



CARL T.C. GUTIERREZ
GOVERNOR OF GUAM

OFFICE OF THE LEGISLATIVE SECRETARY	
ACKNOWLEDGMENT RECEIPT	
Received By	<i>Tom Guzmata</i>
Time	<i>4:00 p.m.</i>
Date	<i>4-9-98</i>

APR 09 1998

Refer to
Legislative Secretary

The Honorable Antonio R. Unpingco
Speaker
Twenty-Fourth Guam Legislature
Guam Legislature Temporary Building
155 Hesler Street
Agana, Guam 96910

Dear Speaker Unpingco:

Enclosed please find a copy of Substitute Bill No. 487 (COR), "AN ACT TO ADD A NEW CHAPTER 14 TO DIVISION 1 OF TITLE 12 OF THE GUAM CODE ANNOTATED, RELATIVE TO ESTABLISHING A DROUGHT MEASUREMENT AND COMPREHENSIVE WATER CONSERVATION PLAN", which I have signed into law today as **Public Law No. 24-161**.

On March 18, 1998, I directed the various departments and agencies of the government to implement the Drought Preparedness & Response Plan adopted by the Drought Response and Water Utilization Coordinating Committee, created on October 14, 1997 by Executive Order No. 97-25.

Substitute Bill No. 487 adopts by statute the U. S. Navy Public Works Center's Water Conservation Levels established by USCINCPAC REP GUAM/CNMI/FSM/ROP INSTRUCTION 11330.1, including any amendments to this instruction, as Guam's drought condition standards and levels of severity.

This legislation provides for the development and adoption of standards for low groundwater (water wells) level conditions, plus severity alert phases. Guam Waterworks Authority is also directed to develop rules and regulations on various water conservation measures and penalties for violating these measures

00739

Office of the Speaker
ANTONIO R. UNPINGCO
Date: *4-9-98*
Time: *4:30*
Rec'd by: *[Signature]*
Print Name: *Charlene Dizon*

This legislation also provides for monitoring and maintaining the integrity of Guam's Northern Lens by both government agencies and by the Water and Energy Resource Institute ("WERI") of the University of Guam..

Very truly yours,



Carl T. C. Gutierrez

Attachment 9:439

cc: The Honorable Joanne M. S. Brown
 Legislative Secretary

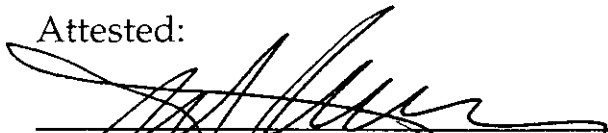
TWENTY-FOURTH GUAM LEGISLATURE
1998 (SECOND) Regular Session

CERTIFICATION OF PASSAGE OF AN ACT TO THE GOVERNOR


This is to certify that Substitute Bill No. 487(COR), "AN ACT TO ADD A NEW CHAPTER 14 TO DIVISION 1 OF TITLE 12 OF THE GUAM CODE ANNOTATED, RELATIVE TO ESTABLISHING A DROUGHT MEASUREMENT AND COMPREHENSIVE WATER CONSERVATION PLAN," was on the 27TH day of March, 1998, duly and regularly passed.


ANTONIO R. UNPINGCO
Speaker


Attested:


MARK FORBES
Senator and Acting Legislative
Secretary

This Act was received by the Governor this 3rd day of April, 1998, at
10:30 o'clock 9 .M.


Assistant Staff Officer
Governor's Office

APPROVED:


CARL T. C. GUTIERREZ
Governor of Guam

Date: 4-9-98

Public Law No. 24-161

TWENTY-FOURTH GUAM LEGISLATURE
1998 (SECOND) Regular Session

Bill No. 487 (COR)

As substituted on the Floor.

Introduced by:

J. M.S. Brown
T. C. Ada
F. B. Aguon, Jr.
A. C. Blaz
Felix P. Camacho
Francisco P. Camacho
M. C. Charfauros
E. J. Cruz
W. B.S.M. Flores
Mark Forbes
L. F. Kasperbauer
A. C. Lamorena, V
C. A. Leon Guerrero
L. Leon Guerrero
V. C. Pangelinan
J. C. Salas
A. L.G. Santos
F. E. Santos
A. R. Unpingco
J. Won Pat-Borja

**AN ACT TO ADD A NEW CHAPTER 14 TO
DIVISION 1 OF TITLE 12 OF THE GUAM CODE
ANNOTATED, RELATIVE TO ESTABLISHING A
DROUGHT MEASUREMENT AND
COMPREHENSIVE WATER CONSERVATION
PLAN.**

1 to these dry periods.

2 (c) The effects of *El Nino* on Guam's wet and dry seasons have
3 been significant. The 1982-1983 event, which cost global damage estimated
4 at Thirteen Billion Dollars (\$13,000,000,000) and claimed nearly two
5 thousand (2,000) lives, was one (1) of Guam's most severe dry period.
6 During this period, the Island's municipal water system was unable to
7 adequately meet Island-wide water demands, particularly for fire fighting.
8 Severe water shortages and outages were experienced in the villages of
9 Merizo and Umatac as springs and surface water sources dried up. While
10 a less severe *El Nino* drought followed in 1986, which lasted through 1987,
11 the Guam Waterworks Authority ('GWA') fell short of meeting normal
12 daily water demands. A prolonged *El Nino* event from 1991 to 1995 again
13 resulted in the Island's water system's inability to meet demands during
14 abnormally dry spells. The Island's current water system is not able to
15 meet current peak demands and will have a difficult time meeting future
16 non-peak demands without development of additional water source
17 alternatives.

18 (d) Because previous *El Nino* events have been met with short-term
19 crisis, intervention measures, such as water rationing and scheduled water
20 outages, it is recognized that a long-term water resource management plan
21 is non-existent. The lack of such a plan increases the Island's vulnerability
22 to drought or water shortages due to extremely dry conditions. Since the
23 scientific community has now come to understand that *El Ninos* are cyclical
24 in nature and that certain weather changes are predictable, a plan is
25 imperative so that management and allocation of our finite water resources

1 be balanced among the populace whenever disruptions in weather
2 conditions and normal rainfall patterns threaten the availability of our
3 water supply.

4 (e) While the Territorial Emergency Plan maintained and
5 administered by the Guam Civil Defense includes 'drought' or 'water
6 shortages' in its definition, the scope of the plan in this regard does not
7 define, in specific terms and standard terminology, factors that trigger a
8 drought condition, the severity of the conditions, and actions or measures
9 to employ for each phase of severity.

10 (f) Because of the physical size and remoteness of Guam, it is
11 imperative that the utilization of water resources among the military and
12 civilian sectors be fair and equitable, and that measures employed to
13 mitigate the effects of water shortages due to drought must be done so
14 uniformly among the various sections of our Island community. No such
15 plan exists to ensure uniformity and equity in the administration of water
16 crisis mitigation measures.

17 **Section 14303. Adoption of Drought Condition Standards and**
18 **Low Groundwater Level Conditions and Severity Alert Phases.**

19 (a) Fena Reservoir, owned and operated by the U. S. Navy Public
20 Works Center ('PWC'), is the largest source of potable surface water supply
21 on Guam. Currently, government of Guam's overall water production
22 includes purchases of approximately seventy percent (70%) of Fena
23 Reservoir's total production, and thus negative changes in Fena's water
24 level reduces GWA's overall water supply for civilian users. Therefore,
25 PWC's Water Conservation Levels ('WCL'), established by USCINCPAC

1 REP GUAM/CNMI/FSM/ROP INSTRUCTION 11330.1, including any
2 amendments thereto, are hereby adopted as the Island's drought condition
3 standards and levels of severity, and are to be made an integral part of the
4 Guam Drought Management and Comprehensive Water Conservation
5 Plan.

6 (b) Concurrently, and in addition to adoption of PWC's Fena-level
7 WCL, standards for low groundwater (water wells) level conditions, plus
8 severity alert phases, shall be developed and adopted as an integral part of
9 the Guam Drought Management and Comprehensive Water Conservation
10 Plan.

11 **Section 14304. Governor's Powers.** The Governor shall, due to the
12 emergency drought conditions existing on Island, immediately develop the
13 Guam Drought Management and Comprehensive Water Conservation Plan
14 to respond to water crises and water shortages. Said plan shall be filed
15 with the Guam Legislature no later than April 15, 1998 and shall be
16 implemented on the filing date. The Guam Legislature may approve,
17 disapprove or modify the plan.

18 **Section 14305. Implementing Rules and Regulations.** GWA shall
19 enact the rules and regulations, which shall include: steps for instituting
20 conservation measures and the interruption of the water supply;
21 procedures for the protection of water resources pursuant to GWA's
22 statutory role as operator of Guam's sole municipal water and wastewater
23 systems; mandatory restrictions and procedures for control of water use
24 during water shortages; procedures to alert the community on the severity
25 phases pursuant to §14303 of this Article; and penalties for violations of the

1 rules and regulations.

2 **Section 14306. Coordination, Guam Environmental Protection**
3 **Agency, Private Well Owners, and Military.** The Guam EPA, in
4 coordination with GWA, the Department of Commerce, and all private and
5 military well owners and operators, shall collect salinity and chloride on a
6 monthly basis during drought conditions for use in determining low
7 groundwater level conditions as required in §14303(b) of this Chapter and
8 other such data as may be deemed necessary to monitor and maintain the
9 integrity of Guam's sole source aquifer, the Northern Lens. GEPA's
10 determination that drought condition exist shall be based on the best
11 scientific advice from WERI, National Weather Service, National
12 Oceanographic Atmospheric Administration and other appropriate
13 agencies, that a rise in Pacific Ocean temperatures is indicative of the onset
14 of drought conditions on Guam."

15 **Section 2. Comprehensive Monitoring Program.** Henceforth, the Water
16 and Energy Resource Institute ("WERI") of the University of Guam shall conduct
17 and administer a Comprehensive Monitoring Program regarding data collection
18 on salt water intrusion, water lens thickness in the northern part of Guam, stream
19 flow data in the southern part of Guam and related matters. Said program shall
20 be administered in conjunction with the United States Geological Survey
21 ("USGS") and monitoring program.

