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3-000828 #68060

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

DATE July 12, 1990
IN REPLY REFER TO: ADO
MAIL STOP: A120
TELEPHONE: (505) 667-9390
(FTS) 843-9390

Mr. Bob Hiller
Water Management Division (6W)
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear Mr. Hiller:

Transmitted herewith are the following documents which are being submitted to you in accordance with Administrative Order Docket No. VI-90-1041 concerning the recent acid release at Los Alamos National Laboratory (LANL).

1. Presentation Outline for Meeting of July 24, 1990

2. Corrective Actions Completed

3. Environmental Tank Interim Discharge Procedure, World Services, Inc. (June 21, 1990)

4. Preliminary Recommendations of Investigation of the Acid Release

5. Action Plan, Report on Specific Actions to Prevent a Recurrence of pH Excursions

6. Proposed Schedule of Compliance

7. Memorandum Concerning pH Readings in Sandia Canyon, World Services, Inc. (May 24 and 31, 1990)

8. Compliance Spill Inspection, EID (May 21, 1990)

9. Wetlands Study in Sandia Canyon, Progress Report, LANL (July 11, 1990)

Information from these documents will be presented to the U.S. Environmental Protection Agency (EPA) at our meeting on July 24, 1990, in order to document the corrective actions which have been completed and which are planned to prevent a recurrence of the acid release. LANL intends to demonstrate through these documents and its presentation of July 24 that further enforcement action is unnecessary.

NOV 14 2000

Please call Steven Rae of the Environmental Protection Group (HSE-8) at (505) 665-1859 if any additional information is required at this time.

Sincerely,

Allen J. Tiedman
Associate Director
for Operations

AJT:SR:gr

Attachments: a/s

Cy: J. Puckett, HSE-DO, MS K491
R. Haarman, ENG-DO, MS M719
K. Hargis (HSE-8:90-609, AI #91), HSE-8, MS K490
S. Rae, HSE-8, MS K490
S. Brown, LC-General, MS A187
H. Season Jr., DOE, LAAO, MS A316
P. Schumann, DOE, LAAO, MS A316
HSE-DO AI #138
CRM-4, MS A150
Circ. File

Exhibit No. 1

Presentation Outline

The following presentation has been prepared for the compliance meeting scheduled for July 24, 1990, with the U.S. Environmental Protection Agency on the sulfuric acid release at the TA-3-22 Power Plant at Los Alamos National Laboratory.

A. Introduction

1. Management and Organization

- Brief Description of Los Alamos National Laboratory.
- DOE Owned Research Facility Operated by the University of California.
- Laboratory Organization and Responsibilities.
  ADO, ENG, HSE, World Services.

2. Introduction of Representatives

B. Description of Sulfuric Acid Release

1. Description of Power Plant

- Power Plant Required for Supporting Laboratory Research Facilities and County Electric Utility.
- Power Plant Operations and Waste Streams.
  (See Attachments 1 and 2)
- Neutralization Tank and Facilities.

2. Description of Release

- Automatic Feed System Failure (May 11, 1990)
- Non-Compliance No. 1, 2 and 3.
- Estimate of Total Acid Release.

3. Immediate Response and Interim Corrective Actions

- Immediate Response. (See Exhibit No. 2, Corrective Actions Completed)

  - Stopped Tank Discharge.
  - Stopped Tank Inflow.
  - Monitored pH of Outfall.
  - Neutralized Stream.
  - Verified Sources of Inflow to Tank.

- Interim Equipment Changes. (See Exhibit No. 2, Corrective Actions Completed)

  - Removed Sight Glass Drain Valve and Capped Acid Line.
  - Installed Timer on Acid Pump.
  - Eliminated Automatic Tank Discharge.
  - Installed Key Switch for Tank Discharge Valve.
  - Installed High Level Alarm at Tank.
  - Installed pH Alarm at Tank.
  - Capped Overflow Line at Tank.
  - Plugged Drain from Secondary Containment Vault for Tank.

- Interim Operational Changes. (See Exhibit No. 3, Environmental Tank)

  - Developed Manual Monitoring and Control Procedure for Tank.
  - Provided Operator Training for New Procedure.
  - Initiated Supervisory Review of Operator's Checklist Prior to Each Discharge from Tank.

- Present Status. (See Exhibit No. 3, Environmental Tank)

  - Isolate Incoming Flow, Mix Contents and Measure pH.
  - Add Caustic if pH is Low.
  - Add Acid Solution if pH is High.
  - Validate pH and Discharge from Tank.
  - Return System to Normal Operation.

4. Investigation of Release (In Progress)

- Investigation Committee Formed May 21, 1990.

- Preliminary Committee Recommendations. (See Exhibit No. 4, Recommendations)

  a. Procedures for Environmental Protection and Compliance at Power Plant.
  b. Increase Environmental Awareness and Site Specific Training.
  c. Initiate New Management System and Supervisory Control at Power Plant.
  d. Improve Communication Between Supervisors and Operators.
  e. Increase Oversight of World Services Utilities Department by LANL.
  f. Revise QA, ES&H and Work Order Control Procedures.
  g. Design and Construct New Facilities for Neutralization at Power Plant.
  h. Provide Environmental Awareness and Emergency Response Training.
  j. Establish LANL Oversight Committee to Review and Document Actions.

5. Action Plan to Prevent Recurrence of Non-Compliance (See Exhibit No. 5, Action Plan)

	Recommendation Reference
• Redesign Environmental Tank Treatment System.	g
• Develop Training and Documentation Program.	b,d,h
• Improve Design Review and Plant QA Procedures.	a,f
• Evaluate/Adjust Organization of Steam Plants.	c
• Develop Oversight Responsibilities/Plan.	d,e,j

6. Planned Corrective Actions and Schedule for Completion (See Exhibit No. 6, Proposed Compliance Schedule)

	Completion Date	Recommendation Reference
• Physical Plant Modifications		
- Engineering Analysis of Alternative Neutralization Processes (Acid, CO_2, Other).	Oct. 31, 1990	g
- Prepare Plans & Specifications for New Facilities.	Jan. 31, 1991	
- Complete QA Review and Obtain Approval for New Facilities.	Feb. 28, 1991	
- Complete Construction of New Facilities.	May 31, 1991	
- Complete Final Inspection, Start-Up and Training for New Facilities.	June 30, 1991	
• Operational and Administrative Changes	Completion Date	
- Establish LANL Oversight Committee to Review and Document Corrective Actions and Increase Level of Oversight by ENG and HSE.	July 31, 1990	e,j
- Provide Environmental Awareness and Emergency Response Training on Neutralization and other Facilities at Power Plant.	Sept. 30, 1990	b

- Revise Power Plant Operations Manual To Include Procedures for Environmental Protection and Compliance and for QA, ES&H and Work Order Control Procedures.	Sept. 30, 1990	a,f
- Complete Additional Operator Training on Interim and New Facilities.	June 30, 1991	b,d,h
- Complete New Record Keeping Contents on Interim and New Facilities.	June 30, 1991	f
- Complete New Communications and Supervisory Control on Interim and New Facilities.	June 30, 1991	b,c,d,h

C. Environmental Response and Impact

1. Description of Environmental Setting and Acid Release

- Topography, Geology, Surface Water and Ground Water.
- Location of Acid Release and Receiving Stream.

