7/25/96

IKE,

AFTER REVIEWING THE CHEMISTRY DATA SUPPLIED BY WBN THE FOLLOWING CONCLUSIONS CAN BE REACHED.

1. WHEN CONDENSATE POLISHING WAS REDUCED FROM 4 TO 1 POLISHERS IN SERVICE THE S/G BLOW DOWN SODIUM REDUCED FROM AVG. OF ≃ 8 ppb TO 2-3 ppb.

2. AT 2-3 ppb SODIUM WE CAN INJECT ACCEPTABLE LEVELS OF AMMONIA CHLORIDE TO PRODUCE NUTURAL CREVICE CONDITIONS OR MOLAR RATIO'S OF < :6

3. SULFATE LEVELS ELEVATED TO LEVELS OF 10-11 ppb SULFATE WHEN THE NUMBER OF CONDENSATE POLISHERS WAS REDUCED FROM 4 TO 1 POLISHERS IN SERVICE.

TVA Exh. 105

4. A CONDENSER TUBE LEAK WOULD HAVE THE SAME OR VERY SIMILAR RATIO'S OF Na, SO_4 AND Cl^- AS S/G BLOW DOWN WHEN A CONDENSER TUBE LEAK OCCURS. ATTACHED IS THE ONLY RIVER WATER ANALYSIS DATA DAVE VOLLAR PROVIDED.

WHEN POLISHERS ARE BY PASSED

NUCLEAR REGULATORY COMMISSION

Docket No. 01-791-01 Official Exh. No. TVA 105

In the matter of TVA

Staff		IDENTIFIED	✓
Applicant		RECEIVED	✓
Intervenor		REJECTED	
Other		WITHDRAWN	
DATE	9-10-02	Witness	Goetcheus
Clerk	R. Davis		

DOCKETED
USNRC

2003 MAR 10 PM 1:23

OFFICE OF THE SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

5. THE PROBLEM I HAVE IS THE CHLORIDE LEVELS ~~ARE~~ (IN B.D.) ARE NOT CONSISTANT WITH THE RIVER WATER RATIO'S. DAVE VOLLAR IS TRYING TO GET ME A LATER RIVER WATER ANALYSIS. IF THE REPORTED CHLORIDE LEVELS OF 2-3 ppb ARE CORRECT ANALYSIS, THE CONCLUSION WOULD BE THE ELEVATED SULFATE LEVELS IN S/G BLOW DOWN ARE NOT FROM A CONDENSER TUBE LEAK BUT WE WOULD HAVE TO LOOK A CONDENSATE POLISHER REGEN TO SEE IF THE SULFATE INCREASE IS THE RESULT OF RINSE DOWNS TO THE CONDENSER HOTWELL.

6.
- YESTERDAY A.M. I WAS TOLD S/G BD CHLORIDE WAS ≃ 2.5 ppb AVG.
- AT NOON I WAS TOLD CHLORIDE IN S/G BD WAS 10 ppb
- AT 1:830 I WAS TOLD S/G BD CHLORIDE WAS 3 ppb AVG.
- IF RIVER CHLORIDE WAS THE SAME AS OR LESS THAN RIVER SODIUM THIS COULD EXPLAIN THE SITUATION.

7. REGARDLESS, WITH CONDENSATE POLISHERS BYPASSED, EXCEPT ONE INSERVICE, THE BEST CHEMISTRY LEVELS YET HAVE BEEN OBTAINED

8. SULFATE LEVELS AND SODIUM LEVELS WILL BE FURTHER REDUCED BY BLOWING DOWN TO THE RIVER. THIS COULD REDUCE Na^+ & SO_4 LEVELS TO VERY ACCEPTABLE VALUES.

9. MOLAR RATIO CONTROL NEEDS TO BE IMPROVED TO OFFSET THE AFFECTS OF SODIUM

10. HOTWELL D.O. IS NOT THE RESULT OF CST MAKE UP. I RECOMMEND WE BRING SQN EXPERTISE UP TO WBN TO RESOLVE THE D.O. ISSUE. WBN HAS NOT RESOLVED THIS IN MORE THAN A MONTH

11. WBN NEEDS TO IMPLEMENT BORIC ACID AND ETA AS SOON AS HOTWELL D.O. IS FIXED. THEY CURRENTLY ARE NOT READY TO IMPLEMENT. I WOULD RECOMMEND SAM HARVEY (CORP. CHEM) BE ASSIGNED TO WBN TO SUPPORT ETA & BORIC ACID IMPLEMENTATION

FC 000003

12. PLEASE FIND THE ATTACHED ACTION PLAN I PUT TOGETHER FOR RICK PURCELL 7/9/96

13. IF WE CAN RUN WITH S/G BD SODIUM AT 2-3 ppb WITH MOLAR RATIO CONTROL AND SULFATES AT 10 ppb UNTIL WE FIND THE SOURCE OF SULFATE (CONFIRM CONDENSER TUBE LEAK) WE SHOULD BE ABLE TO CONTINUE OPERATION WITH OUT FURTHER DAMAGEING THE S/G. I THINK AT THIS POINT THE SULFATES AND SODIUM WILL REDUCE WITH BLOW DOWN ALIGNED TO THE RIVER TO VERY ACCEPTABLE LEVELS,

(OR CONDENSATE POLISHER RINSE DOWN TO HFW)

I HAVE ATTACHED THE TREND CHARTS WE PUT TO FOLLOW WBN CHEMISTRY FOR BLOWDOWN Na, Cl, SO_4 AND H.W. DO, I'LL CALL AS SOON AS I TALK TO WBN.