22 **Section 3.** There is hereby appropriated from the General Fund to the
23 Water and Energy Research Institute ("WERI") of the University of Guam the
24 sum of Three Hundred Twenty Thousand Dollars (\$320,000.00) to provide for the
25 immediate reinstatement and administration of the Comprehensive Monitoring

- 1 Program with the United States Geological Survey ("USGS") and WERI's
- 2 obligations related thereto."



Office of Senator
Joanne M. Salas Brown
Twenty-Fourth Guam Legislature

March 11, 1998

Speaker Antonio R. Unpingco
Twenty-Fourth Guam Legislature
155 Hesler Street
Agana, Guam 96910

Dear Speaker Unpingco:

The Committee on Natural Resources, to which **Bill 487(COR) An Act to Add a New Article 3 to Chapter 14, Title 12 of the Guam Code Annotated Relative to Establishing a Drought Measurement and Comprehensive Water Conservation Plan** was referred, wishes to report back to the Legislature its recommendation **TO DO PASS**.

The voting sheet is as follows:

TO PASS	<u>9</u>
NOT TO PASS	<u>0</u>
ABSTAIN	<u>0</u>
TO PLACE IN INACTIVE FILE	<u>0</u>

Copies of the Committee Report and other pertinent documents are enclosed.

Thank you for your attention to this matter.

Sincerely,

JOANNE M. S. BROWN
Senator

Enclosures



Office of Senator
Joanne M. Salas Brown
Twenty-Fourth Guam Legislature

March 11, 1998

MEMORANDUM

To: Committee Members

From: Chairperson, Committee on Natural Resources

Subject: Bill 487(COR) An Act to Add a New Article 3 to Chapter 14, Title 12 of the Guam Code Annotated Relative to Establishing a Drought Measurement and Comprehensive Water Conservation Plan

Transmitted herewith for your consideration and action is our Committee Report on the above subject matter.

Please indicate your choice on the Attached Voting Sheet and return the documents to my office for transmittal to the other members.

Should you have any questions on the narrative report on the accompanying documents, I would be most happy to answer them.

Your attention and cooperation in this matter is greatly appreciated.

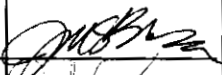
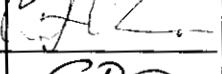
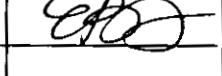
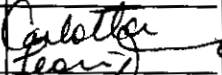

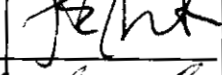
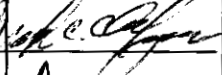




JOANNE M. S. BROWN

Attachments

Committee on Natural Resources
Joanne M.S. Brown
Chairperson

VOTING SHEET

Committee Report Bill 487(COR)

COMMITTEE MEMBERS	TO DO PASS	NOT TO PASS	ABSTAIN	TO PLACE IN INACTIVE FILE	SIGNATURE
Joanne M.S. Brown Chairperson	✓				
Tony Lamorena Vice Chairman	✓				
E. Barrett-Anderson Member	✓				
Tom Ada Member					
C. Leon Guerrero Member	✓				
Mark Forbes Member	✓				
Francis Santos Member	✓				
M. Charfauros Member	✓				
Anthony Blaz Member	✓				
J. Won Pat-Borja Member	✓				
A.R. Unpingco Speaker Ex-Oficio Member					

Committee on Natural Resources

Public Hearing on

Bill No. 487(COR)

An Act to add a New Article 3 to Chapter 14, Title 12 of the Guam Code Annotated Relative to Establishing a Drought Measurement and Comprehensive Water Conservation Plan.

Committee Report

The Committee on Natural Resources held a public hearing on Bill No. 487(COR), 'An act to Add a New Article 3 to Chapter 14, Title 12 of the Guam Code Annotated Relative to Establishing a Drought Measurement and Comprehensive Water Conservation Plan' on Thursday, March 5, 1998.

Present were: Senator Joanne M. S. Brown, Chairperson
 Senator Frank B. Aguon, Jr.
 Senator Frank Camacho
 Senator Lawrence Kasperbauer

Senator Brown thanked everyone for their attendance despite their heavy schedule and began the hearing with testimonies relative to Bill No. 487. She called Dr. Leroy Heitz to begin the testimony and asked Mr. John Rosario, Mr. Jordan Kaye, Mr. Bert Johnston, and Dr. H. G. Siegrist to join the group.

Senator Frank Aguon was introduced.

Dr. H. G. Siegrist, Jr., Director of the Water & Energy Research Institute (WERI) of the Western Pacific, University of Guam, read his testimony in support of Bill No. 487(COR). He stated that WERI is contributing a share to solving what could easily evolve into a major water crisis, and considers this a serious business. His testimony pointed on various areas that can be affected through the El-Nino drought and called upon our legislators to make some tough decisions to protect our water supplies. (See attached for complete testimony)

Dr. Leroy Heitz, Water Resources Engineer and Researcher, also from the Water and Energy Research Institute (WERI) stated that the El Nino drought that is affecting our part of the Pacific is one of the strongest droughts in this century. He pointed out that as growth in demand stretches our fresh water supply more and more thinly, relative modest droughts will have increasingly severe effects on our island's water supply. Congratulated the committee on its efforts in the development of a formalized drought response plan for our island. Feels that the bill could be substantially strengthened if direct economic incentives were added to the strategies for promoting conservation, otherwise it would not be effective. Guam Waterworks Authority should be directed to develop such a conservation incentive rate structure as part of the total plan. In support of Bill No. 487 and hopes the committee will act favorably on their suggestions to strengthen this important bill.(See attached for complete testimony)

Senator Brown thanked Dr. Heitz for his testimony and called upon Mr. Johnston from the Guam Waterworks Authority.

Mr. Johnston asked of the Chair to have Mr. Clifford Guzman from the Governor's office join them and because of his tight schedule allowed him to go before him, and also, Mr. Roman Quinata, Acting Chairman, Guam Waterworks Authority, Board of Directors.

Mr. Clifford Guzman, Director, Bureau of Planning, stated he was there on behalf of the Governor to read his testimony. The Governor went on record in support of a new law to deal with the threat of a serious drought on Guam, and commended Senator Brown for introducing Bill No. 487(COR) which he endorses. (See attached testimony)

Senator Brown thanked Mr. Guzman for the Governor's written testimony and also extended her thanks to the Governor. She stated that there will be many issues which will be dealt with within the upcoming months, however, the issue of water resource and the protection of that and the insurance that our people are going to continue to have it rises above all issues. Appreciates the Governor for extending that hand of cooperation and will work with him in the upcoming months to implement this law when it gets in place and certainly brings up a very valuable point that the Governor has in his letter with regards to public outreach. There is not enough education out there and feels that we need to take the

disadvantage of this year and use it as an opportunity to get more public awareness out in the community because it is an issue that is going to face the community year after year.

Recognized Senator Aguon for any comments or questions for Mr. Guzman before he leaves.

Senator Aguon stated his biggest concern is:

- What needs to be done immediately to ensure that we can be able to have an effective water conservation program?
- What has to be done immediately and how can the community contribute to this process?

Mr. Guzman responded:

- The Drought Preparedness and Response Plan outlines some course of action in the immediate and long term.
- Community awareness and a concerted effort on everyone's part to make sure that conservation measures were imposed.
- On the economic development side, builders are being encouraged to use energy saving equipment.
- Everyone needs to do their part, and the Drought Preparedness and Response Plan submitted in its draft form will be an opportunity for everyone to work together to do what we can to make it better.
- WERI has been a big part of this and we are very pleased that they have been up front in their act of participation and congratulate them.

Senator Aguon commented that:

- The Executive Director of the Guam Hotel and Restaurant Association was posed a question by the students at the University of Guam with reference to conservation measures.
- The Executive Director responded to the students at the University of Guam that the hotels are already contributing to the conservation effort and they are all aggressive in terms of minimizing any excess use or unnecessary use of water here in our community.

- That needed to be said for the record.
- Feel very strongly that in addition to the Governor formulating a plan and having it implemented, from a personal viewpoint, it needs the reinforcement of law.
- Going to be a difficult decision on our part as policymakers, but it is a type of decision that we have to face. If we have to come together as a community, it may need to some extent a force of law so that our people can understand, and that there can be enforcement measures and mechanisms in place to ensure that conservation continues according to projected plans.

Senator Brown stated that Senator Aguon brought up a very valid point and further added:

- The crisis is upon us and have not put a lot of focus or interest with regards to our water resource.
- Evident in the amount of support in funding that is given to do the kind of research that needs to be done, but at the same time do not want to look at it as a disadvantage.
- This is a prime opportunity to get awareness out there.
- With regards to incentives, we can put penalties for just incentives, but need to also put benefits for incentives. Perhaps if consumers out in the community are using less water than on average then they normally do, perhaps, a certain percentage off their bill can be given.
- With the big hotels, perhaps with qualifying certificates, this has not been a priority in the past, can be amended to include that any construction or facilities particularly like the size of a hotel, doing 500-600 rooms who are major consumers, can be given a tax break or tax incentive if they put conservation measures into the construction of their hotels in terms of to the type of bathroom facilities that are used, that will reduce the amount of water consumed. This is an opportunity for us to get this awareness out there, set the standards, because the doctors from WERI are telling us this is not something we are not just going to deal with in 1998 and go away.
- Recognized the concern and it is a crisis issue at this point.

Senator Frank Camacho commented that he would like to be updated or made aware of some of the wells that the water levels has been going down. He mentioned that the water level in one of the wells located in the golf courses has gone down considerably and it is not even pumping. The signs are all out there evident of the drought crisis and we have to make sure that an island-wide participation in conserving water is there.

Senator Brown recognized Mr. Roman Quinata, Acting Chairman, Guam Waterworks Authority.

Mr. Quinata testified in support of Bill No. 487(COR). He stated Bill No. 487 is a very important piece of legislation and should have been introduced a long time ago. He further stated that a plan is just merely a plan with no guarantee of its implementation, but if a plan is required by legislation, the plan carries the force of law and must be implemented. Bill 487 requires the Guam Waterworks Authority to come up with a Drought plan and spell out in specific terms how water distribution and uses are to be managed during an emergency shortage, as well as what actions are needed to ensure that the plan is followed. It also empowers the Guam Waterworks Authority on behalf of the Government of Guam to take the lead in instituting measures for the wise use of water and to prevent waste and abuse of this vital resource. (See attached for complete testimony)

Senator Brown thanked Mr. Quinata, and also introduced Senator Larry Kasperbauer. To continue on with the testimonies, she called upon Mr. Herbert Johnston.