2. Response to Acid Release

- Immediate Response on May 20.
  - ADO, ENG, HSE and World Services on Scene.
  - Emergency Operations Center Opened.
  - World Services Neutralization of Receiving Stream Initiated. (See Exhibit No. 7, pH Readings)
  - Corrective Actions at Power Plant Initiated.
- Response During Week of May 21.
  - Neutralization of Receiving Stream Continued.
  - Corrective Actions at Power Plant Continued.
  - HSE/World Services pH Monitoring.
  - EID Inspection of Acid Release. (See Exhibit No. 8, EID Inspection)
  - EID Inspection for NPDES Compliance.

3. Impact of Acid Release

- World Services pH Study.
- Wetlands Study in Sandia Canyon. (See Exhibit No. 9, Wetlands Study)

4. Emergency Response Manpower and Cost

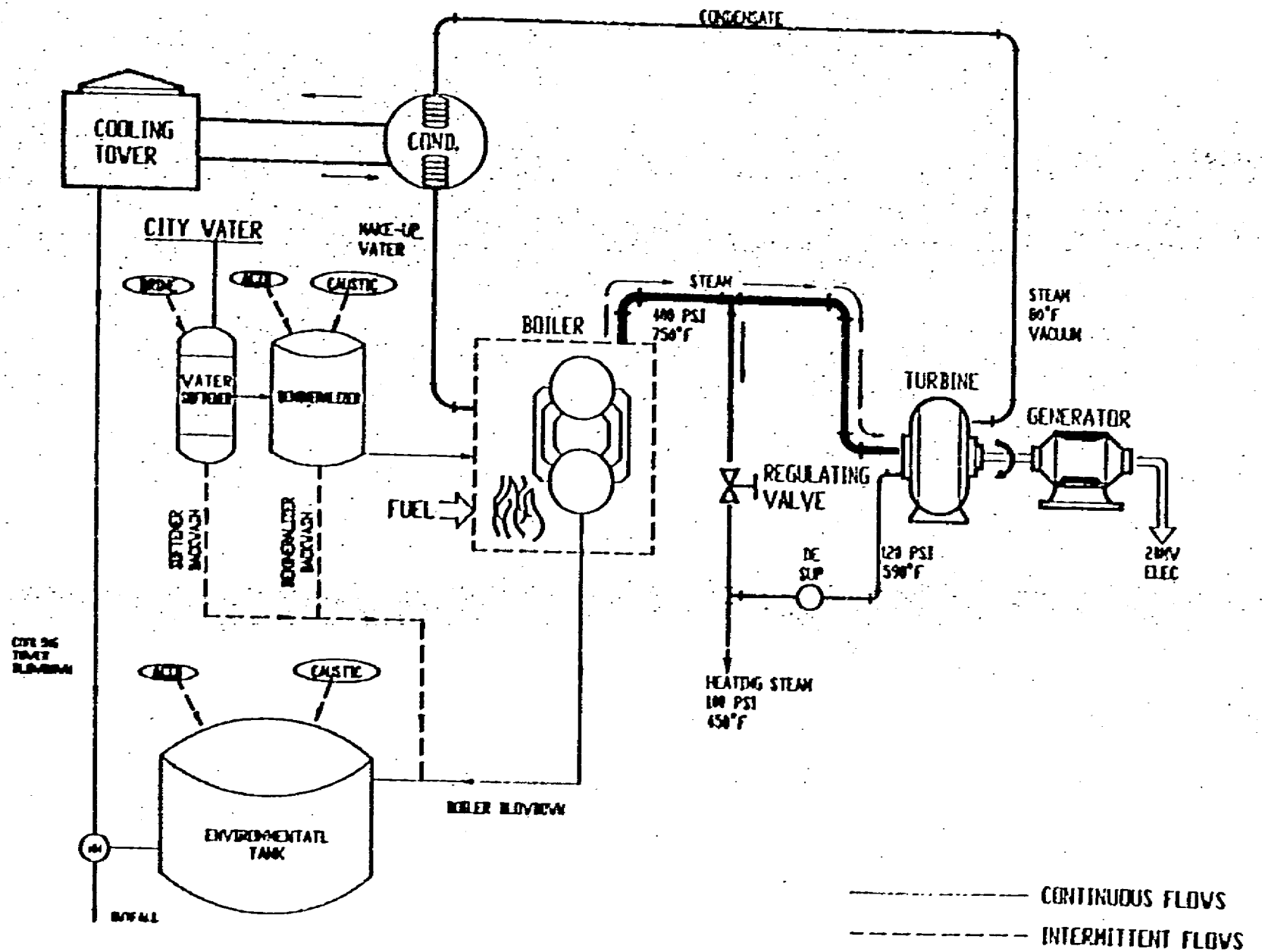
- Manpower
- Cost

D. Summary

1. Demonstrated Commitment to Environmental Protection and Compliance by Response to Acid Release

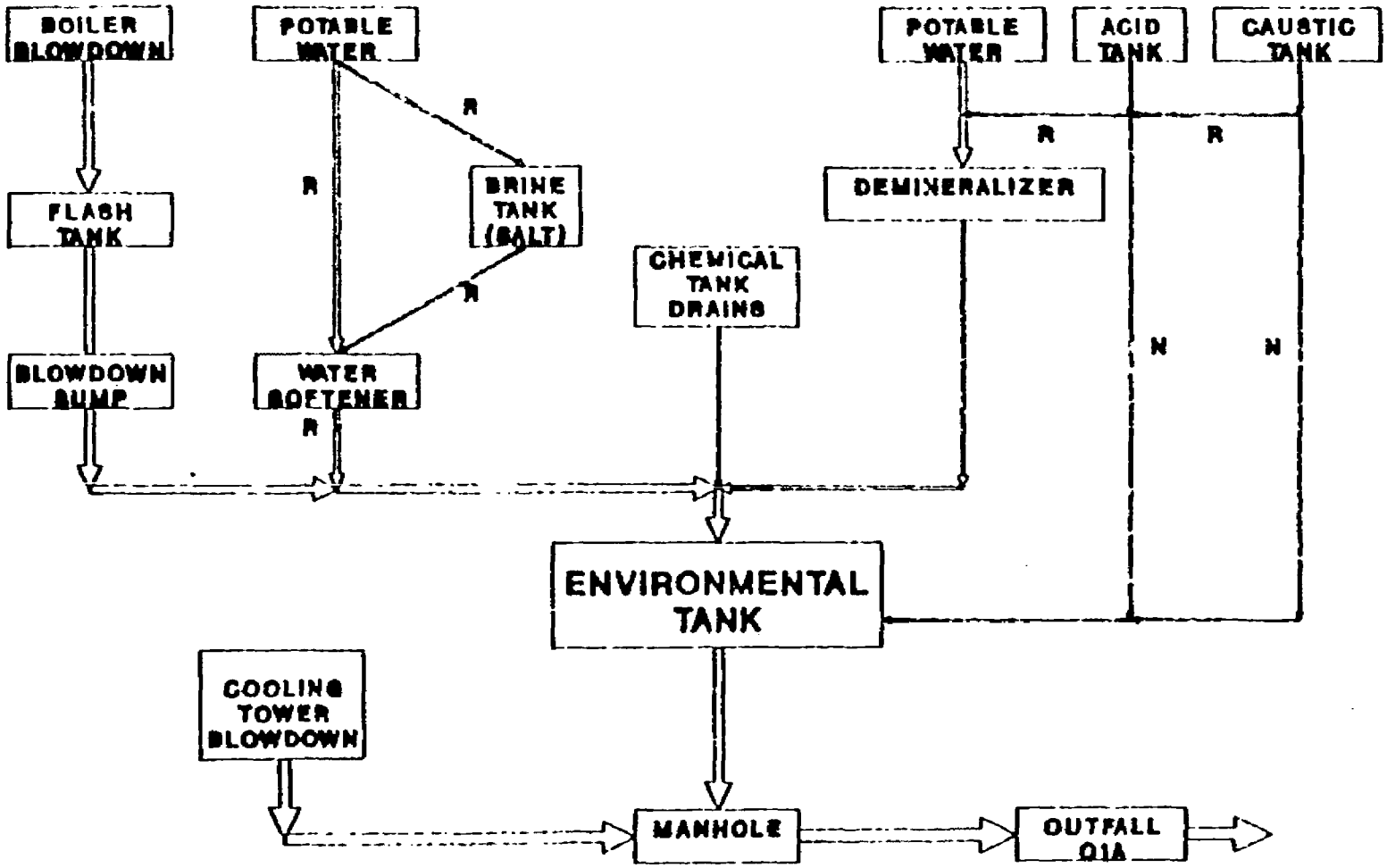
- Immediate Response
  - Commitment of Senior Management on Scene, ADO, ENG, HSE, World Services.
  - Commitment of Manpower and Resources.
  - Completion of Interim Corrective Actions.
- Long - Term Response
  - Commitment to Implement Investigate Committee Recommendations.
  - Commitment to Improve Neutralization Facilities Under Proposed Compliance Schedule.
  - Commitment to Prevent Recurrence of Non-Compliance.

Attachment 1



POWER PLANT STEAM CYCLE

Attachment 2



R - REGENERATION FLOWS
N - NEUTRALIZATION FLOWS

ENVIRONMENTAL TANK SOURCES

ACTION PLAN

- Redesign environmental tank treatment system.
- Develop training and documentation program.
- Improve design review and plant QA procedures.
- Evaluate/adjust organization of steam plants.
- Develop oversight responsibilities/plan.

Exhibit No. 2

Corrective Actions Completed

The following corrective actions have been completed in order to eliminate and prevent a recurrence of the pH excursions at the TA-3-22 Power Plant at Los Alamos National Laboratory.

Date	Corrective Action
May 20	Set up pH monitoring stations downstream of outfall. Continuously monitored for 2-1/2 days until pH of stream returned to normal. Added soda-ash to stream to maintain pH between 6.0 and 9.0. Neutralized low pH pools along length of stream.
May 20	Established interim procedure to monitor pH of outfall hourly. Continued for one week, then reduced to twice per 8 hour shift.
May 20	Removed electrical power to tank discharge valve and tagged controls. Disabled auto discharge feature of controls.
May 20	Moved approximately 1,500 gallons of environmental tank contents to nearby abandoned cooling tower basin in order to prevent tank overflow. Plugged discharge lines from basin.
May 21	Moved remaining contents of environmental tank into 18-300 gallon "tuff tanks." Set up titration tests on tuff tanks and cooling tower basin to determine approximate amount of acid lost.
May 21	Validated and established temporary written procedural controls on all inflow sources into environmental tank. Establish supervisory control of tank discharge valve with checklist for neutralization, HSE validation of pH, monitoring of outfall pH, and discharge of environmental tank.