DAVID GOERTHELS

7/9/96

CORRECTIVE ACTIONS TO REDUCE S/G SODIUM AND SULFATE LEVELS

- Current Na exposure level exceeds 3360 ppb hours associated with action Level 1 (7 days @ 20 ppb)
- The potential for initiation of S/G tube outside diameter stress corrosion cracking is very high

Action	Basis
1. Blowdown to river to reduce levels of Na and SO_4	→ Currently Na and SO_4 from blowdown are diluted 10:1 and not effectively reducing Na and SO_4 levels in secondary system. **Prerequisite Actions** 1. Ecolochem trailer capacity must be 300GPM minimum and have enough additional capacity to support condensate polisher regenerations 2. CST N_2 sparging capability 3. CST DO < 100 ppb 4. CST and DMW storage tank levels 5. Procedures ready
2. SF-6 and Helium leak check condenser water boxes.	**Basis** → Sodium and Sulfate levels in Hotwell indicate condenser tube leaks. → Total exposure to ≈ 10 ppb Na for extended period of operation will produce caustic conditions in S/G crevice and tubesheet areas that will initiate ODSCC. **Prerequisite Actions** 1. Have SF-6 and He leak testing expertise on site (SQN or contractor)

2. SF-6 and Helium leak check condenser water boxes

Prerequisite Actions

2. SF-6 and He testing procedures
3. OPS procedures to drain and tag H_2O box
4. Establish stable down-power conditions to isolate water boxes
5. Maintenance equipment and procedures to open, test and plug condenser tubes
6. ECT test equipment and personnel to test leaking tubes (ISO)
7. Be prepared for refilling and draining second water box
8. Establish a HIT team (Operations, Chemistry, Maintenance, Tech Support, and ISO)

Basis

3. Reduce number of condensate polishers in service to reduce ionic slip associated with high temp. condensate conditions and regeneration separation problems

Ionic slip due to high condensate temp. and regeneration separation issues inherent to design contribute to S/G B.D. Na and SO_4 levels above industry and INPO criteria.

Prerequisites

1. Condensers leak tight (Action #2)
2. Identify polishers with most significant Na and SO_4 throw
3. Blowdown to river (Not 100%)

Basis

4. Provide additional technical support for site Chemistry manager

- WBN Chemistry manager and staff need experienced support to implement changes in secondary chemistry and to diagnose secondary system chemistry problems
- Short-term:
  - Rob Richie (SQN)
  - Sam Harvey (Corporate)