Mr. Johnston stated his name for the record and was there representing Mr. Richard Quintanilla, General Manager of the Guam Waterworks Authority. Mr. Johnston testified in support of Bill 487 and stated it is a timely piece of legislation that is long overdue. Bill 487 will allow the authority to implement a course of action that will mitigate the effects of a prolonged dry period this year as well as prepare itself for future adverse climatic situations taxing our islandwide water system. Appreciates the provisions of Sections 14304 and 14305 which grants the executive branch the authority to establish and implement mandatory restrictions and procedures for control of water use during severe shortages, as well as impose fines and penalties for violators of the restrictions. The urgency created by El Nino necessitates that the Governor's powers be broadened to

implement restrictive and punitive measures in the shortest time possible and asked that Section 14304 be revised so that the last sentence is replaced with the following: "The Governor shall proceed with implementation of such plan, when required, without further legislative approval or PUC regulations in coordination with the Guam Waterworks Authority." and asked that the following be added to Bill 487: "Section 14308. Authorization to accept Military Conveyance of U. S. Navy "Ace Corp" Well and U. S. Air Force Tumon Maui Well, and General Authorization to Establish Mutual Cooperation and Coordination for System Integration and Interoperability. (See attached for complete testimony)

Senator Brown thanked Mr. Johnston for his testimony and asked Mr. Jordan Kaye, Guam Environmental Protection Agency, (GEPA) if he was the chief representative from EPA to do a presentation.

Mr. Kaye apologized for the Administrator, Mr. Salas' absence, who was on a medical appointment and stated that the agency is in support of the bill and have no objections to it. GEPA will work with Guam Waterworks Authority to make sure it is implemented and put in place once it becomes law.

Senator Brown directed her inquiry to Mr. Johnston with reference to GWA's proposal with the incentives or penalties:

- Inquired if the amounts have been determined;
- Are they different classes in terms of users during household use, hotel operation use, is there anything set out already that GWA would like to propose, or is it something that will need to be incorporated in the bill itself, or is it still being worked on.
- Would not like to hold off the passage of the bill with regards to setting the conditions and standards needed for El Nino, but specifically be able to do the monitoring and enforcement work, is GWA imposing penalties?
- The other senators would like to see that a balance is done with reference to incentives for the people who go the extra effort to reduce the amount of water they consume.

Mr. Johnston responded:

- That the figures are being worked on, and agreed that penalties should be used as a last resort.
- GWA does not want to get in the business of being the water police. Would rather encourage people to take this under their own measures. Incentives are the right direction.
- The large water users have already taken those measures because it makes economic sense.
- It is the large residential customers that GWA needs to focus on and start providing incentives for them in terms of reworking the fixtures, and go after their misuse of water, get their behavior to be more water conscious.
- GWA does not like to use penalties and should be only there as a deterrent, but very carefully implemented.

Senator Brown inquired what is the timeline of when the penalties are to be completed so the committee members can look at them.

Mr. Johnston responded that it should be completed within a month.

Senator Brown referred to a question by Mr. Johnston that GWA should have an addition to the bill with regards to the procurement or acquisition of the Navy and Air Force well. She stated that:

- GWA would have to meet with all key players before the next session to discuss and come to some consensus on whether or not it is truly in our best interest to acquire those wells.
- Have reservations with the Navy and Tumon Maui well, especially, the Tumon Maui well because of concerns of contaminants in the well.
- Very apprehensive with the government of Guam acquiring property that will have to be dealt with issues of clean-up even though the Tumon Maui well does the air stripping process so the well will continue to supply water to the Andersen Air Force Base.
- This is a very serious issue and understands the desire of Guam Waterworks to obtain these properties, but at the same time wants to ensure that it is in the community's best interest that we acquire

property that we already have concerns with regards to contaminants. These are the issues that are going to accelerate the level of discussion in order to come to consensus is it in the best interest of our community to acquire property with known contaminants, otherwise, it will have to be addressed on a separate piece of legislation.

Senator Aguon inquired:

- What is the agency's request to reword the particular section which states "would grant the governor the opportunity to implement such a plan"?
- What is the status of the plan?
- Is it complete, or is it going to require an additional 2-3 weeks work?

Mr. Johnston responded that the draft copy of the plan had been submitted to the committee this morning.

Senator Aguon inquired:

- Is the draft is in its final form?
- What are we looking at in terms of time frame?

Mr. Johnston responded it is a draft, and again, should be completed within a month. The draft also gives the opportunity to be reviewed and give feedback to GWA.

Senator Aguon stated:

- Concern with the particular provision being placed in the draft plan because anytime a plan is formulated and penalties are going to be imposed, the other colleagues will come into play and should be provided with the final plan to review in order to make their decision.
- Understood the urgency of the situation at hand, however, he did not know that a draft plan had been provided to the committee and appreciated that as it would give the others the opportunity to review the plan.
- If the plan is completed before this particular proposal is entertained in session, the likelihood of it going through with the consent of his

colleagues would be much better in terms of being able to ensure a plan is consented to by the body itself.

- Another concern are the water leakages.
- What are we looking at in terms of water leakages that are under the jurisdiction of Guam Waterworks Authority?
- Are there aggressive efforts to ensure that at least all of them are discovered within the next 2-3 months?
- Has there been a plan implemented so that in fact we can put emphasis on that aspect in conjunction with the community effort?

Mr. Johnston responded:

- Discovery of the leaks have not been that difficult.
- The part of GWA's concern is how fast can they respond to the discovery of those leaks.
- Leak detection crews have gone through and implemented response to some trouble areas.
- GWA has a 24 hour crew that is responding to leaks as they are called in.

Senator Aguon suggested and also inquired:

- On top of the educational awareness to also incorporate a line 'to please call GWA if leaks are discovered.' This will remind people to place a call to GWA if they discover a leak.
- Based on GWA's assessment at this time, what percentages are we looking at in terms of possible leakages in the system?

Mr. Johnston asked for clarification if it was a percentage of water loss or percentage of leaks that have not been addressed?

Senator Aguon responded:

- A percentage of water loss that has not been accounted for that are not being paid by the consumers and are not being consumed by the consumers. Basically, leakages.

Mr. Johnston responded:

- GWA had a recent water audit and showed there were 20% leakages in some areas, and those areas that are serviced by galvanized pipes installed a long time ago are a little bit higher.
- GWA is aggressively addressing these situations. In other areas, waterlines had to be replaced because it made better sense, than it did to put a series of sleeves on the pipe.

Senator Aguon stated:

- We need to have a comfort level to ensure that GWA is proceeding with an aggressive program to address the leakages out in the system.
- Emphasis on that particular effort has to be increased or quadrupled to an extent because of the drought that is impending.
- GWA has to double the reinforcement on that particular program and aggressive efforts made to ensure no further leakages occur.
- Would like to see the plan completed before this particular proposal can be entertained in session as it would also assist the colleagues in moving forward and ensuring an acceptable plan is adopted.

Mr. Johnston responded:

- GWA shares the same concerns, but given the age of the system in some areas, there will always be leaks.
- It is incumbent upon GWA to clean up their act first, before they ask the community.
- Important part of the conservation program is their response. The leaks will always be there, but will try to track them as fast as we can and try to speed up the process, but the water loss is not as important as the image of the fact that our system is leaking.

Senator Aguon commented that when a very aggressive education awareness and conservation plan goes forth, calls will be heard going into K-57 and other media sources saying, 'here's GWA implementing a conservation plan and imposing all these penalties, and have a leak out in my home. That is why he made the suggestion

that in conjunction with the education program, that GWA also incorporate an aspect where in fact our consumers identify a leak, to please report it immediately to GWA.

Senator Brown stated:

- Some of those key provisions that were brought out in his testimony were omitted because he does not want to sabotage the rest of the bill. Experience on the legislative floor has dictated that things just go out very quickly.
- We are in the height of the political season and do not want key issues that we need passed this month to be held back.
- Senator Aguon brought up a good point that if the information is available before the session in a week and a half and are able to look at it, we can get a feel from the other colleagues as to whether or not this is something they want to entertain.
- Does not want to sabotage the key issues and would like to facilitate the bill. Mentioned that session is scheduled every month, even if the bill comes back a month later, it can be entertained the following month. If it is that serious and the Governor needs his Authority, then it can be looked at.

Senator Camacho suggested that:

- There should be some phases of implementation, such as a voluntary, mandatory, and enforcement time period.
- Notification process is probably needed, because radio and TV may not be enough.
- The mayors should be involved in the event there is going to be some penalty.
- If enforcement measures have reached a point where people are going to be penalized for usage that are not under the authorized uses, then each household is notified that the enforcement process starts.
- Very important that the word is out once enforcement is out and penalties are to be imposed.

Mr. Quinata stated:

- It is very difficult to set penalties, especially when GWA produces 44M production per day, and lose 19.36M gallons per day.
- GWA should start cleaning house first before they start penalizing people.
- Big percentage of unaccounted water is in the non-registry meter. The other is the fire-fighting usage under forestry. These are not metered, but GWA still has to come out with numbers.
- The water conservation dictates numbers as to what is 10 low, and maybe 15 or 20 high to educate many of the residential areas.
- Looking at assisting the farmers as far as irrigation is concerned. GWA can subsidize by means of pumps to get them off from using tap water because of its high expense.

Senator Camacho responded:

- Was referring towards the development of the plan where mandatory water usage is enforced if a certain shortage of water level is reached. The plan should address the worse.
- People from WERI have assisted the other neighboring islands of Micronesia to provide some kind of a catchment system. We're not that remote that we cannot start implementing the catchment system for the farmers.
- Wanted to ensure that we look at the phases of implementation through the educational and notification process as part of the plan when it is developed before we start penalizing.

Mr. Quinata stated the cooperation of the community is needed. The Navy can not develop any water supplies because they can not go out and drill more wells like government of Guam. FENA dam is there and that is how their plan is set.

Senator Camacho suggested that perhaps people from WERI can assist the farmers in some catchment system to supplement areas where water ration is mandatory. If it gets too severe, it may be possible to tap our water lens where stringent measures call for. This is something UOG can get involved in programs to develop and make those things available for our agricultural people.

