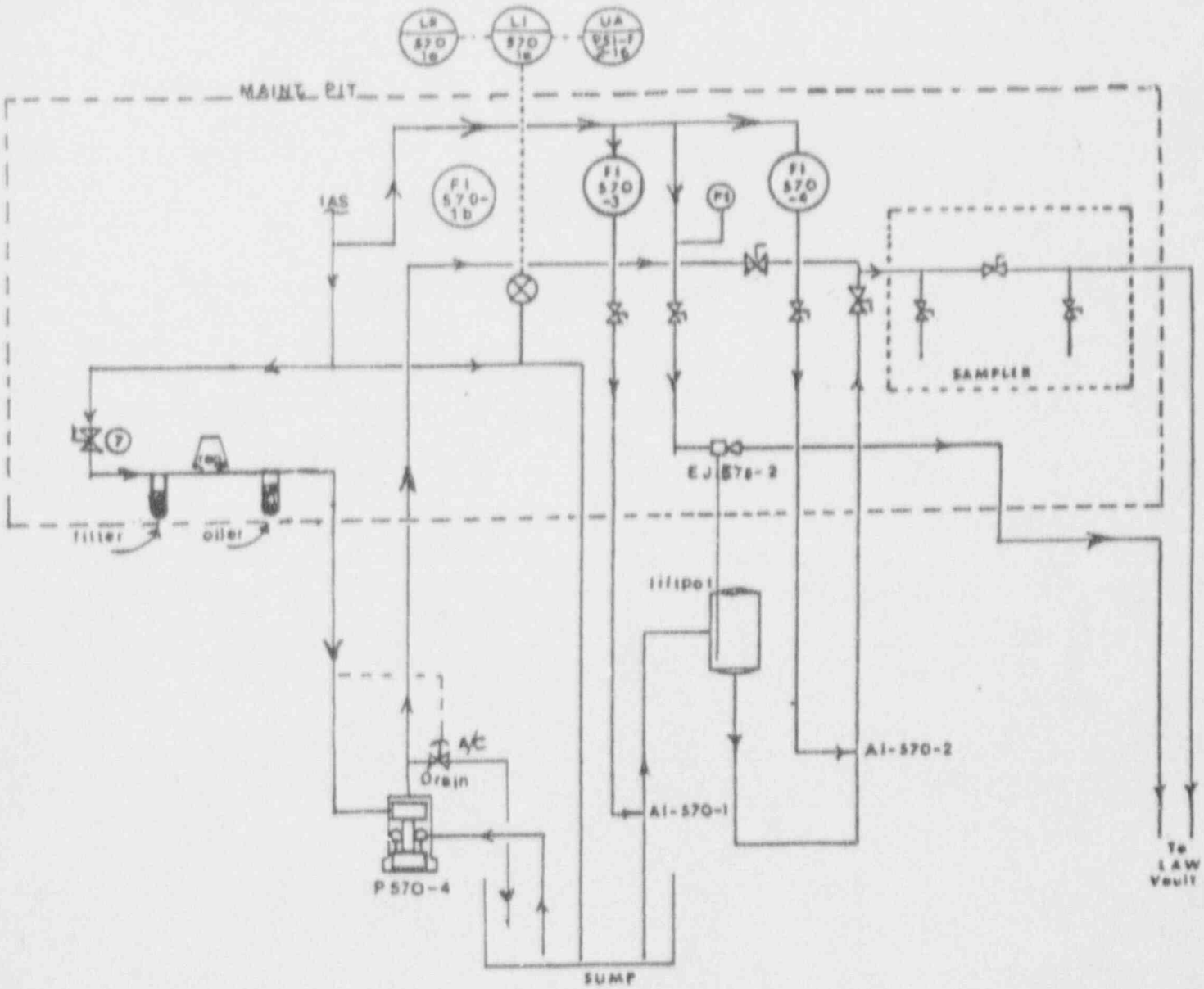
- Intrusion water pump-out capability
- Intrusion water high level alarm function
- Positive shutdown of intrusion pump if there is a high level in the annular tank
- Concentrations of radioactivity are <5.0 x E-06 microcuries per milliliter (gross gamma)

The annular tank sump, located between the inner tank wall and the concrete vault liner, collects potential leakage from the inner tank. In addition to level instrumentation and alarms typical of other systems of this type, there are several methods of empty-out, including primary and secondary airlifts used in conjunction with a vacuum air jet and an air operated diaphragm pump.