ACTIONS TO BE TAKEN TO REDUCE POTENTIAL FOR S/G TUBE DEGRADATION ASSOCIATED WITH S/G B.D. Na AND SO4 LEVELS

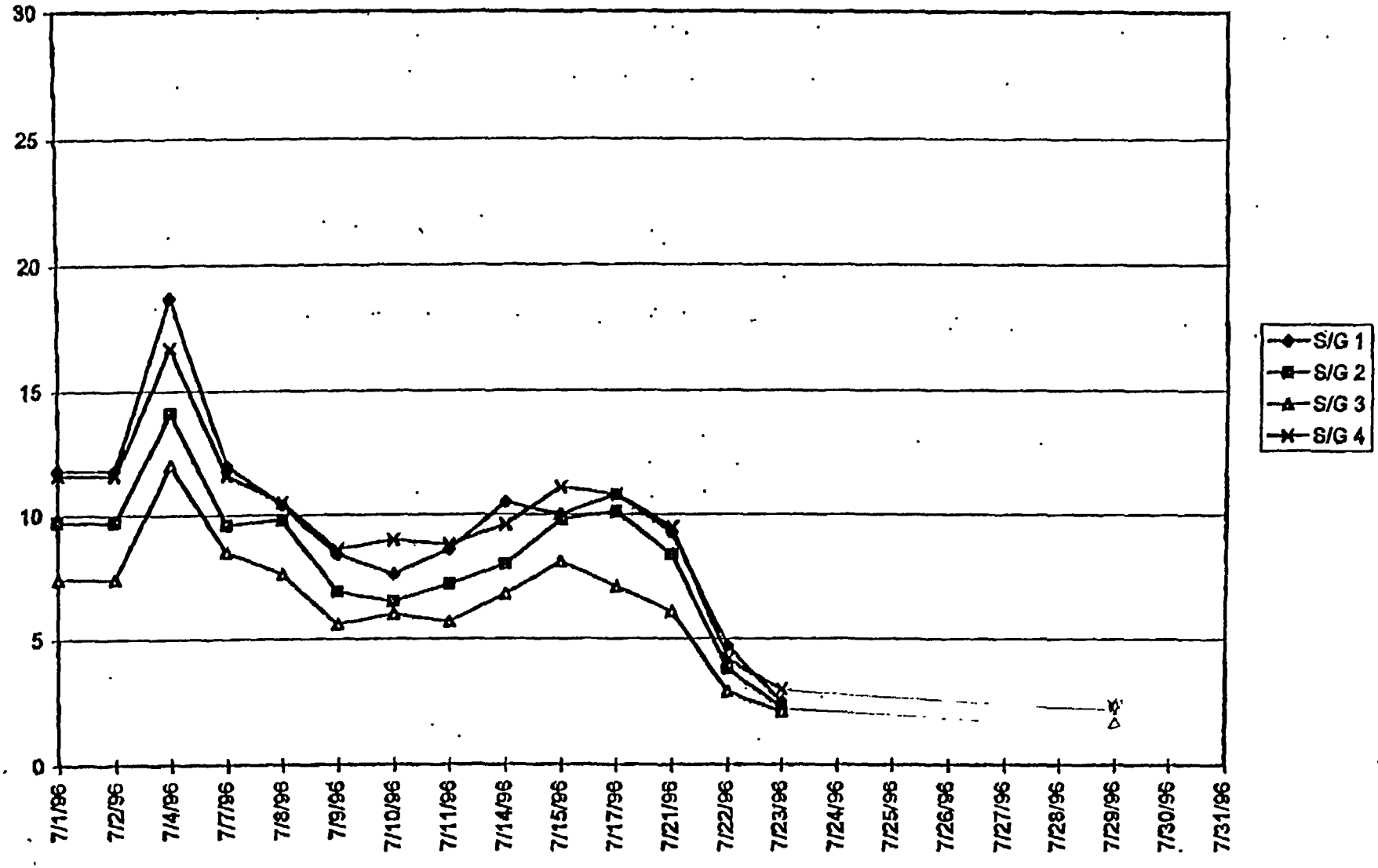
	Action	Basis
1.	Initiate molar ratio control	→ Reduce or minimize the effects of Na ingress → Correct molar ratio will produce neutral crevice and sludge pile conditions. **Prerequisites** 1. Procedures 2. Equipment 3. Materials 4. Keep Cl to < 12 ppb
		Basis
2.	Add Boric Acid to secondary system	→ Inhibits ODSCC in S/G due to caustic conditions → Controls (slows) growth of ODSCC → Improved ECP to reduce corrosion
3.	Add ETA to secondary chemistry	→ Minimize Fe transport to S/G and prevents corrosion due to sludge
4.	Run high Hydrazine	→ Improves ECP to reduce S/G corrosion → Produces reducing conditions in S/Gs
5.	Sludge Lance	→ Removes sludge from top of tubesheet and aggressive ionic impurities that cause S/G tube corrosion

Action		Basis
6. Hot soaks to remove sodium, chloride and sulfate from crevice and sludge pile area	→	Removes sodium, chloride, and sulfate from tubesupport plate an top of tubesheet

W\a\Presentation\WBSGActn

WBN S/G Chemistry

Sodium - July 1996



7/24/96

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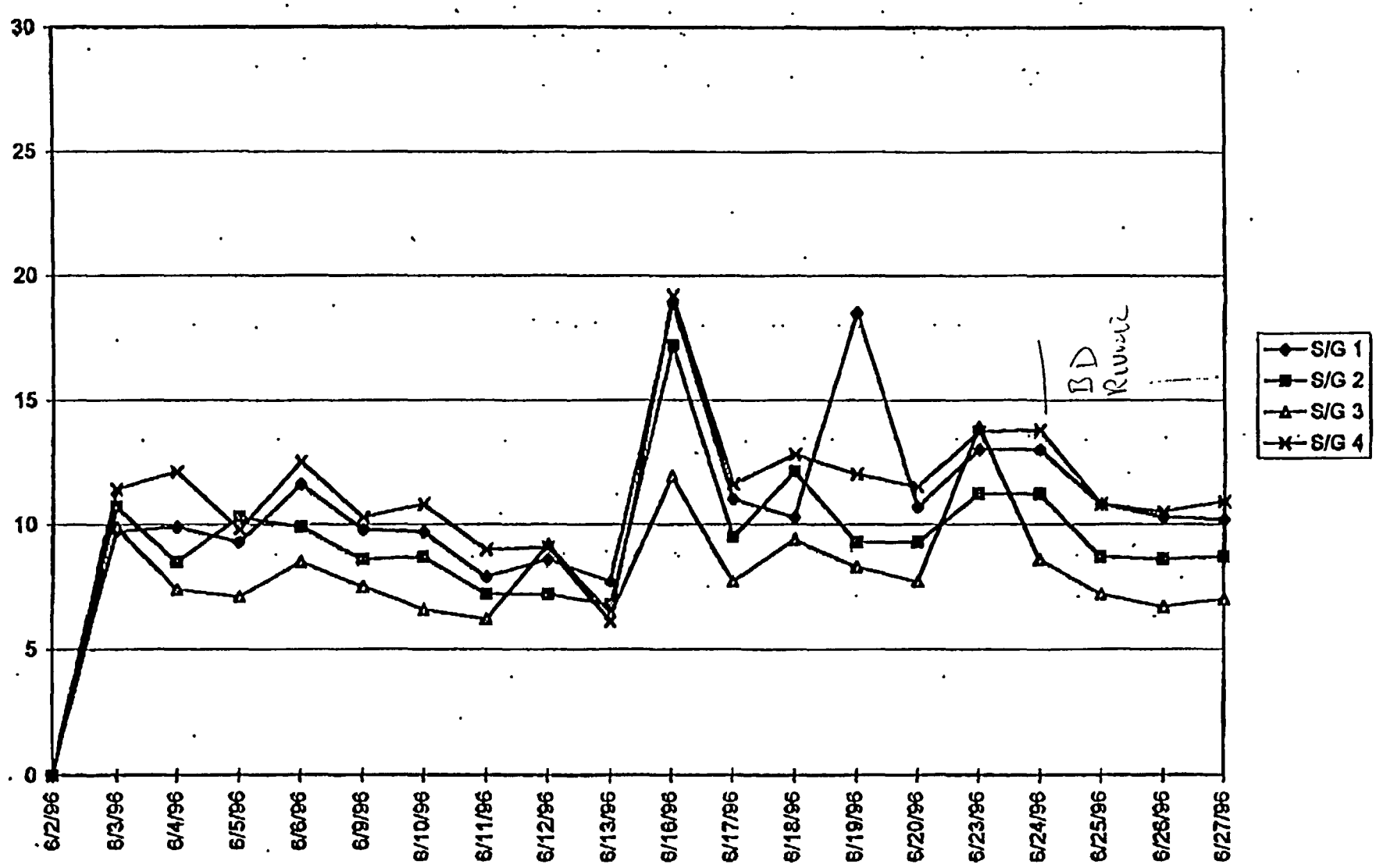
WBN S/G Chemistry