Senator Brown stated a legitimate point has been brought up with the public outreach:

- We have to look at the realities, as there will be production of less surface water resources down south.
- The more information you give, the more people will be aware so they can be prepared to face the water crisis. The more work that is done to educate people and keep people aware, and working together, we can get through this. This is the message we have to get out there.
- Extra phone lines specifically dedicated to the water watch line be provided to report leakages and people abusing the use of water to call in. If people are not manning it, then an answering machine should be made available. Make it more user friendly for people to get involved in the process. We can legislate all we want, but if we don't get the community's support, it is not going to happen. It is a very important component and look forward to your educational campaign, be it through informational leaflets or people informing them of set standards. These are important things that need to be done and have to go back and keep reenforcing because it is going to take a while to sink in.

Senator Kasperbauer commented areas of concern not addressed in the draft proposal.

- Part of the education process is having the public become aware of leaks that are highly visible, as an example major water lines in areas where the grass is so green.
- Very discouraging where pipe is ruptured like a geyser and has been reported, and the response time is so slow that thousands of gallons of water has gone.
- How rapid GWA can respond is very important for the image as well as saving the water.
- Other area is the leaks in the home (which he did not see addressed in the plan) Leaks in the shower because the washer is damaged. Also water leaks in government offices. Poor example in government offices when you see the leaks in the toilets running.
- Other concern is making sure we are educated on the balance between

the business and the consumer, let alone the difference between the military and local.

- How do we justify the water conservation of the golf courses and the hotels where there are signs on the tables on the restaurant, saying that water is a precious thing.
- Concern about washing our cars and how do we deal with businesses that make a living on using water, like car wash, etc. Was not referenced in the draft proposal, nor heard about farmers who irrigate their farms.

Senator Brown thanked Mr. Quinata, Mr. Johnston, Mr. Jordan Kaye for coming down to testify on Bill No. 487. She also inquired if anyone else who has not sign the Sign In Sheet wishes to come up and testify. She recognized Mr. Norbert Perez.

Mr. Perez stated his name for the record as the President of the Republic of Guahan. Testified orally in favor of this bill, however, extended some reservations as far as the intent of the bill. Believed it is a very good bill and long time coming. It should have been here many, many years ago. His concerns are the penalties involved that was mentioned in the testimony and even in the bill itself. That we are working out provisions for penalties to penalize people for wasting water. It concerns the whole republic, because the biggest waste management we have is Guam Waterworks Authority. If they are providing or pumping out 3 billion gallons of water and they are only billing 1 billion, there is a loss of X number of water, and where is that going to? This is why the republic is very concerned of the bill, although, they support the bill, it is a measure that needs to be done and implemented as soon as possible. Also applaud the effort that GWA has done in the recent past that they are trying to accommodate these issues and these situations, but they can do a lot more by coming around and do the type of monitoring that is needed so they can tell and do a statistical data on what type of water usage and usary, we can come up with a very progressive plan in trying to implement this conservation measure. Our main concern is the waste of water, and if GWA is going to advise the public that they are going to penalize \$20 for wasting water when the government is the biggest waste, they are not going to buy it.

Senator Brown thanked Mr. Perez, and asked the next speaker to read his testimony.

Mr. Kramer testified in support of Bill No. 487 and stated his name for the record

as Mark Kramer of Earth, Tech, Inc., Office Regional Manager. Have always in the past advocated both working from the demand management side as well as the supply side. With respect to the penalties, realized that they are lot of problems within the system at Guam Waterworks Authority and worked with them a lot in trying to address them, but GWA is actively addressing a lot of the key issues. His thought was it should not be used as an excuse to allow the common citizen to go ahead and waste water blatantly. Believe that the conscientious citizen will do the voluntary conservation measures, and with a little incentive, the average citizen will too. But there is always going to be those people, that unless you have a disincentive, they are just going to ignore anything they ask them to do. The other thing he will like to see addressed is Section 14306, and would like to see it go further than that. Realized that for this drought situation, it is very good to give them and WERI the salinity and chloride data from all the wells, but also believe that there should be repository for information that is generated through any kind of well drilling operation. Have discussed this with GPA and would continue to be the managing authority, but with samples collected from cutting during drillings, these could be passed on to WERI and they could identify them a lot more clearer than what we can in the field as to what particular materials it is and then add it on to their GIS model. In conclusion, it was reported in the Pacific Daily News that Earth Tech is in the process of working an agreement where we are going to try to get 2 1/2M per day on line within about 90 days. At the same time, GWA is pursuing about 20 wells which will get 2-3M gals of water, but this will take time, but believe this bill should be put into law as soon as possible. Please pass this bill, and if you can put a little "teeth" or modify it a little bit, then all the better.

Senator Brown commented that Mr. Kramer does have a good point and also stated:

- That the committee has had meetings and will continue to have meetings to ensure continued dialogue between GWA, GEPA and WERI.
- Concern has been brought up time and time again with regards to being able to collect the information, be it GWA going out and hiring a driller to go out or some private company does it.
- No records have been kept in the past and information is not readily available.
- Meeting was held in January and another scheduled meeting in April to continue to dialogue and make sure the context that are being said between these key agencies and WERI at the University as being

- maintained in that dialogue and sharing of information is maintained.
- The hydrogeologic survey is working to ensure that in the future information is readily accessible to those doing the study, those who are managing the utility, and those who are having to regulate it.
 - Information should be ready to the students who wants to study in this field, and anyone in the general public who may want to study this issue. Again, this was not made a priority in the past, and it is something that we should, particularly with what we are facing.
 - Make this a priority and makes sure this information is available, when the time comes to provide for additional funding, her colleagues will be supportive of it.

Senator Camacho commented with reference to the government buildings which have a lot of leakages. This is the first thing that GWA and the government of Guam should address. They have been detected, but it comes along with the attitude that “it is not their building and not paying the bill”. These are the leakages that need the attention of GWA.

Senator Brown stated that Guam Waterworks has been tasked with a lot, the Governor’s proposed plan can include that all departments and agencies are in full compliance with these conditions that we are setting up for the general public.

Mr. Perez stated he has been around visiting the wells and the pump stations and have come across several without any kind of security measures and the biggest thing is anybody can just go in there. We need to find a way to protect our people some way or another.

Senator Kasperbauer stated that although we talk about leakages in government buildings and homes, it is different level that is being discussed, and needs to be corrected.

Mr. Kramer responded:

- It is going to require a big combination of various number of activities to get us through this drought. Granted, one individual in and of himself that you are not talking a heck of a lot of water, but when you are talking 40,000 connections, it really adds up fast.

- Do not need to go and punish people, but with the proper incentives and disincentives with very little effort, people can save a considerable amount of money and water, and in some of the analysis done in the past, it could mean a difference of having to building surface water source in 2004 and being able to push out to 2008.
- The longer we can go without surface water sources and the higher cost of treatment, the better and that was without taking the El Nino into account. With the way the El Nino is developing rapidly, then there is a lot more critical nature into getting these things in place.

Senator Kasperbauer stated that his concern was not to focus only on the residents, or individuals, and let all the other wastage continue to go.

Mr. Perez responded, that he was more in tune of giving people incentives rather than billing or charging them, or putting them through paying off. (for example if their usage of water for this month is like 30,000 gals, then they are billed a certain way or given a disincentive). Looking more on incentives where people are given incentives for cutting back, reducing for conserving.

Senator Brown thanked Mr. Perez and inquired if there were any more testimony on Bill 487.

Public Hearing on Bill 487 adjourned at 11:25 a.m.

FISCAL NOTE
BUREAU OF BUDGET AND MANAGEMENT RESEARCH

BBMR-F7

Bill No.: 487 (COR)
Amendatory Bill: Yes

Date Received: February 20, 1998
Date Reviewed: March 12, 1998

Department/Agency Affected: Guam Waterworks Authority
Department/Agency Head: Richard A. Quintanilla
Total FY Appropriation to Date: \$ -0-

Bill Title (preamble): AN ACT TO ADD NEW ARTICLE 3 TO CHAPTER 14, TITLE 12 OF THE GUAM CODE ANNOTATED RELATIVE TO ESTABLISHING A DROUGHT MEASUREMENT AND COMPREHENSIVE WATER CONSERVATION PLAN.

Change in Law: Adds new Article 3 to Chapter 14, title 12 of the Guam Code Annotated.

Bill's Impact on Present Program Funding:

Increase: See attached Decrease _____ Reallocation _____ No Change _____

Bill is for:

Operations _____ Capital Improvement _____ Other _____

FINANCIAL/PROGRAM IMPACT

ESTIMATED SINGLE-YEAR FUND REQUIREMENTS (Per Bill)			
PROGRAM CATEGORY	GENERAL FUND	OTHER	TOTAL
Utilities and Infrastructure	See attached comments.		

ESTIMATED MULTI-YEAR FUND REQUIREMENTS (Per Bill)						
FUND	1st	2nd	3rd	4th	5th	TOTAL
GENERAL						
OTHER						
TOTAL						

FUNDS ADEQUATE TO COVER INTENT OF THE BILL? N/A IF NO, ADD'L AMOUNT REQUIRED: _____

AGENCY/PERSON/DATE CONTACTED: See attached comments.

ESTIMATED POTENTIAL MULTI-YEAR REVENUES						
FUND	1st	2nd	3rd	4th	5th	TOTAL
GENERAL FUND						
OTHER						
TOTAL						

ANALYST Carlos P. Bordallo DATE 3/11/98 DIRECTOR Joseph E. Rivera DATE MAR 12 1998
Carlos P. Bordallo JOSEPH E. RIVERA

Comments on Bill 487 (COR)

While there is no outright appropriation entailed in Bill 487, there may be an adverse fiscal impact to revenues of the Guam Waterworks Authority if conservation measures and interruptions of water supply are implemented. The extent of any adverse fiscal impact would be dependent upon the limitation of water services imposed upon customers. In addition, businesses and individuals involved which are highly dependent upon a steady supply of water, such as the agriculture and hotel industry, may be affected.