A sampling station is located in the common line for these empty-out systems. Samples are obtained for any and all empty-outs and all discharges are routed back to the LAW inner tank. Quarterly license compliance tests verify leak detection and pump-out capability.




LAW VAULT AND TANK


LR 570 1a
LI 570 1a
UA PSL-F 1a
MAINT PIT
IAS
FI 570-1b
FI 570 -3
PI
FI 570 -4
SAMPLER
LSH
EJ 570-2
filter
oiler
filtpot
A/C
Drain
AI-570-2
AI-570-1
P 570-4
SUMP
To LAW Vault

ANNULUS

# FUEL STORAGE BASIN LEAK DETECTION

The basin leak detection system consists of a continuous level monitoring instrument with audible and visual alarm functions in the Control Room, to detect liquid level in the void behind the basin liner and the concrete structural walls/floor of the unloading and storage basins.

Collection channels, formed in the concrete at the concrete and steel liner interface, interconnect with a perimeter channel that slopes to a low point which is the bottom of a six inch diameter stand-pipe. This pipe and perimeter channel are embedded in the reinforced concrete structural walls.

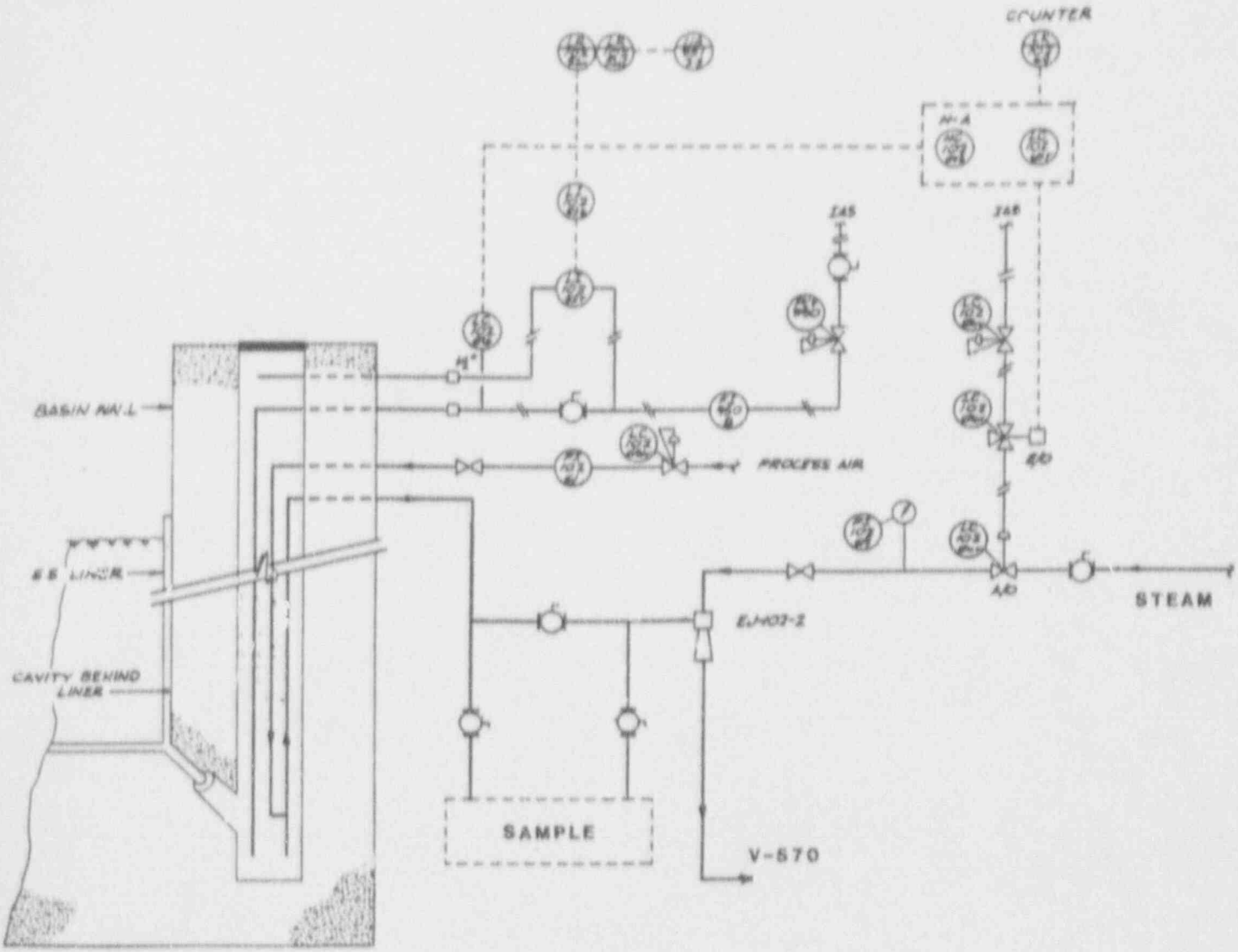
A build-up of liquid, whether by infiltration, condensation, or liner leakage, is sensed by the dip-tube and differential pressure level indication transmitter. The indicating range is from 0 to 200 inches of water.