Sodium - June 1996



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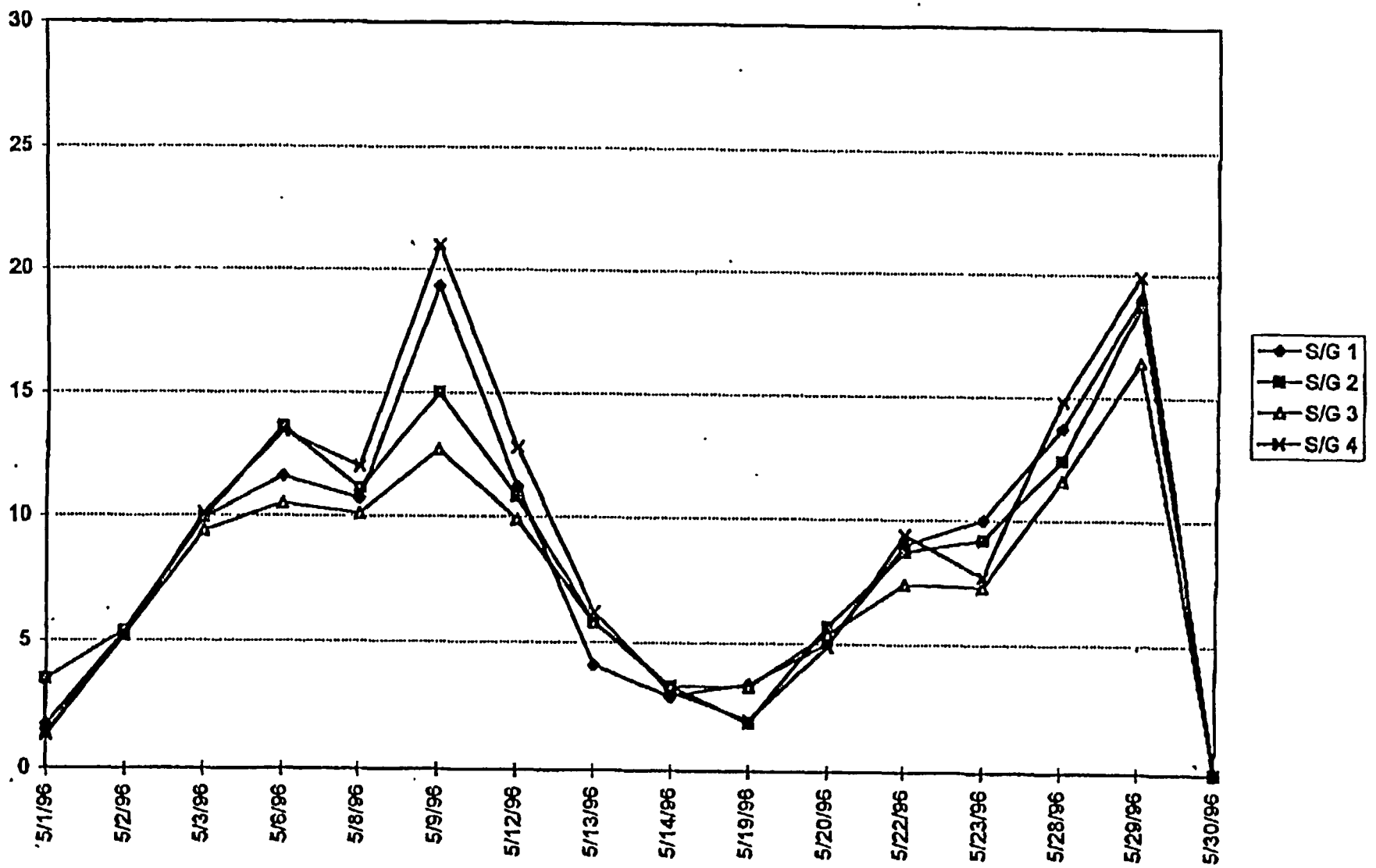
WBN S/G Chemistry