The General Fund revenues available for appropriation, as adopted in Public Law 24-59, is \$353,292,790 (includes \$7,600,000 Autonomous Agency Fund, \$7,000,000 Use Tax and \$36,000,000 in Section 30 Funds). The appropriations for FY 1998 in P.L. 24-59 is \$346,128,092 plus continuing appropriations for debt service of \$2,504,141 for a total appropriation against of \$348,632,234. Pursuant to P.L. 24-59, surplus FY1998 revenues available for appropriations is \$4.6M.

However, it should be noted that Section 30 revenues are expected to be reduced by \$1,047,129 and the expected combined collection from both the Autonomous Agency Fund and the Use Tax is only \$3.0M, a reduction of \$11.6M ($\$14.6 - 3.0 = \11.6). Thus, it is anticipated that the FY1998 revenues will be reduced by \$12.6M to a level of \$340,692,790. As such, \$340,692,790 in revenues less \$348,632,234 in appropriations leaves an expected shortfall of (\$7,939,444) as of P.L. 24-59.

COMMITTEE ON NATURAL RESOURCES

**Senator Joanne M. S. Brown
Chairperson**

Public Hearing

**Thursday, March 5, 1998
10:00 a.m.**

AGENDA

1. Introduction of Committee Members

2. Commencement of Public Hearing

Bill No 487(COR)

'An Act to Add a New Article 3 to Chapter 14, Title 12 of the Guam Code Annotated Relative to Establishing a Drought Measurement and Comprehensive Water Conservation Plan'

Bill No. 504(COR)

'An Act to Establish Rules and Regulations for the Guam Environmental Protection Agency for the Solid Waste Disposal'

3. Public Comment

4. Adjournment



UFISINAN I MAGA'LAHI
TERITORION GUAM

MAR 05 1998

The Honorable Joanne M. Salas Brown
Chairperson
Committee on Natural Resources
Twenty-Fourth Guam Legislature
130 Aspinal Street
Agana, Guam 96910

Dear Madame Chairperson,

I submit this testimony in support of Bill 487 (COR), "An Act to Add a New Article 3 to Chapter 14, Title 12 of the Guam Code Annotated Relative to Establishing a Drought Measurement and Comprehensive Water Conservation Plan."

I am pleased to go on record in support of a new law to deal with the threat of a serious drought on Guam. In the spirit of bi-partisan cooperation, I commend you for introducing Bill 487 (COR) which I write here to endorse. I have asked the Director of the Bureau of Planning, Mr. Clifford Guzman, to represent me at your bill's public hearing today, to emphasize my willingness to work closely with you in formulating and implementing aggressive drought response measures.

The threat of prolonged drought is very real. Extreme dryness from El Niño during this year's dry season months is expected to extend beyond September of this year, and promises to surpass any previous dry periods recorded for Guam. The absence of any significant rainfall will affect the Guam Waterworks Authority's surface and spring sources, diminishing the Authority's overall production yield for island residents. We are anticipating the worst, and therefore see an urgent need to institute mitigation measures islandwide.

Bill 487 (COR) provides uniform Guam standards for measuring the severity of drought conditions. The bill also establishes an islandwide alert system and response action. The measurement, alert and response system, set forth by Bill 487 (COR), has been successfully administered in Guam by the United States Navy for many years. The Guam Waterworks Authority voluntarily administers this system through an administrative agreement with the Navy. The system works and the time has come to make it mandatory.

Bill 487 (COR) also empowers the Governor to develop and implement a drought management and water conservation plan to respond to the water crises we perceive. On October 14, 1997, I issued Executive Order 97-25 to set up a Drought Response and

Testimony Bill 487 (COR)

March, 1998

page 2

Water Utilization Coordinating Committee to begin drafting the Governor's plan. Just last week the Committee finalized its draft plan. And while we will be putting this plan into effect in the coming weeks, I also believe that the plan should have the force of law behind it. I have attached the draft plan for your consideration as Bill 487 (COR) is marked up.

The Guam Waterworks Authority (GWA) has been working to develop a conservation public education campaign. GWA is also working with large commercial property managers and government facility managers to institute voluntary conservation measures. I have also asked GWA to again reinforce our commitment to set an example at our agencies by cutting back all non-essential use of water. GWA has begun to reduce Navy water purchases in a cooperative effort to reduce the daily drawdown of water from the Fena reservoir.

On the Governor's authority, GWA has completed the RFP process, and has signed a memorandum of understanding with a private firm to develop new production wells. Once in place, this firm will begin immediate permitting and design work on new wells required to produce an additional 2.5 million gallons of water daily. Overall, we seek 8.5 million gallons per day to be produced from the newly developed well system.

Requirements for monthly salinity and chloride inspections provided in Bill 487 (COR) address my concern to protect and maintain the integrity of our northern aquifer. I have instructed the GWA Board and management that ground water protection is my top priority in the Chamorro Land Trust Development infrastructure program. It is crucial that our Chamorro ancestral land occupants are provided with the means, through an effective and efficient sewerage system, to prevent any type of pollutant from contaminating our very valuable sole-source aquifer. Appropriations to fund salinity and chloride monitoring may be necessary. The Water Energy Research Institute (WERI) of the University of Guam has specific recommendations along this line, which I hope you will support.

Thank you for this opportunity to add my support for Bill 487 (COR), and I look forward to working closely with your committee, the Drought Response Group, and the GWA Board and management as we cooperatively address this impending crisis.

Very truly yours,



Carl T. C. Gutierrez
Governor of Guam

J E P S

**DROUGHT
PREPAREDNESS & RESPONSE
PLAN**

Prepared by:

Planning & Real Estate Administration
Guam Waterworks Authority
Government of Guam
Agana, Guam 96932

October, 1997

EXECUTIVE SUMMARY

Concerns from worldwide climatologists about catastrophic weather conditions as a result of El Niño's return in early 1997, prompted the Guam Waterworks Authority to examine these concerns and their significance to our locality. The conclusion was that there is a need for local concerns as extremely dry conditions are predicted for Guam and her sister islands in the region, and that the possibility of water shortages exists, particularly for southern villages, as surface water sources dry up. Moreover, it was learned that El Niño is a recurring weather phenomenon that surfaces every two to 10 years. As a result Guam can expect abnormally dry conditions to occur consistent with the return of an El Niño.

Previous El Niños have had adverse impacts on the island's water supply, taxing the Authority's ability to produce sufficient supply for all island residents. While additional water sources through an ongoing wells development program have increased our production capability, population and economic growth continue to rise causing a concurrent rise in water demand. As a result water deficits are not immediately expected to be a thing of the past and that, therefore, a systematic and comprehensive approach to water management are essential. The Authority does not currently have a water conservation or an operating plan to manage water shortages resulting from high user demand or climate-generated shortages. Consequently, the preparation of a comprehensive preparedness plan to guide the Authority in responding to water shortage crises is long overdue.

Both short-term and long-term measures are essential to any water resource management plan. Short-term measures provide immediate opportunities for dealing with extreme situations, while long-term measures span a time frame of multiple years before relief becomes apparent.

Five immediate responses are recommended in this report. First, a Public Awareness and Education program targeting specific user groups such as residential, commercial, and industrial is needed. A separate education program targeting students in all levels helps in developing good water habits in formative years that will hopefully become life-long habits.

Second, a Drought Watch Water Utilization Group is essential to get the community involved. Without community involvement the chances of succeeding in any conservation goal is slim. More importantly, however, is the need for all water well owners and/or operators, e.g., GovGuam, military, and private, to collaborate on mutually beneficial ways to share and maximize water resources drawn from the Northern Lens should the need to do so arise.

Third, the business community particularly high water users in the different industries must be included as part of any water conservation plan. As businesses are the backbone of our island's economic well-being, it is important to ensure that any plans instituted by the Authority does not unnecessarily cause any financial hardships. A mutually beneficial water use and conservation plan would address economic and business sensitivities.

Fourth, mandatory measures may have to be implemented depending upon the severity of our water situation. Limiting water ~~through~~ pressure regulating efforts and other extreme actions should only be resorted to when conditions warrant their use in order to ensure public safety and health.

Finally, the fifth recommendation is a surcharge to penalize high consumption. While this final measure is negative in nature, it has been applied in mainland cities, such as San Diego for one, and has proven to work for that city.

Long-term measures are more structural in nature that require significant capital investments and lead time of five to ten years to accomplish. First, the development of

additional ground water source and surface water sources are recommended. Second, legislation for various water conservation policies are proposed for enactment. Third, institutionalize the drought watch coordinating groups through written memoranda of understanding so that the partnering effort being formulated is permanently established. Fourth, clean up "in house structural problems" through a system wide leak detection and repair program. Expecting the community to cooperate in changing its water use habits is unfair and unwise unless we first apply the standard of zero-tolerance for water waste to ourselves. Moreover, response time to reported leaks must be aggressively improved. Finally, a meter repair and replacement program must be implemented to properly account for all water produced and to capture revenues that are current being lost because of defective meters.

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Long-Term Measures

RECOMMENDATIONS

INTRODUCTION

With much recent publicity from the scientific community about El Niño 1997 and the “nasty” global weather conditions predicted as a result, the Guam Waterworks Authority saw the need to prepare beforehand a comprehensive plan to respond to a dry spell anticipated to happen before the end of 1997 and intensifying to a drought-like condition through the first half of 1998. Therefore, the Authority’s Planning Office was tasked to prepare this report for the purpose of examining the validity of meteorological claims of an El Niño weather havoc, its significance to the island, and to recommend ways to prepare for and mitigate the effects of a drought predicted in 1998 for Guam and neighboring Micronesia islands.

The report is organized into three major sections. A background and general history section discusses the El Niño weather phenomenon, examines its relationship to Guam and nearby regions, and evaluates how the Guam Waterworks Authority handled or responded to previous drought conditions from past El Niños.

A second major section examines immediate- and long-term measures to consider in the preparation of a drought plan. The measures were gleaned from different jurisdictions in the United States and abroad who have adopted either a drought or conservation plan to deal with water shortages.

The third and final section of this report provides a matrix summarizing those measures that are recommended for implementation. Nearly all of the short- and long-term measures that were discussed in the previous section are seen as viable measures that may work in our community.

For this plan to succeed it is imperative that it be viewed not as a cure-all answer to water shortage problems, but rather as a **flexible plan** to guide the Authority's response to water shortage dilemmas and long-term management of our water resources. This means that as the measures in the plan are implemented, they must be evaluated for effectiveness and updated as may be required.