May 21	Removed ball valve from acid tank. (Prohibited gravity flow of acid to environmental tank) Disconnected metering pump.
May 21	Installed blind flange in environmental tank overflow. Plugged floor drain in environmental tank pit.
May 21	Initiated engineering hydraulic analysis of acid tank piping to validate amount of acid lost.
May 21	Further developed interim manual procedures to also monitor pH in cooling tower basin and manhole between basin and outfall.
May 22	Began neutralizing contents of acid/water solution in cooling tower basin under the direction of HSE.

May 22	Began using contents of tuff tanks to neutralize high pH boiler blowdown water in environmental tank to a pH level of 6.0 - 9.0. Modified checklists and procedures to incorporate methods.
May 22	Modified controls on environmental tank: - Key switch to operate discharge valve - Moved mixer blade to lower level - Revised control logic to operate mixer continuously from 30" to 96" levels. - Calibrated pH probe and meter in tank controls.
May 23	Installed limiting timers on acid transfer pumps to power plant day tank, and acid metering pump to environmental tank.
May 24	Conducted final stream profile to ensure return to normal pH.
May 25	Installed environmental tank high level alarm near operator's station in power plant.
May 25	Established permanent written operating procedures for manual neutralization and discharge of environmental tank, with separate checklists for each phase of adjustment and neutralization.
May 25	Achieved final neutralization of cooling tower basins to pH of 7.3.

Exhibit No. 3

TEMPORARY AND PERMANENT PROCEDURES
AND EQUIPMENT MODIFICATIONS

WORLD SERVICES, INC.

June 21, 1990

ENVIRONMENTAL TANK INTERIM DISCHARGE PROCEDURE

Since the original environmental control system could not be operated completely in automatic mode, and until the system is modified, the procedures in Flow Chart #1 will be in effect. Flow Chart #1 is a step by step procedure explaining how to operate the system manually. It was written to help avoid any problems. The applicable checklists indicated by the flow chart should be executed by the person in charge of discharging the environmental tank. The manual procedures will be in effect until the existing system is modified and complies with all QA and environmental requirements.

SAFETY NOTE:

1. When collecting sample from tank or measuring level, be sure agitator is turned off.

2. Ensure that all appropriate protective gear is worn as detailed in the following check list.

Date _____ Time _____

CHECKLIST No. 1 (CK-1)

INITIALS	TIME*	
		SECURE ALL INFLOW TO THE TANK
		1. DEMINERALIZER (when in Regeneration only)
_____	_____	A. Turn demineralizer power off at the panel.
_____	_____	B. Turn demineralizer timer power off.
_____	_____	C. Secure the water inlet to the demineralizer.
		2. SOFTENER (when in Regeneration only)
_____	_____	A. Secure the discharge valves.
		3. BLOWDOWN
_____	_____	A. Secure the continuous blowdown at the steam drum.
_____	_____	B. Turn the power off to the blowdown tank pumps.
_____	_____	C. Close the valves on the blowdown tank pumps.