Sodium - May 1996



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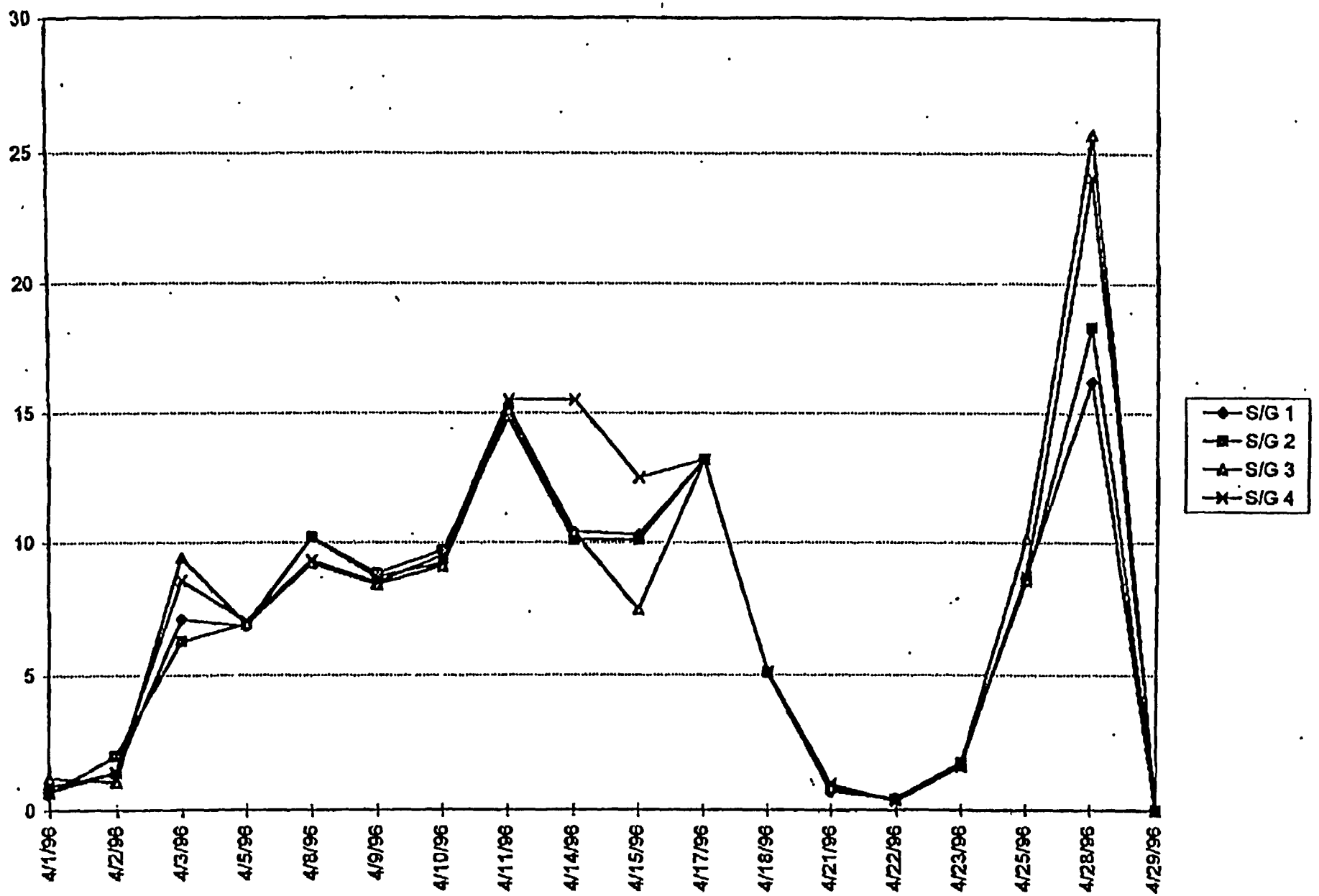
WBN S/G Chemistry