BACKGROUND & GENERAL HISTORY

Pacific Climatic Changes and Effects on Guam's Weather

Guam is located in what is known as the Humid Tropical Domain. Because of its location, the island's weather is uniformly warm and humid throughout the year, with only slight variation in temperature and humidity. However, considerable changes to rainfall and wind factors give distinction to Guam's seasons.

There are two major seasons: wet and dry; and two secondary seasons referred to as transitional seasons that can be either rainy or dry. The months in which these seasons occur is shown in Table ____.

Table ____

**Guam's Weather Characteristic
by Periods**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Major DRY Season												
Secondary (Transitional: Wet or Dry)												
Major WET Season												
Secondary (Transitional: Wet or Dry)												

Source: *Guam Surface Water Development Study*, Volume 1, August 5, 1994, prepared for Guam Waterworks Authority by Barrett Consulting Group, page I.3-5.

Guam's annual rainfall varies between 80 inches to 110 inches. Some years bring torrential typhoon storms while others bring droughts, thus causing a wide variation in annual rainfall figures. The extent of Guam's weather changes is greatly affected by climatic changes that occur in the vast Pacific Ocean, most notably by two weather conditions known as the *El Niño* and *La Niña*. The *El Niño* weather condition is characterized as a "warm event" that

involves a rise in ocean water temperature; while a *La Niña* is the opposite and is referred to as a “cool event” that involves a drop in ocean water temperature.

Climatologists and meteorologists worldwide and Guam’s own scientists at the University of Guam Water and Energy Research Institute have only recently begun to understand the widespread effects of these Pacific weather systems have not only in our region, but worldwide. For Guam extreme variations occur in rainfall patterns, particularly during the dry season and transitional months.

Significance of EL NIÑO and its relation to Guam’s Wet and Dry Seasons

El Niño is Spanish for “Christ child,” a name dating back in time and given by Peruvian fishermen to describe a warming event of Pacific Ocean current which greatly affected Peru’s productive fisheries and bird population. When an *El Niño* occurred warm ocean currents off Peru’s coast prevented nutrient-rich cold water from rising, thus depriving the region’s fish stock with food supply. As a result fish died and were washed up on Peruvian coast or went elsewhere in search of food. Because of its frequent late December appearance, the phenomenon was given its name--“Christ child” or *El Niño*--by Peruvians.

Today, climatologists know that *El Niño* is a global complex of weather conditions, which begin in the Pacific Ocean, occurring every two to seven years. The event throws normal global weather patterns off-balance, and introduces climatic dissaray to entire regions resulting in floods, droughts, pestilence, famine and illness on a global scale.

Normal global weather disruption under *El Niño* begins when Earth’s warmest ocean waters found in the far western Pacific area takes a big eastward shift. This warm, ocean water supplies both moisture and energy for huge thunderstorms. These thunderstorms in turn feed

both moisture and wind energy into the upper atmosphere influencing “jet stream winds,” which drive worldwide weather patterns. As the eastward shift occur, normal jet stream wind patterns are disrupted, which in turn move storms on different paths than usual and thus upsetting normal patterns of wet and dry weather. Some areas that don’t usually get rain are hit hard, while wet areas dry up.

The effects of *El Niño* on Guam’s wet and dry seasons has been significant. For example, the 1982-1983 *El Niño* event, which cost global damage estimated at \$13 billion and claimed nearly 2,000 lives (see The Seattle Times, August 28 1997, by Erica Bulman, AP, entitled: “El Nino Phenomenon to Cause Global Weather Extremes, Experts Say”), was one of Guam’s most severe dry period. Though information is unavailable to substantiate any economic impact the drought had on Guam, the Authority was unable to adequately meet islandwide water demands for fighting numerous grassfires which occurred. The villages of Merizo and Umatac in particular experienced **severe water shortages** as springs supplying their water dried up.

Since the worldwide devastation of the 1982-1983 *El Niño* event, the global scientific community has been carefully studying this phenomenon. Since that period sufficient data has been gathered to predict, with certain degree of reliability, the onset of *El Niño* and its intensity, but unfortunately not its duration or conclusion. Worldwide climatologists, meeting at a three-day U. N.-sponsored climate conference in Geneva, Switzerland, in August 1997, were in consensus that *El Niño* is back (began in spring of 1997) and could become “the climate event of the century,” far surpassing the 1982-1983 event.

According to USA Today Weather Bulletin of 8/20/97, correspondent Jack Williams lists “some of the changes the current *El Niño* is causing or could be causing.”

1. Peru's coastal water is 9 degrees warmer than normal, with warmer than normal water stretching west to the International Date Line.
2. Warm water and warm-water fish such as tuna have moved northward to California Coast.
3. Drought has begun in Indonesia.
4. Pakistan and northwest India are dry, with normal monsoon rains sparse.
5. Heavy rains in central and northern Chile in May and June, with flooding on the northern dessert.
6. Central America is starting to have less-than-normal rainfall for this time of year.
7. Drought in North Korea and parts of China related to the *El Niño*.
8. The wet, cool weather in central USA this summer and dryness in Mid Atlantic is suspected to be related to *El Niño*.
9. Papua New Guinea is expecting the worst drought in 50 years caused by the current *El Niño* and is on the verge of declaring a national state of emergency. It is expected that up to one million people would like face starvation.
10. California is seeking federal assistance to help potential victims get ready for a deluge of torrential rainstorms, mudslides, and crop failures. The Federal Emergency Management Agency has responded by hosting an October 14 summit in Lost Angeles on how to prepare for *El Niño* storms.
11. Representative Ken Calvert (California) has asked the House Appropriations Committee to fully fund \$18 million in National Weather Service research programs that will focus on the effects of *El Niño* this year.

For Guam local meteorologists are anticipating an extremely dry period following *El Niño*. Forecasts for “Third Quarter-1997-University of Guam *Pacific ENSO Update*,” prepared by Water and Energy Research Institute’s meteorologist, Mr. Chip Guard, verify that an *El Niño* (warm event) is currently in process and that *La Niña* (cool event) conditions were likely to follow in 1998. According to the update the current *El Niño* has become one of the strongest of the century. Predictions for Guam are for dry conditions to develop beginning in the fall of 1997, as the southwest monsoon disappears. The winter of 1997 and the spring of 1998 are expected to be extremely dry, with dry conditions extending into the early summer. Drier than normal conditions will continue into July of 1998. While fall rainfall is predicted to be near normal for Guam, late winter and spring conditions will be extremely dry. During this winter-spring period, some months could be more than 75% below normal rainfall.

Previous “Drought” Periods & How the Island Responded

Drought is a condition where water level in grounds, lakes, reservoirs, and rivers are significantly below normal. The condition is accompanied by crop failure, increased forest fires, wind blown erosion of dry soil, and possibly animals dying of thirst.

A drought occurs when the Earth’s water balance cycle take more water away from the Earth than percipitation adds. Ground water is lost through evaporation or natural use by plants (called transpiration). When there is not enough rain or any other form of precipitation to balance the loss, a drought occurs.

Drought-like conditions have occurred on Guam, although the magnitude is not of the kind found elsewhere resulting in famine due to crop failure or deaths due to lack of water. Even during extreme dry spells, Guam is fortunate to have an abundance of water in its natural

underground aquifer, or commonly known as the Northern Water Lens. The Northern Water Lens rests on top of salt water, but because of its depth the lens can provide the civilian community up to 60 million gallons of freshwater daily, during any given time of the year. The Authority has only tapped half of the Lens' full daily potential. Water availability on the island, or lack of, during previous *El Niño* years were primarily attributed to production, storage, transmission, and distribution problems.

National Oceanic & Atmospheric Agency (NOAA) Bulletin 97-37, issued June 17, 1997, identified five recent *El Niño* events: 1982-1983; 1986-1987; 1991-1993; and 1994-1995. The 1982-1983 was a strong event which caused billions of dollars worldwide, followed by a milder 1986-1987 event. A prolonged *El Niño* episode occurred from 1991-1995.

Table ___ is a comparative analysis of water production and metered demands during each *El Niño* episode.

The 1982-1983 *El Niño* years have been described as very severe events by worldwide climatologists. The Guam was hit with one of the worst dry spells, which resulted in most of the island's springs and rivers drying up, with the exception of Ugum. However, according to WERI scientists the water flow at Ugum was at one-half of normal flow. For both 1982 and 1983 the Authority was unable to meet both normal demands and was really crippled during peak demands. The villages that were hardest hit were the southern villages.

The next event occurred three years later in 1986 and lasted through 1987. In 1986 during non-peak hours there was a margin of half-million gallons of excess water. However, during peak demand periods water availability was short by almost 6 million gallons. As the event extended into 1987 the Authority was unable to even provide for non-peak demands and was in extremely short supply during peak hours. In 1987 the Authority (PUAG at the time)

implemented a leak detection/repair program resulting in 5% drop in unaccounted water loss. However, even the recapture of 5% additional water, non-peak demand increased about 30% from the previous year. This occurred despite press releases offering conservation tips and urging the public to lower usage.

A dry period spanning 5 years began in 1991. The first year into the dry period the Authority was just barely able to meet average daily demand, but could not meet peak demand for the first year and each year thereafter. In 1992 the Authority could not even meet non-peak demands, being short by about 160,000 gallons of water daily. Also in 1992 average water demand during non-peak hours rose by about 11%. In 1993 the Ugum Water Dam came on line providing an additional 1.2 million gallons of water. However, unaccounted water loss rose that year, the total water supply remained the same as 1992. Non-peak water demand in 1993 dropped by 200,000 gallons. While water production rose in 1994 and 1995, the percentage of unaccounted water loss also rose. While non-peak demands in 1994 were met, water was in short supply in 1995.

During the prolonged dry period of 1991-1995 water purchases from the U. S. Navy increased every year. In 1991 the Navy sold GovGuam 4.37 mgd; 1992 - 4.10 mgd; 1993 - 5.11 mgd; 1994 - 6.1 mgd; and 1995 - 6.6 mgd. With the U. S. Air Force the amount of water purchased consistently remained at around 80,000 gallons of water daily, except in 1994 it increased to 500,000 gallons a day and in 1995 to 800,000 gallons.