CHECKLIST No. 2 (CK-2)

INITIALS	TIME*	
		ADDING CAUSTIC SOLUTION (pH is low)
_____	_____	1. Wear appropriate protective equipment. A. Rubber Gloves B. Face Shield C. Rubber Jacket D. Rubber Pants E. Rubber Boots F. Ensure agitator has operated at least ten minutes.
_____	_____	2. Check the pH at the local indicator. Record pH here _____.
_____	_____	3. Open the drain valve on the caustic holding tank. (It is located near the demineralizer)

* N.R. - Indicates step is not required.

_____ Date _____ Time

Also, have water flowing into the spill pan at this time. Use a moderate flow to avoid splashing.

_____ _____ A. Lower the level in the holding tank two to three inches.

_____ _____ B. Check the pH to see if an adequate amount of caustic has been added.

Record pH here _____

_____ _____ C. If the pH in the holding tank is still not in the dump parameter of pH 7.0 to 7.8 and is below 7.0 repeat step 3A of Checklist No. 2. Record reading after each pH adjustment below:

Time	pH Reading
_____	_____
_____	_____
_____	_____

* N.R. - Indicates step is not required.

Date _____ Time _____

CHECKLIST No. 3 (CX-3)

INITIALS TIME*

ADDING SULFURIC ACID SOLUTION (pH is high)

_____ _____ 1. Wear appropriate protective equipment.
   A. Rubber Gloves
   B. Face Shield
   C. Rubber Jacket
   D. Rubber Pants
   E. Rubber Boots
   F. Ensure agitator has run for at least 10 minutes.

_____ _____ 2. Check the pH at the local indicator. Record pH here _____

_____ _____ 3. Insert pump into Tuff Tank. Start the acid pump and pump approximately one half (1/2) to one (1) gallon of solution. (Remove the pump to protect against syphoning.) Allow the environmental tank mixer ten (10) minutes to mix the solution. Check the pH after the ten (10) minutes has elapsed. Record reading here _____. If the pH is still high, repeat step 3 in checklist #3. Record reading after each adjustment below:

Time	pH Reading
_____	_____
_____	_____
_____	_____
_____	_____

*N.R. - Indicates step is not required.

Date _____ Time _____

CHECKLIST No. 4 (CX-4)

ENVIRONMENTAL TANK DUMPING

DO NOT LEAVE THE HOLDING TANK LOCATION UNTIL THE VALVE HAS BEEN RETURNED TO THE CLOSED POSITION. (THIS IS TO INSURE THAT THE VALVE IS NOT LEFT IN THE OPEN POSITION.)

INITIALS	TIME*	
		1. Ensure agitator has operated at least 10 minutes.
_____	_____	2. Make certain that the pH is between 7.0 and 7.8 on local pH indicator. Collect a "full depth" sample from tank and validate on pH meter in the lab. Record pH reading here _____. If pH meters disagree more than .3 unit, notify UICS to calibrate.
_____	_____	3. Locate the dump valve key switch and turn the key to the open position. (FULL COUNTER CLOCK WISE). A. Valve will open
_____	_____	4. Make sure valve opens by watching indicator pointer to make certain it goes to the O position.
_____	_____	5. Monitor the pH on the pH meter located at the tank. If it goes above pH nine (9) or below pH six (6) close the valve, rotate the switch to the closed position, (FULL CLOCK WISE) and modify pH to bring it back into the range of pH 7.0 to pH 7.8. See Checklist #2 is pH is low and Checklist #3 is pH is high.
_____	_____	6. While tank is dumping, collect a sample at the outfall. After tank is finished dumping and discharge valve is returned to the closed position, measure the pH of the sample in the lab and record here _____, and on the Power Plant Environmental Tank Monitoring Log.

* N.R. - Indicates step is not required.

Date Time

_____ _____ 7. Once the holding tank is empty, rotate the key switch to the closed position (FULL CLOCK WISE) and make sure the valve closes by watching the indicator on top of the valve. The pointer will point to C position when closed.

CHECKLIST No. 5 (CK-5)

RETURN THE SYSTEM BACK TO NORMAL OPERATION

REVERSE OPERATION SHOWN IN CK-1 (SECURE ALL INFLOW TO THE TANK)

INITIALS	TIME*	
		1. DEMINERALIZER (when in Regeneration only)
_____	_____	A. Turn demineralizer power on at panel.
_____	_____	B. Turn demineralizer timer power on.
_____	_____	C. Open water inlet to the demineralizer.
		2. SOFTENER (when in Regeneration only)
_____	_____	A. Open the discharge valves.
		3. BLOWDOWN
_____	_____	3-A. Open continuous blowdown at steam drum.
_____	_____	2-B. Turn continuous blowdown tank pump power on.
_____	_____	1-C. Open continuous blowdown tank valves at pumps.

* N.R. - Indicates step is not required.

* *THIS PROCEDURE REVIEWED AND APPROVED* _____

— SUPV. INITIALS *DATE*

Exhibit No. 4

Preliminary Recommendations of Investigation Committee on the Acid Release

The following actions are recommended by the Investigation Board established on May 21, 1990, to conduct a investigation of the sulfuric acid release from the TA-3-22 Power Plant to Sandia Canyon at Los Alamos National Laboratory.

a. Procedures be written for the operation of environmental protection systems at the power plant. All new procedures go through a formal review process including external review. These procedures should be reviewed by HSE-8, ENG-8, PENV, PSFT, and other appropriate groups.

. Increase the environmental awareness through general environmental and site specific training.

c. World Services should establish a Superintendent reporting directly to the Utilities Manager to provide increased supervision over the operation of the power plants and in particular, environmental control systems at the power plants.

d. Management must also commit to implement a strategy to improve communication between workers and supervisors.

e. The level of oversight of the Utilities Department by LANL needs to be increased, the working relationships of all oversight groups need to be clarified.

f. World Services should revise their procedures to ensure that the Utilities Department conforms with current World Services structure and modus operandum in regards to QA procedures, ES&H reviews, and work order control.

g. Redesign the entire environmental tank and acid application system to discharge within the limits of the NPDES permit. This should include the installation of an automatic, continuous read, pH monitor at the outfall.

h. Power plant personnel must participate in semi-annual emergency awareness programs dealing with plant specific scenarios.

j. LANL management must form an oversight committee to review and document the implementation of these recommendations.

Exhibit No. 5

Action Plan

Report on Specific Actions To Prevent a Recurrence of pH Excursions

This action plan has been developed in order to implement the corrective activities which are required in order to prevent a recurrence of the acid release at the TA-3-22 Power Plant at Los Alamos National Laboratory.