Sodium - April 1996



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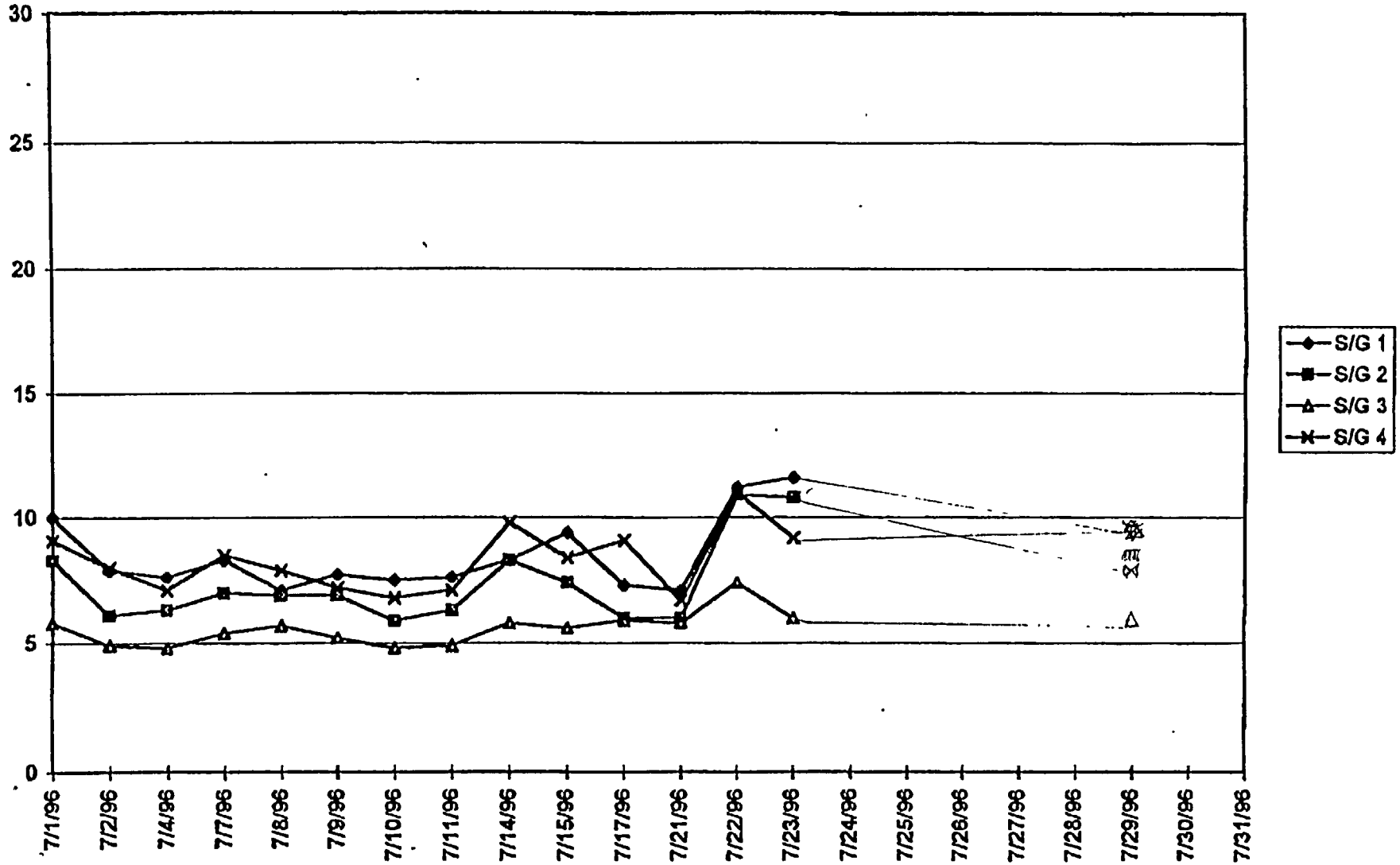
WBN S/G Chemistry