During each *El Niño* years noted above, the Authority responded to the crises with short-term measures, primarily conservation measures. For example, in 1982 a 7-page "Water Conservation Proposal Plan" was prepared by an in-house committee consisting of the Wastewater Division Manager, Water Division Assistant Manager, the Superintendent of Service

Division, and an Acting Program Coordinator. The plan provided a cursory discussion of several conservation measures, their advantages and disadvantages. Among the measures were public education to include a school visitation program, islandwide meter replacement program, leak detection/repair program, pricing, and installation of water saving devices.

The plan was followed up with a "Drought Contingency Plan" in 1983 which consisted of three major efforts:

1. **Leaks** - all leaks were to be reported to PUAG for immediate repair; consumers were advised to repair leaks on private premises.
2. **Limit Use of Water** - customers were advised to re-cycle used water; water plants in the evening; car washing kept to a minimum of once a month; mayors were notified to assist in monitoring the use of water in their villages and to control mis-use of water.
3. **Water Rationing** - a water rationing or low water pressure schedule was prepared and distributed in advance to the public through village mayors, media, and radio stations.

Based upon estimated figures it is unlikely that the Authority can improve its response to water demands from the public, especially during peak demand hours. Table _____ shows that we will continue to experience water deficits during both peak and non-peak hours. Even with an ongoing wells development program, significant impact will not occur unless the Authority can concurrently reduce its water loss ratio to a manageable level. Industry standards from the American Water Works Association (AWWA) say that a system the size of Guam's that is well maintained should range between 15% to 20% of unaccounted water.

Table _____

An Analysis of Production vs. Demand
(expressed in million of gallons per day - MGD)

Water Sources	1991	1992	1993	1994	1995	1996	1997	1998
Ground	24.7	25.28	26.8	27.38	26.8	27.49	27.12	27.20
Surface	0.76	0.74	2.0	1.95	2.8	2.25	2.25	2.31
Navy	4.37	4.1	5.11	6.1	6.6	7.2	6.25	6.54
Air Force	0.26	0.09	0.08	0.47	0.8	0.6	0.49	0.59
Less Water Loss	42%	37%	44%	45%	45%	45%	45%	44%
Avg Daily Metered Demand	17.34	19.20	19.0	16.36	20.5	25.35	21.88	23.6
Variance [+ / (-)]	0.11	(0.17)	0.03	3.21	(0.15)	(4.7)	(2.04)	(3.45)
Maximum Peak Demand	26.01	28.8	28.5	24.54	30.75	38.0	32.85	33.9
Variance [+ / (-)]	(8.56)	(9.77)	(9.47)	(4.97)	(10.4)	(17.35)	(12.99)	(13.75)

NOTE:

(a) 1996 surface source figure is estimated based on average of 1993 through 1995 actual.

(b) Water loss ratio for 1997 and 1998 based on average of last four years actual.

(c) 1997 and 1998 production figures are estimated based on last four years actual and does not include additional production from new wells. These figures may therefore be understated.

(d) Demand figures for 1997 and 1998 are estimated based on previous years actual. However, these estimates should be considered **unreliable** because of significant distortions in metered demands for 1996. Distortions were a result of high estimated billings that transpired over a 6-month period during the consolidation of water/sewer billing function with Guam Power Authority.

The Need For A Comprehensive “Drought Preparedness/Response Plan

Drought hits hardest when people place too high a demand on the water supply. People’s unrealistic expectations during a crises contribute to overestimating the water supply. Drought can be mitigated by **balancing** demand with supply.

The abundance of rainfall that the island gets during wet season months make it difficult for Guam’s residents to take the likelihood of a drought threat seriously. Extreme dry conditions and water shortages on Guam have been dealt with on a crises-management basis. That is, they were addressed as they occurred, and then quickly forgotten when the rains came. But, planning for drought should be a normal process that even a community such as ours with an abundance of water supply should undertake. Investing time and resources in planning allows a community to ease the effects of a next drought or a next dry season.

Planning for drought means action be taken ahead of time--essentially practicing **risk management**. More people need more water. As Guam’s population grows, so does the amount of water needed for drinking, agriculture, and other uses. Therefore, our vulnerability to drought or “water shortages due to extremely dry conditions” increases along with population growth. It is important that we recognize and understand the stresses on our water supply.

Based on the scientific data collected on *El Niño* and *La Niña*, drought or drought-like conditions are inevitable for Guam and the global community. These disruptions in weather conditions and normal rainfall patterns, population growth, economic expansion, etc., are stress factors which challenge Authority’s ability in managing and allocating its water resource. A comprehensive “Drought Preparedness & Response Plan” will enable the Authority to replace short-term emergency response with long-term mitigation practices--practicing risk management rather than crises management with respect to drought. By doing so two major accomplishments

can be realized: (1) We minimize any **dramatic and/or expensive effects** (e.g., as a trigger of **famine** it can devastate vulnerable population or devastate agriculture, livestock, and wildlife); and (2) decision makers have the chance to **relieve the most suffering at the least expense**.

MEASURES TO CONSIDER IN A DROUGHT PREPAREDNESS/RESPONSE PLAN

As reported in the Pacific Daily News of September 23, 1997, page 3, "El Niños are no aberration; they're a **routine part of nature** that occur every two to 10 years." (Emphasis added.) Therefore, planned measures should be adopted, implemented, and routinely updated, as needed, to mitigate any severe adverse effects that the events may pose to the island. Short-term measures and long-term measures are examined in this part of the report.

Short-term measures

Short-term measures are "interim" measures which provide the most immediate opportunities for dealing with extreme dry spells or drought-like conditions caused by *El Niños*. The measures are primarily in the realm of public education and technical assistance in promoting water use efficiencies. The goal of these measures is to change people's water use habits by making them more conscious about their attitudes on water use and educating them on ways to conserve.

Five short-term measures are discussed below. These measures are not new; they have been used in other communities. Some measures have been effective, while others have not. It is important to note that not all these measures will work in our community. Each measure should be tested, however, by putting them into practice, and then evaluated to determine its effectiveness and ways to improve.

- (1) **Public Awareness & Education Program** - provides the means to communicate message to water users and to form an alliance or partnership in support of whatever plans or programs the Authority institutes. It is essential for water users

to be knowledgeable about their water system and to be informed of any threats or disruption in its supply. An informed public makes the task of instituting water conservation measures less difficult for the Authority to implement because it empowers them to make the choice of participating or not in water conservation practices.

(a) **Conservation Program for Residential Users, Commercial Users, & Industrial Users** - Three separate programs should be designed for each category of water users. Brochures, pamphlets, and other written paraphernalia should be printed and distributed. They should contain a comprehensive listing of useful tips on ways to conserve and should emphasize wastewater re-use or re-cycling. The objective of the program should be to change poor attitudes and bad habits on water use and **promote wise water use.**

(b) Prepare separate **educational program** for students in grade school, middle school, and high school levels. Coloring books, pamphlets, brochures for each reading and comprehension levels should be utilized to educate students on how they can **save water for tomorrow.**

(2) **Military/Civilian (GovGuam) "Drought Watch" Water Utilization Coordinating Group** - Provides the opportunity to partner with other sectors in the community for more effective coordination and communication. Because of our remoteness and the small size of our island, water resource management under drought conditions **requires the cooperation** of a consortium of federal, government & local interests. The Consortium should include Navy, Air Force,

Guam Waterworks Authority, University of Guam - WERI, Guam EPA, Guam Fire Department, Civil Defense, and a representative from the Mayor's Council.

The consortium should meet regularly to exchange information and to coordinate the dissemination of information or "drought advisories" to the public.

(3) **"Drought Watch" Water Utilization Group with Hotel**

Association and Golf Courses - A separate "drought watch" coordinating group should be established with large water users, such as hotels and golf courses. It is imperative for the Authority to ensure lines of communication & information flow are not impeded in any way. The group should meet regularly with the Authority to discuss and implement ways to minimize any adverse economic effects during drought period. For example, it may be necessary to coordinate scheduling of hotel water storage tank refilling during peak period, if necessary, in order to maintain sufficient water pressure to the Tumon area during critical periods of the day.

(4) **Mandatory Water Conservation** - Limitation on water use may be implemented in stages as drought conditions intensify. First stage may take the form of notices to public asking to curb the use of water for non-essentials, i.e., car wash, hosing down driveway, etc. Second stage may include all of first stage plus encouragement for water users to re-cycle used water for watering plants, lawns, or vehicle wash. Third stage may include extreme measures such as water outages on a rotating basis, or decreased water pressure during certain hours of the day.

- (5) **Water surcharge** - Finally, a surcharge based on high consumption may deter people from wasting water and generate some new revenues for the Authority to offset the cost of implementing water conservation programs. A legal opinion is needed to determine if a surcharge requires special legislation or PUC approval.

Long-term measures

Long-term measures are structural actions that include construction of new water source facilities, repair and maintenance of facility deficiencies, and legislation promoting energy saving plumbing retrofits and new installations in exchange for cash or tax rebates.

Guam's abundance of water makes the island less vulnerable to droughts than its sister islands in the Marianas and in Micronesia. It is known that the combined use of ground and surface water provides more than sufficient quantities to support island activities and demands during abnormally dry spells. The island's vulnerability during adverse dry conditions lies in defective metering program, water production deficiencies, and distribution inadequacies. Therefore, capital investment in addressing these structural problems is the crux of any long-term measures that the Authority wishes to implement.

- (1) **Develop Additional Water Sources** - Ground water source (Northern Lens) can provide up to 60 MGD of water. Only 57% of this daily yield has been tapped by the Authority. New production wells should be constructed so that the maximum yield of our ground water can be enjoyed by our community. Also, a number of wells have been abandoned for various reasons ranging from lack of repair parts to contamination. These abandoned wells should be examined for possible rehabilitation.

The importance of developing surface water sheds should not be overlooked. The abundance of rainfall during normal rainy seasons has resulted in millions of gallons of water discharging into the ocean. The use of surface water in conjunction with ground waters provides for a more effective and efficient year-round water resource management program. As the time frame from project conception to completion runs anywhere from 5 to 10 years, it is essential for the Authority to pursue the development of additional surface sources right away before the maximum daily yield of the Northern Lens is tapped. It has been recommended in Guam's *Vision 2001* Economic Plan that the Ylig watershed be developed at an estimated cost of about \$7.0 million.