1. Redesign Environmental Tank Treatment System

   This action item will include an engineering evaluation of the environmental tank treatment system, including alternative neutralization methods. One such alternative will be the use of CO_2 injection instead of sulfuric acid. This system is already being used successfully at the TA-16 and TA-21 steam plants. A formal design package for the selected system will be prepared which will include a complete QA review. (Recommendation g)

2. Develop Training and Documentation Program

   Implementation of this item is intended to ensure that all operating personnel are fully trained in the proper operation and maintenance procedures required for equipment under their purview. This is particularly important for new and/or modified equipment before that equipment is placed in service. Greater emphasis will be placed on environmental awareness and emergency response procedures. (Recommendations b,d,h)

3. Improve Design Review and Plan QA Procedures

   Procedures will be developed to ensure that all system modifications are reviewed and approved by the appropriate levels of authority. Also, documentation systems will be established which will provide a record of the review process for these modifications and additions to plant systems. (Recommendations a,f)

4. Evaluate/Adjust Organization of Steam Plants

   Various options will be explored to ensure that an adequate degree of appropriate technical knowledge exists within the steam plants organization. Some of these options include the possible reinstatement of the plant engineer position or a superintendent position devoted to the steam/power plant operation. (Recommendation c)

5. <u>Develop Oversight Responsibilities/Plan</u>

This item will provide improved operations communications between supervision and craft personnel. Improved supervisory oversight techniques will be developed and implemented. This process will be reviewed by an implementation/oversight committee. LANL will reallocate resources to provide a higher level of oversight of World Services Utility Department and power plant operations. (Recommendations d,e,j)

Exhibit No. 6

Proposed Compliance Schedule

The following compliance schedule is proposed in order to prevent recurrence of the pH excursions at the TA-3-22 Power Plant at Los Alamos National Laboratory.

Physical Plant Modifications	Completion Date	Ref.
- Engineering Analysis of Alternative Neutralization Processes (Acid, CO_2, Other).	Oct. 31, 1990	g
- Prepare Plans & Specifications for New Facilities.	Jan. 31, 1991	
- Complete QA Review and Obtain Approval for New Facilities.	Feb. 28, 1991	
- Complete Construction of New Facilities.	May 31, 1991	
- Complete Final Inspection, Start-Up and Training for New Facilities.	June 30, 1991	

Operational and Admin. Changes	Completion Date	Ref.
- Establish LANL Oversight Committee to Review and Document Corrective Actions and Increase Level of Oversight by ENG and HSE.	July 31, 1990	e,j
- Provide Environmental Awareness and Emergency Response Training on Neutralization and other Facilities at Power Plant.	Sept. 30, 1990	b
- Revise Power Plant Operations Manual To Include Procedures for Environmental Protection and Compliance and for QA, ES&H and Work Order Control Procedures.	Sept. 30, 1990	a,f
- Complete Additional Operator Training on Interim and New Facilities.	June 30, 1991	b,d,h
- Complete New Record Keeping Controls on Interim and New Facilities.	June 30, 1991	f

• Complete New Communications and Supervisory Control on Interim and New Facilities.	June 30, 1991	b,c,d,f

Exhibit No. 7

M E M O R A N D U M

TO: Distribution

THRU: Michael Brown, PENV Supervisor MB for

FROM: Teri Monaghan, PENV Health Specialist

DATE: May 24, 1990 MEMO #: 90-257

RE: pH readings from effluent discharges from TA-03, SM-22 steam plant, and TA-03 WWTP, following neutralization of an acid release.

After conducting pH analysis of the effluent stream in Sandia Canyon, the three separate readings are tabulated below per your request. On May 23, a stream profile was conducted from the initial outlet, through the canyon, and 0.5 miles past the Meson facility entrance.

EFFLUENT LOCATION	05/21 pH #1	05/21 TIME #1	05/21 pH #2	05/21 TIME #2	05/23 pH #3	05/23 TIME #3
SM-22 weir	7.99	1:44	--	--	--	--
" " below weir	7.77	1:36	--	--	8.10	9:45
" " culvert	6.95	1:30	6.99	1:26	--	--
Eastward from culvert 6" deep	5.75	1:30	--	--	--	--
Eastward from culvert old valve	6.89	1:10	--	--	--	--
TA-03 WWTP culvert	7.03	1:00	--	--	--	--
WETLAND SOUTH FORK:						
Far West end	6.96	1:38	7.71	2:50	7.25	10:05
Pool	2.70	2:07	6.13	3:27	--	--
12" Pool	3.00	2:11	6.44	3:25	--	--
pH Calibration	7.10	2:09	--	--	--	--
Further Eastward mainflow	--	--	8.78	3:03	--	--

table con't.

EFFLUENT LOCATION	05/21 pH #1	05/21 TIME #1	05/21 pH #2	05/21 TIME #2	05/23 pH #3	05/23 TIME #3
Further Eastward						
sediment-1	5.60	2:03	--	--	7.75	10:13
topflow-1	7.30	2:04	--	--	7.38	10:20
sediment-2	2.90	1:58	--	--	--	--
topflow-2	7.50	2:00	--	--	--	--
Further Eastward						
12" deep	4.00	1:55	8.82	3:23	10.24	10:45
18" deep	3.30	1:56	6.44	3:25	--	--
East end, 8" deep	--	--	6.63	3:15	9.71	11:05
pH Calibration	--	--	7.80	3:19	7.07	10:50
East end, 8" deep	--	--	8.10	3:21	10.13	10:40
WETLAND NORTH FORK:						
Far West end	6.81	1:53	8.40	2:58	10.40	10:08
Further Eastward						
3" deep	--	--	9.10	3:08	10.09	10:15
12" deep	--	--	8.80	3:10	10.87	10:29
East end	--	--	8.07	3:12	7.17	10:36
Out of wetland	--	--	--	--	9.56	11:09
Secondary wetland	--	--	--	--	9.61	11:12
Eastward of wetland 1.7 paint reading	--	--	--	--	7.20	11:22
pH Calibration	--	--	--	--	7.05	11:24
100 yds. East of wetland (NTS)	--	--	--	--	6.91	11:45
Further Eastward 1.6 paint reading	--	--	--	--	7.10	11:50
pH Calibration	--	--	--	--	7.30	12:03
Further Eastward Past trailer ct.	--	--	--	--	7.39	12:40

table con't.

EFFLUENT LOCATION	05/21 pH #1	05/21 TIME #1	05/21 pH #2	05/21 TIME #2	05/23 pH #3	05/23 TIME #3
0.5 miles East of Meson entrance	--	--	--	--	7.02	2:00

Teri Monaghan

Teri Monaghan

M E M O R A N D U M

TO: Distribution

THRU: Michael Brown, PENV Supervisor

FROM: Teri Monaghan, PENV Health Specialist

DATE: May 31, 1990 MEMO #: 90-264

RE: Addendum to the tabulated pH readings taken from the TA-03, SM-22 acid release; Memo #: 90-257, dated May 24, 1990.

The following table reviews the pH readings taken May 23 during the Sandia Canyon stream profile, and current pH readings taken May 30. The high pH readings from May 23 have dropped, and all current pH readings are now in compliance with the National Pollutant Discharge Elimination System.