Sulfate - July 1996



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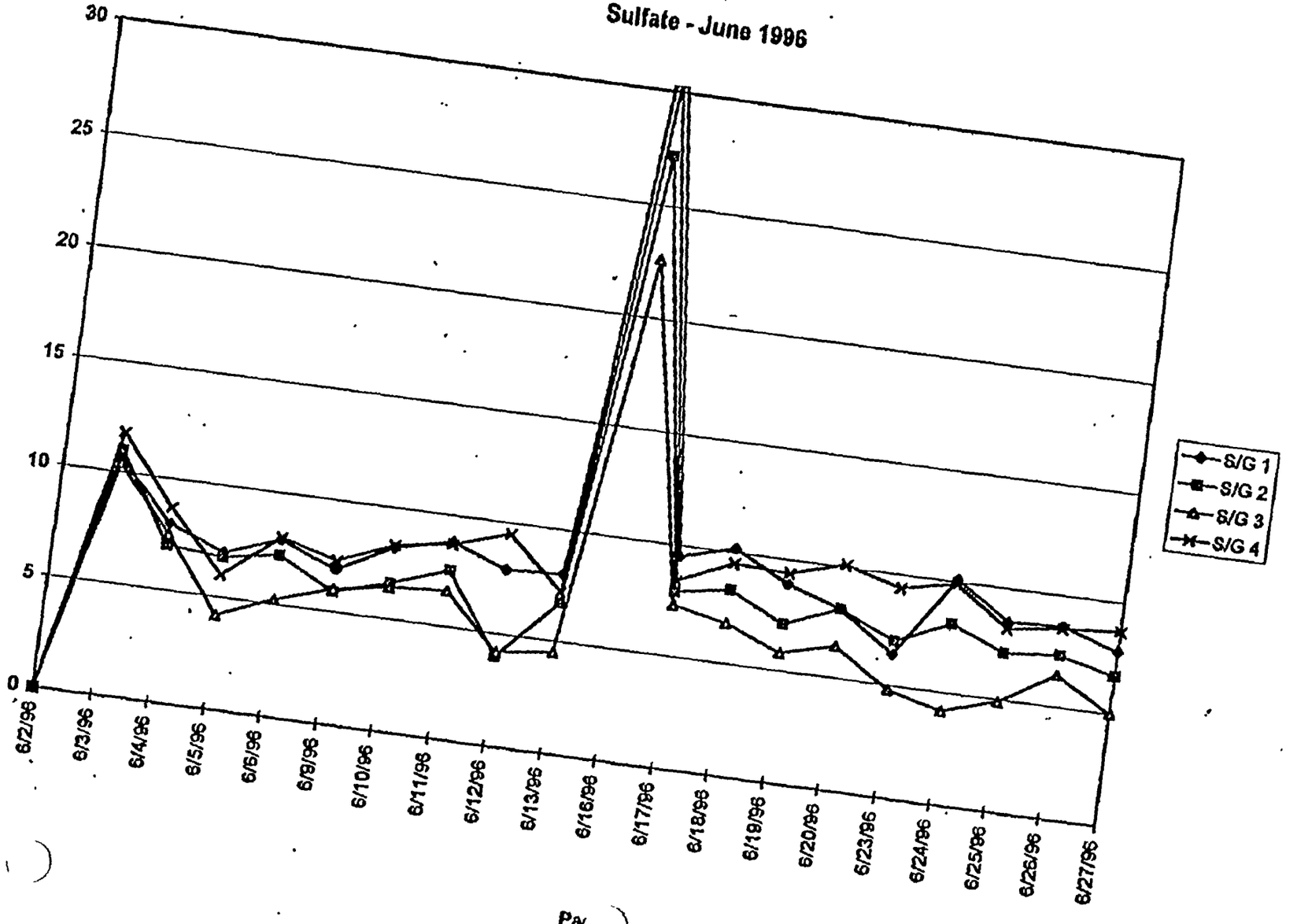
WBN S/G Chemistry

Sulfate - June 1996



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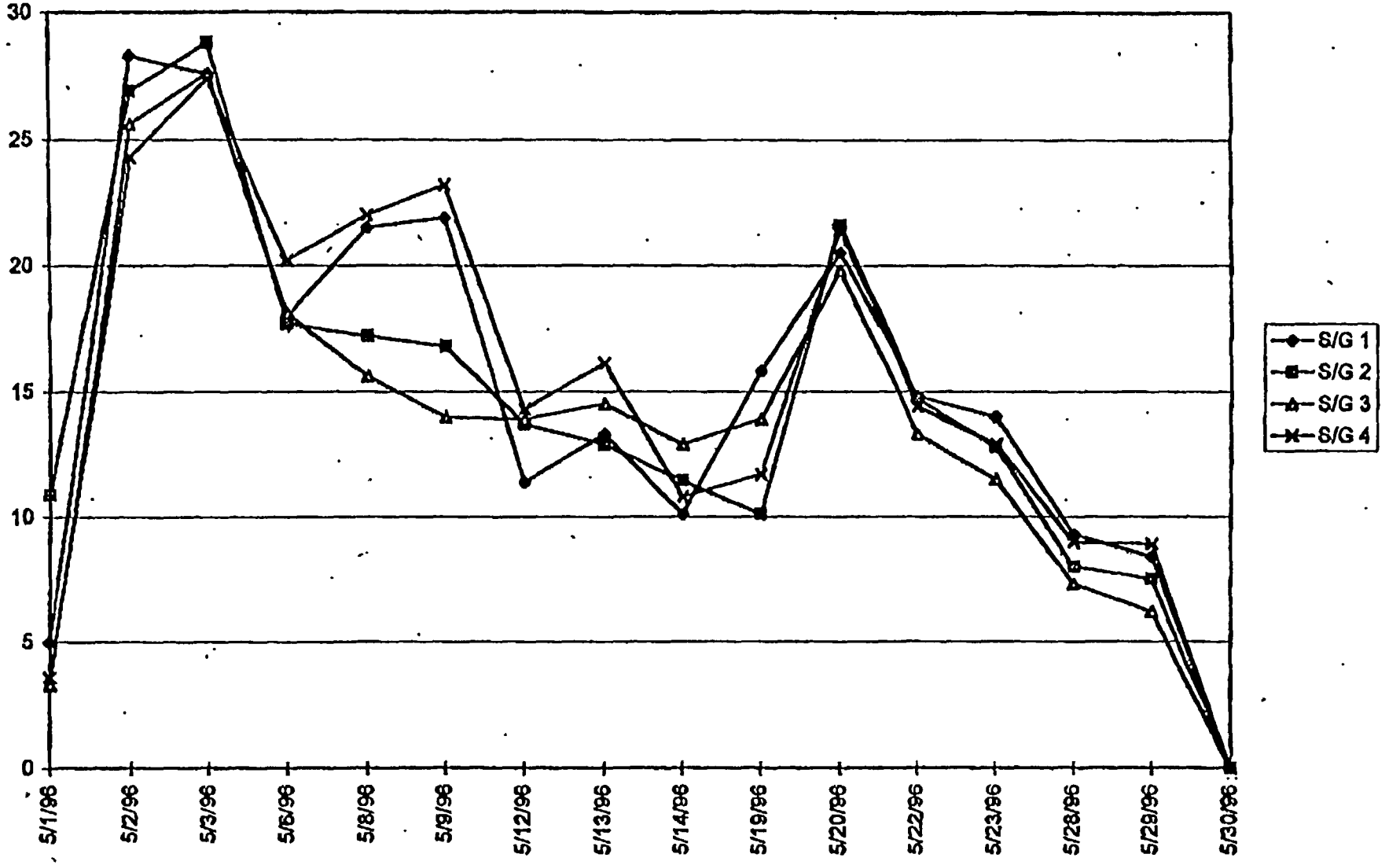
WBN S/G Chemistry