Empty-out is provided by an airlift and steam jet pump arrangement with a sampling station in-line between airlift output and the jet pump suction. Liquid removed is then discharged to the LAW vault.

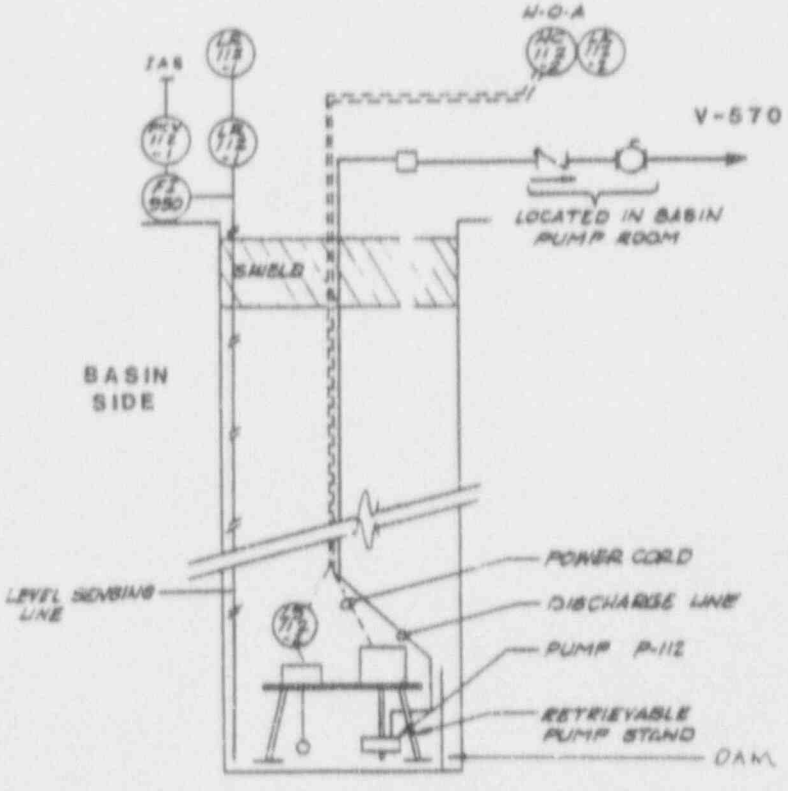
Weekly license compliance tests are performed to verify operability of the high level alarm function; monthly to calibrate the level instrument and quarterly to verify operability of the empty-out system and determine by sample analyses that no liner leakage has occurred.

The expansion gate, located in the south wall of Basin-2 also has a sump formed by the inner and outer gates which are sealed to the basin walls. This void has an expanded scale level indication instrument and electric pumpout systems. A divider plate or dam isolates the level instrument and pump to the compartment closest to the basin.

Build-up of liquid in either compartment is identified, based on sample analyses, as originating from the basin, groundwater, or other sources.




BASIN LINER LEAKAGE, MONITOR & JETOUT SYSTEM
(BASIN LEAK DETECTION)




EXPANSION GATE PUMP OUT SYSTEM