EFFLUENT LOCATION	05/23 pH #3	05/23 TIME #3	05/30 pH #4	05/30 TIME #4
pH Calibration	--	--	7.04	3:20
SM-22 below weir	8.10	9:45	--	--
" " culvert	--	--	8.15	3:08
Eastward from culvert	--	--	8.17	3:07
TA-03 WWTP culvert	--	--	7.42	3:16
WETLAND SOUTH FORK: Far West end 8" deep	7.25	10:05	7.23	3:02
pH Calibration	--	--	7.09	2:52
Further Eastward	--	--	6.67	2:48
4" deep	--	--	7.71	2:28
12" deep	10.24	10:45	8.95	2:27
pH Calibration	--	--	7.11	2:25
12" deep (again)	--	--	8.89	2:23

Table con't.

EFFLUENT LOCATION	05/23 pH #3	05/23 TIME #3	05/30 pH #4	05/30 TIME #4
Further Eastward				
sediment-1	7.75	10:13	8.13	2:08
topflow-1	7.38	10:20	7.79	2:07
Far East end	10.13	10:40	7.91	2:19
WETLAND NORTH FORK:				
Far West end	10.40	10:08	8.19	2:04
Further Eastward				
3" deep	10.09	10:15	7.85	2:57
12" deep	10.87	10:29	7.15	2:36
pH Calibration	--	--	7.09	2:52
Far East end	7.17	10:36	7.26	2:20
SECONDARY WETLAND	9.61	11:12	--	--
Out of secondary wetland	7.20	11:22	7.85	2:02

Teri Monaghan

Teri Monaghan

Exhibit No. 8

New Mexico Health and Environment Department

GARREY CARRUTHERS
Governor
DENNIS BOYD
Secretary
MICHAEL J. BURKHART
Deputy Secretary
RICHARD MITCHELFELT
Director

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

July 9, 1990

Mr. Jack B. Tillman
Area Manager
Department of Energy
Los Alamos Area Office
Los Alamos, NM 87544

Mr. Allen Tiedman
Associate Director for Support
University of California
Los Alamos National Laboratory
Los Alamos, NM 87544

RE: Compliance Spill Inspection, DOE/UC-LANL NPDES Permit No. NM0028355

Dear Sirs:

Enclosed is a revised copy of the spill inspection report pertaining to the acid spill from TA-3, SM22 power plant at the Los Alamos National Laboratory. The original inspection was submitted to the Department of Energy and the University of California/Los Alamos National Laboratory on June 26, 1990.

If you have any questions, please feel free to call me at (505) 827-2798.

Sincerely,

Mike Saladen
Water Resource Specialist
Surface Water Section

MS:ms

Enclosures

xc: NMEID District II Office
NMEID Espanola Field Office
Bob Hiller, EPA (6W-ET)
Steve Rae, UC-LANL/HSE 8
Jim Phoenix, DOE Los Alamos Area Office

— ENVIRONMENTAL IMPROVEMENT DIVISION —
Harold Runnels Building
1190 St. Francis Dr.
Santa Fe, New Mexico 87503

Sulfuric Acid Spill
Compliance Inspection Report
DOE/UC-LANL, NPDES Permit No. NM0028355
May 21, 1990

INTRODUCTION

On May 21, 1990, an inspection was conducted at the Department of Energy/University of California-Los Alamos National Laboratory (DOE/UC-LANL) by Mike Saladen and Scott Hopkins, Environmental Improvement Division-Surface Water Quality Bureau (EID-SWQB) of the New Mexico Health and Environment Department. The purpose of the inspection was to: (1) investigate the cause and damage of a sulfuric acid spill which occurred between May 19-20, 1990; (2) observe the corrective actions taken by DOE/UC-LANL; (3) evaluate DOE/UC-LANL's compliance with the New Mexico Water Quality Control Commission (WQCC) Regulations; and (4) collect information to be reviewed by the U. S. Environmental Protection Agency (USEPA). This report is based on observations made by the inspection team, verbal information supplied by representatives of DOE/UC-LANL, and samples collected during the inspection.

SPILL INSPECTION

The inspection team arrived at the UC-LANL, Health Safety and Environment, Group 8 (HSE-8) office at 1142 hours on May 21, 1990. The inspection team met with Mr. Steve Rae (UC-LANL, HSE-8), showed their credentials and explained the purpose of the inspection. During the pre-inspection interview, the following items were discussed: 1) Mr. Rae explained the normal operations of the power plant which would lead to a discharge through the NPDES outfall from the facility; 2) Mr. Rae explained the events leading up to the spill, as he understood them. The summary was as follows: Sometime in early May 1990, the power plant had experienced pH violations at NPDES outfall 01A, the power plant discharge. Pan American (Pan Am) operators noted problems with the automatic sulfuric acid dosing device. The operators switched to manual mode and allegedly fixed the problem. After repairs were made, the dosing device was switched back to automatic mode. On May 19, 1990, at approximately 2230 hours, a Pan Am operator was conducting routine maintenance checks and noted the two valves from the sulfuric acid tank were open. The operator immediately closed the valve. On May 20, 1990 at 0530 hours, the same operator notified his supervisor that there may be a problem at the power plant's NPDES outfall. The DOE/UC-LANL Emergency Center was notified. At 0730 hours, May 20, 1990, additional Pan Am personnel arrived at the spill site to investigate the situation and started collecting effluent samples. A pH reading as low as 1.4 standard units (S.U.) was documented of effluent discharging through outfall 01A; 3) corrective actions taken by DOE/UC-LANL and Pan Am to mitigate the spill; 4) the spill may have impacted approximately 2.5 miles of receiving stream before it

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infiltrated the subsurface. The Rio Grande is approximately 7 miles downstream from the location where the spill entered the subsurface; 5) a Pan Am survey team was investigating any potential damage to the environment (i.e. property, plant and animal damage etc.) on May 21, 1990; 6) additional Pan Am spill crews were on-site monitoring the receiving stream since May 20, 1990; 7) the EID inspectors explained NPDES and WQCC spill reporting requirements; and 8) Mr. Rae indicated that the USEPA had been notified.

The inspection team notified the office of Mr. Jim Phoenix, DOE, of their presence and the reason for the visit. Mr. Phoenix arrived at the HSE-8 office at 1215 hours, May 21, 1990. The inspection team showed their credentials, explained the purpose of the inspection and discussed the current spill information (same as documented above).