Sulfate - May 1996



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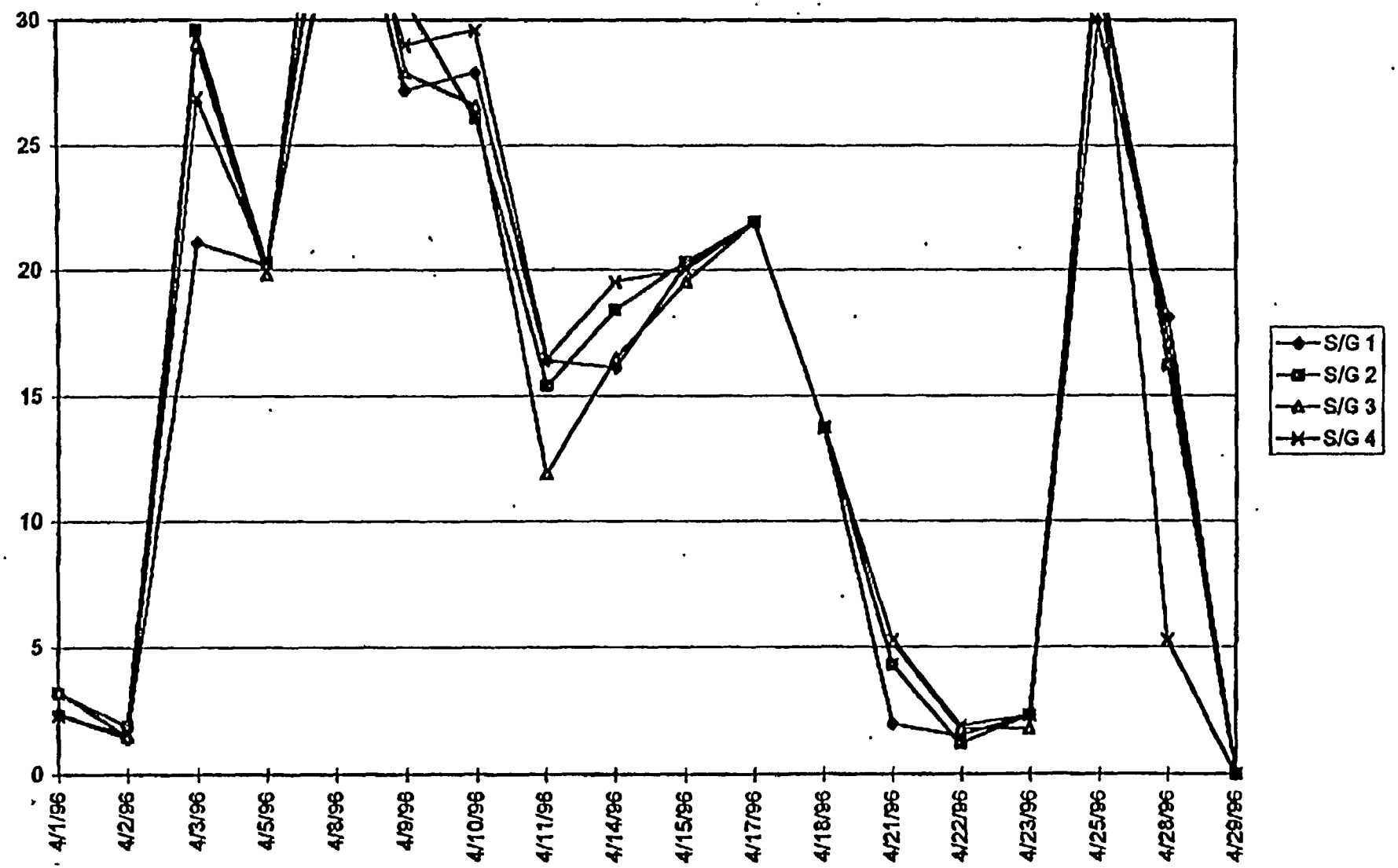
WBN S/G Chemistry

Sulfate - April 1996



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