Next, the inspection team accompanied by Messrs. Phoenix and Rae, arrived at TA-3, SM 22, at 1231 hours, May 21, 1990. The inspection team met with Messrs. Ken Hargis and Al Tiedman, (UC-LANL), Jim Griffins, Bob Grueter and Stan Nallie (Pan Am). The inspection team showed their credentials and explained the purpose of the inspection. According to Mr Grueter, on May 19, 1990 at 2230 hours a plant operator discovered that two valves were open on the sulfuric acid tank during routine shift checks of the power plant. The valves were closed but the operator did not report the incident until after 0500 hours, May 20, 1990. The sulfuric acid tank had emptied into the neutralization tank between 2230 hours on May 19, 1990 and 0500 hours on May 20, 1990. The neutralization tank filled and eventually overflowed into a manhole where it combined with cooling tower effluent and discharged through NPDES outfall 01A. At the time of inspection, the estimated amount of sulfuric acid discharged through the outfall was approximately 1700 gallons, according to Mr. Grueter. The pH was measured as low as 1.4 S.U. through outfall 01A. The corrective actions that had been implemented and/or that were being conducted consisted of: 1) valves to sulfuric acid tank were closed; 2) discharge of cooling water blowdown into the neutralization tank was stopped at the source; 3) pH in the neutralization tank was measured at 0.1 standard units. A vacuum truck pumped approximately 3800 gallons of the acidic solution out of the neutralization tank to give 5-6 feet of freeboard. The acid solution was then transferred into a cooling tower basin which was no longer in use (cooling tower storage basin). Caustic soda was then added to the acid solution in the cooling tower storage basin for neutralization. Pan Am officials said discharge from the cooling tower storage basin would not occur until it was within appropriate NPDES permit limits; 4) continuous monitoring for pH was conducted at outfall 01A; 5) a neutralization station was established on the lower end of the watercourse. Pan Am personnel were applying soda ash directly to the receiving stream; 6) a pH survey was conducted along the 2.5 mile stretch of watercourse; 7) a survey crew was investigating the environmental damage to the aquatic

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life and vegetation caused by the spill; and 8) an investigation into the cause of the spill was started by DOE/UC-LANL. After the interview, the inspection team took a tour of the power plant, and the NPDES outfall.

During the tour of the power plant, the inspection team noted Pan Am workers neutralizing the effluent in the cooling tower storage basin with caustic soda and water from a fire hydrant. Several barrels of the caustic soda were observed to have been accidently overturned outside the fenced area of the cooling tower storage basin. The barrels of caustic soda were lying in a puddle of water. A small discharge from this ponded water was entering a nearby storm drain. The EID inspectors requested Pan Am to remedy the situation. The barrels of caustic soda were immediately turned upright, and properly stacked out of the ponded water.

At outfall 01A, Roy Bohn, UC-LANL, was collecting pH measurements of the effluent. At the time of the inspection, 1302 hours, May 21, 1990, the effluent pH was 7.43 S.U. and the flow was approximately 150 gpm. The inspection team reviewed the pH records. This review of the sampling records documented large fluctuations in pH readings. The EID inspectors believed the high pH was attributed to the addition of soda ash directly into the discharge stream. The low pH was of concern to the EID inspectors. UC-LANL personnel indicated they had just recently discovered a seep of acid solution from the cooling tower storage basin into the collection system which eventually discharged through outfall 01A. Once this was discovered, the seep was plugged with sand bags at the manhole. Observations of the outfall area by EID inspectors did not establish any immediate visible damage to the environment. Departure from the power plant was at 1425 hours, May 21, 1990.

Between the hours of 1505-1805 on May 21, 1990, Messrs. Roy Bohn, Steve Rae, Scott Hopkins, Mike Saladen and/or Mike Alexander walked portions of the receiving stream between NPDES outfall 01A and the location where the effluent seeped back into the ground. The following observations were noted: 1) the acid spill entered a section of the Sandia Canyon, an ephemeral stream consisting mainly of NPDES discharges. During precipitation events, stormwater runoff would combine with these discharges; 2) the discharge flowed for approximately 2.5-3.0 miles downstream and eventually entered the subsurface; 3) the point where the effluent entered the subsurface was approximately 7 miles upstream from the Rio Grande; 4) the discharge did not leave DOE owned property. All the property impacted by the spill were within boundaries that had "no trespassing" signs posted. However, it should be noted that potential flow or rinsing of acid further downstream was of concern; 5) the inspection team stopped at the neutralization station established by Pan Am, approximately 2.0 miles downstream from the outfall. The inspection team met with Mr. Martin Northic, Pan Am, showed their credentials and explained

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the purpose of the inspection. Mr. Northic and other Pan Am employees were periodically applying soda ash directly to the receiving stream and then measuring the pH levels at 15 minute intervals. Approximately 1350 pounds of soda ash had been added directly to the effluent and/or stream at that time, according to Mr. Northic. Pan Am was collecting pH measurements both upstream and downstream from the neutralization station. Mr. Northic indicated that continuous monitoring had occurred since the afternoon of May 20, 1990. The EID inspectors reviewed the pH records. The receiving stream, upstream from the neutralization station, had pH readings ranging from 3.05 to 3.26 S.U. Downstream from the neutralization station, in-stream pH readings ranged from 5.50 to 9.35; 6) the inspection team collected various pH readings of the receiving stream water below the neutralization station to where the effluent entered the subsurface, using litmus pH paper. The pH ranged from 6.5 to 7.0 in this area; 7) the inspectors could not establish any immediate visible damage to the receiving stream; 8) in-stream pH readings collected directly below outfall 01A ranged from 5.5-6.0; and 9) by the end of the inspection, DOE/UC-LANL decided to add water from a fire hydrant directly into the cooling tower basins to dilute the acid and rid the fluctuations in pH through the outfall. This caused a big increase in flow through outfall 01A. Mr. Rae indicated he would report and explain this increase on DMRs for May 1990.

Summary

During the inspection, and/or prior to leaving the spill site, the following information was discussed between EID, DOE/UC-LANL, and Pan Am personnel: 1) events leading up to the spill/discharge; 2) corrective actions taken by DOE/UC-LANL to mitigate the spill; 3) DOE/UC-LANL was investigating the cause of the spill; 4) spill reporting requirements under the NPDES permit program and pursuant to NMWQCC Regulations; 5) Mr. Rae notified EPA and EID of the spill and pH violations at 1429 hours, May 21, 1990. Written reports would follow; 6) a follow-up inspection conducted by EID was possible; 7) it was to early for EID inspectors to fully evaluate the impact on the environment as a result of the spill. DOE/UC-LANL must submit all relevant information (i.e. sampling results, Pan Am environmental impact survey information, results into the cause of the spill, spill reports etc.); and 8) once all information had been reviewed by EPA and EID, compliance with appropriate State and federal regulations would be determined.

Exhibit No. 9

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

memorandum

TO: Kenneth Hargis, HSE-8, K490 DATE: July 11, 1990

THRU: Doris [illegible], HSE-8, K490 MAIL STOP/TELEPHONE: K490/7-3024

FROM: Teralene Foxx, HSE-8 SYMBOL: HSE-8:90-584

SUBJECT: WETLAND STUDIES IN SANDIA CANYON: PROGRESS REPORT

On May 19-21, 1990, an accidental spill of 1000-1400 gallons of sulfuric acid occurred in the effluent flowing from the Technical Area (TA) 3 Power Plant Environmental Tank to the cattail-dominated wetland in Sandia Canyon. As a result of this incident, the Ecological Team of the Environmental Assessments and Resource Evaluations Section, HSE-8, was asked to review the impact of the spill on the downstream wetland. The wetland has been maintained by the effluent from both the TA-3 Steam Plant and the Sewage Treatment Plant. The following is background information and a progress report of this review to date.

Background

In April 1990, the Ecological Team initiated a study to characterize wetlands identified as part of the National Wetlands Inventory, Fish and Wildlife Service. A map of the wetlands was required as part of the Part B permit. The wetland within Sandia Canyon was among the areas to be characterized during the 1990 field season. The characterization will provide information needed for compliance with Executive Order 11990, "Protection of Wetlands," and the Laboratory/Department of Energy, Resource Conservation and Recovery Act (RCRA) Part B permit, as well as provide information for long-term and cumulative impacts of laboratory activities needed to support National Environmental Policy Act documentation.

On May 20, 1990 at the time of the acid spill, the characterization study initiated in April was not at a stage where any quantitative data on biota and soils had been gathered. Additionally, no other pre-acid spill quantitative baseline data for the plants, animals, aquatic organisms or soils exists for Sandia Canyon. Previous surveys across the Laboratory have been conducted on a project-specific basis. Resources have not been allocated to develop a systematic

baseline for the biological resources of this or any other canyon system.

The only project-specific data for Sandia Canyon that had been collected were some qualitative data from a survey conducted in 1986 for a proposed project, the Selected Rubble Landfill. This latter survey provides some observational information on plant and animal populations.

The wetland characterization study to be conducted this summer (1990) will provide observational and quantitative data for Sandia Canyon and provide post-acid spill information. On May 22, 1990, a more comprehensive study was begun.

Study Components

The study has several components:

1. To characterize the wetlands and to determine wetland boundaries as baseline information to determine the applicability of a jurisdictional wetland classification. Jurisdictional wetlands must have saturated hydrology, hydrophytic vegetation, and hydric soils. Procedures for delineating wetlands are outlined in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands. Methods of identification and delineation are systematic and must be closely followed.

2. To establish a photographic record of the wetlands so changes through time can be assessed qualitatively. Some baseline photographs of cattail marsh in Sandia Canyon were initially taken in April 1990. Additional photo-stations were established after the acid spill.

3. To establish some observational and quantitative baseline information on the biota inhabiting and/or utilizing the wetlands.

4. To determine if changes through time within the wetlands can be assessed using techniques such as Remote Sensing.

5. To establish some information on water quality within the wetlands. Water quality has been monitored at the effluent pipe but not within the wetlands.

6. To define soil characteristics.

Post Acid Spill Observations

Although pre-acid spill data were not available, the following information has been accumulated within the first month after the spill. Three sampling locations have been established for consistent measurement of pH, status of aquatic organisms, and soil nutrients. The three sampling locations are:

1. immediately below the culvert carrying water from the TA-3 Steam Plant;

2. within the wetlands, approximately midway between the culvert and the end of the cattail-dominated areas; and

3. below the cattail-dominated areas where the water pools.

Aquatic Organisms

The water within the stream channel at the three above noted locations has been sampled for the presence or absence of aquatic organisms using an aquatic net. Table 1 records the results of the weekly sampling periods.

Table 1: Presence of Aquatic Organisms

Date	Culvert	Midpoint	Below Cattails
May 22, 1990	None	None	None
May 29, 1990	None	None	None
June 5, 1990	None	None	None
June 12, 1990	None	None	None
June 19, 1990	None	None	Diving beetles Tubicid worms
June 29, 1990	None	None	Diving beetles Water sliders Tubicid worms Mosquito larvae

In 1986, Wenzel and Kent (memo Wenzel and Kent to Olinger April 30, 1986) observed that the cattail marsh had a purifying function for the released effluents. They noted "the sterile environment upstream is replaced by a healthy aquatic system with many invertebrates after the water passes through the cattail marsh". As can be seen from Table 1, aquatic organisms were not found at the three sampling

locations immediately after the spill but were observed below the marsh within a month after the spill. This appears to be a pattern similar to the observations in 1986. Dip-net sampling to determine species and numbers of aquatic organisms will continue during the 1990 field season.

Vegetation

Seven photostations were established to visually record changes in the vegetation within the wetlands. Photographs were taken weekly from May 22 through June 12, 1990 and will be taken periodically throughout the next 3-4 months.

No damage to the cattails or grasses lining the stream channel was noted until approximately 10 days after the acid spill. At that time, the cattails within one meter of the stream channel were chlorotic, and many appeared dead. The damage extended the full length of the cattail marsh wherever acid came in contact with the plants. On July 3, 1990, the field crew noted that a few of the damaged cattails were sending up new shoots. Recovery is being monitored.

Within the next two months transects to determine species composition, cover, and density will be completed as part of the wetland characterization.

Animals

A trapping grid was established for live trapping of small and medium sized mammals from May 29 through June 13, 1990. The purpose was to examine animals for any potential acid burns and general condition. Four species of mammals were trapped, tracks of one species were noted, and one additional species observed. The species recorded included the least chipmunk, rock squirrel, meadow vole, vagrant shrew, raccoon, and mountain rabbit. All animals appeared to be in good condition.

There will be additional trapping periods during 1990.

Reptiles and Amphibians

Pit-traps to collect reptiles and amphibians have been established in Sandia Canyon on the perimeter of the wetland for a evaluation of wetland utilization by these organisms. Within the last two months, three species of lizard (skink, eastern fence lizard and plateau whiptail), one species of

snake (garter snake) and one species of amphibian (canyon treefrog) have been noted within Sandia Canyon. No tadpoles of any amphibians have been collected in Sandia Canyon. The acid spill came at a time when the tadpoles were hatching in other canyons.

Birds

A qualitative survey of bird species had been conducted in Sandia Canyon in 1986 (memo Wenzel and Kent to Olinger, April 30, 1986). Several species recorded in 1986 were also observed 1990. Of particular note were nesting pairs of the American kestrel and the red-winged blackbird. A systematic inventory of bird species utilizing the wetland will be done within the next two months.

pH Measurements

The pH of water flowing in and through the wetlands was measured by Pan Am World Services immediately after the spill with a pH of below 2 recorded. (Action to neutralize the acid spill was immediately undertaken.) The pH within the wetland has been recorded on a weekly basis by members of the Ecological Team at the three sampling stations from May 29 to the present. The pH ranged from 6.5 to 8.0 for the sampling period. Measurement of pH within the wetland will continue throughout the remainder of the 1990 field season.

Soils

Soils were collected at the three sampling stations on June 19, 1990, to determine condition of the soils within the channel, within the cattail damaged area and within a control area. Soils are being submitted for metal and nutrient analysis.

Summary

May 22, 1990, a study was initiated in Sandia Canyon to monitor pH, aquatic organisms, soils and vegetation within the wetland downstream from the TA-3 Steam Plant. In addition, reptiles, amphibians and mammals utilizing the wetlands are being recorded. This study was designed to provide post-acid spill data.

The study shows that immediately after the spill the entire stream was devoid of aquatic organisms. Additionally, within

10 days after the incident, vegetation within 1 meter of the stream was chlorotic and appeared dead. To date, there appears to be recovery of some aquatic organisms in the stream below the cattail marsh but not within or above the marsh. Some damaged cattails along the stream bank are sending up new shoots. The wetlands will continue to be monitored for the remainder the of the 1990 field season.

DG:TF:smm

Cy: R. Ferenbaugh, HSE-8, MS K490
S. Rae, HSE-8, MS K490
R. Vocke, HSE-DO\ER, MS K491
Circ. File