- (2) **Enact legislation** for implementation of various water conservation policies for several essential reasons. First, as a rapidly growing community with a rapidly growing demand for water, Guam's residents must recognize that water conservation measures ensure the island's continued future growth and as such must be made a way of life regardless of whether it's a drought period, an extremely dry season, or a wet season. Second, legislation sends a signal to the community that water conservation is a serious matter connected to our future well being, and that the enactment into law transforms this policy into a community-wide cause. Third, legislation forges a partnership between the community and water resource managers as they collaborate on programs designed to reduce water waste. The last chapter of this report discusses and provides sample model legislations.

- (3) **Establish Memorandum Of Understanding (MOU)** to institutionalize the “Drought Watch” Water Utilization Coordinating Group for Military and GovGuam and a separate one for the Guam Hotel & Restaurant Association (including Golf Courses) will enable any partnering efforts to outlast the short-term and take shape permanently over the long-term period. Getting businesses and other sectors of the community involved in policy-making in water resources uses goes a long way in winning people over to a conservation oriented lifestyle. After all that is what water conservation is really all about--modifying public behavior towards water uses.
- (4) **Leak Detection & Repair Program** is vital to achieve any measurable impact of water conservation regardless of a drought or not. Currently, the Authority’s unaccounted-for water level is estimated to be just under 50%. This means that for every gallon of water that the Authority produces, one-half gallon disappears somewhere. It is suspected that a large part of this unaccounted-for water loss may be a result of underground leakages from old water pipes that have exceeded their life expectancies. Many of these pipes are over 20 years old and have not been replaced because of funding constraints that preclude the Authority from establishing a consistent, system-wide replacement program. Also, because water pipes are buried, some as deep as 10' or more, water leaks are not seen and require special equipment to detect them before they can be dug up for repair. Again, funding problems have made it difficult for the Authority to invest in leak detection equipment. Moreover, it is difficult for the Authority to promote its

water conservation plan if it does not first clean up house. It is unfair and unwise to expect the community to implement water saving measures, when we in turn are not committed to reducing our unaccounted-for water level, which has over the past fifteen years or more ranged between 40% to 50%. Concurrently, effort must be made to increase our efficiency by improving our response time in repairing reported leaks. While most of our efforts are concentrated on repairing large water line breaks, it is essential that small leaks be treated with some (if not same) importance. In the final analysis, to quote a U. S. Geological Survey bulletin, "...it is the **little leak that keeps on leaking** that wastes water."

(Emphasis added) Because the leaks are little or of minor importance, we have a tendency to ignore them concentrating only on large main line breaks. It's when we ignore the little leaks over a period of time that stretches into months, that this constant little leak turns into a big waste. If we can view all water leaks along these terms, then a truly successful leak detection and repair program can be a reality barring any funding constraints.

- (5) **Meter Repair & Replacement Program** is equally important as leak detection and repair. Again, the emphasis is in reducing the level of unaccounted-for water and in generating additional revenues that are critically needed to off-set the costs of leak detection and repair, as well as other conservation programs. A large percentage of residential and business meters are under registering or not registering because of deficiencies stemming from the lack of a systematic maintenance, repair & replacement program. They are either in need of

calibration due to normal wear and tear or must be entirely replaced with new meters because they have exceeded their life expectancies.

RECOMMENDATIONS

Protecting our island community from water shortages and reducing the islandwide water system's vulnerability to drought or extreme dry conditions require implementation of permanent demand-reduction measures (e.g., conservation measures, education, etc.) and development of new water production sources, both surface and ground. Therefore, all the measures discussed in this report are recommended for implementation in the immediate or near future. These measures are summarized into 11 major programs or activities listed in the matrix that follows. Additionally, this chapter contains additional information for further development of each program and are appended according to its corresponding letter designation.

**BOARD OF DIRECTORS
GUAM WATERWORKS AUTHORITY
POST OFFICE BOX 3010
AGANA, GUAM 96932**

BILL 487 (COR)

**AN ACT TO ADD A NEW ARTICLE 3 TO CHAPTER 14, OF THE
GUAM CODE ANNOTATED RELATIVE TO ESTABLISHING A DROUGHT
MEASUREMENT AND COMPREHENSIVE WATER CONSERVATION PLAN**

**TWENTY-FOURTH GUAM LEGISLATURE
COMMITTEE ON NATURAL RESOURCES**

TESTIMONY

Submitted by:

**Roman Quinata, Acting Chairman
Board of Directors**

March 5, 1998

Good Morning, Madame Chairwoman and members of the Committee on Natural Resources. For the record my name is Roman Quinata and I am the Acting Chairman of the Guam Waterworks Authority Board of Directors. I am here to testify in support of Bill 487 (COR): An Act to Add a New Article 3 to Chapter 14, Title 12 of the Guam Code Annotated Relative to Establishing a Drought Measurement and Comprehensive Water Conservation Plan. I wish to thank you for inviting the Guam Waterworks Authority to testify on this bill.

There has been so much discussion in the media and among the scientific community of El Niño and how seriously it is going to affect us on Guam in the months ahead. The prediction that we're in for a record dry spell is not something

that we should take very lightly. As a retired employee of what was once called PUAG, I can remember the 1983 and 1984 El Niño drying up our springs and surface water sources. The consequences was that southern villages were without water for many days at a time and highly elevated areas were affected with periodic water outages as well. Farmers were seriously affected and untold dollars in income were lost as water to irrigate crops became nothing more than a “trickle” from the tap.

Bill 487 is a very important piece of legislation that should have been introduced a long time ago. Nonetheless, I applaud you, Madame Chairwoman, for taking the initiative to come up with this Bill for it is vitally needed today.

A plan is just merely a plan with no guarantee of its implementation. But if a plan is required by legislation, then the plan carries the force of law and must be implemented. Bill 487 requires the GWA to come up with a Drought Plan and spells out in specific terms how water distribution and uses are to be managed during an emergency shortage, as well as what actions are needed to ensure that the Plan is followed.

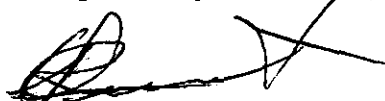
Guam is an ever growing community and the once-thought of abundance of water is no longer true. Every one of us in the community, both civilian and military, have a responsibility to make sure that we do our part to prevent water

waste. However, the government must take the lead for the community. Bill 487 empowers Guam Waterworks Authority on behalf of the government of Guam to take the lead in instituting measures for the wise use of water and to prevent waste and abuse of this vital resource.

Richard Quintanilla, the Authority's General Manager, and his staff, are working very hard in putting together a water management plan for this community. With the support of the Governor, a Committee consisting of military, GovGuam, and private businesses was formed last year to develop a plan that would address the concerns of all three important sectors. This Committee has been meeting often and is now in the process of putting together a final draft for the Governor's consideration. It is encouraging to know that Bill 487 will give the Committee's Plan the clout it needs to be effectively implemented in our island.

Madame Chair and members of this Committee, thank you for your interest in the Guam Waterworks Authority. Bill 487 is just one example of your continued support of our activities and programs. Si Yu'os maase.

Respectfully submitted,



ROMAN QUINATA
Acting Chairman

BILL 487
AN ACT TO ADD A NEW ARTICLE 3 TO CHAPTER 14, TITLE 12, GUAM
CODE ANNOTATED

TESTIMONY

Submitted By

Water and Energy Research Institute (WERI)
University of Guam

March 5, 1998

Good morning Madam Chairperson and members of the Committee on Natural Resources. For the record, my name is Leroy Heitz and I am a water resources engineer and researcher at the University of Guam, Water and Energy Research Institute commonly known as WERI. I am here to testify on behalf of WERI on Bill 487. I would like to thank you, the committee chairperson for inviting WERI to submit this testimony.

As part of my work at WERI, I have been involved with research and outreach activities concerning the El Niño drought that is affecting our part of the Pacific. At this point in time we are virtually assured that we are facing one of the strongest droughts in this century. Also we can be assured that this El Niño cycle will repeat itself on a 5-10 year interval guaranteeing that we will be seeing similar such droughts in the future. Furthermore, as growth in demand stretches our fresh water supply more and more thinly, even relatively modest droughts will have increasingly severe effects on our islands water supply.

I would like to congratulate the committee on its efforts in the development of a formalized drought response plan for our island. We are in agreement with the committee that there is a need for conservation of water throughout the drought period. We feel that the Bill could be substantially strengthened if direct economic incentives were added to the strategies for promoting conservation. It has been shown in other areas of the world that conservation programs without economic incentives are ineffective. On the other hand those programs that incorporate measures such as sliding scale rate structures are much more effective. Guam Waterworks Authority should be directed to develop such a conservation incentive rate structure as part of the total plan.

We agree with the committee that it is very important to measure the impact of droughts on Guam's water resources. We have to report, however, that the island is seriously lacking the measurement stations needed to accurately assess the full impact of the drought on groundwater and surface water supplies. We are currently facing the prospect of losing the data collection program administered by the US Geological Survey for over 20 years under a 50% cost-sharing arrangement with the Government of Guam. Many of the island's groundwater observation wells and stream gages have fallen into disrepair or have been abandoned over the last 20 years. For Example, following the 1982 Northern Guam Lens Study of the island's groundwater resources seven wells were installed across northern Guam to monitor the thickness of the lens and the occurrence of salt water in it. None of these is operating today--the last three fell out of service in 1996. Without this vital information there is no way to accurately monitor and therefore to manage our islands water resources. We urge this committee to add appropriate funding to this legislation to bring our monitoring capability back to at least where it was nearly 15 years ago.

Again we applaud your efforts at developing Bill 487. We hope that you will act favorably on our suggestions to strengthen this important bill. The steps to be taken under this bill will go a long way to insure that our people will make it through this drought with a minimal amount of suffering. At the same time it will protect the island's single most valuable natural resource it's water supply. Thank You.

Testimony on Bill 487
March 5, 1998
by
H.G. Siegrist, Jr., Director
Water & Energy Research Institute of the Western Pacific
University of Guam

I would like to say that WERI is delighted to be here this morning contributing a share to solving what could easily evolve into a major water crisis. We consider this serious business. A sustainable quantity of good drinking water is to my mind the defining factor as to whether or not Guam can continue as a major player in tourism, and more importantly, whether or not our quality of life can be maintained.

A protracted El Niño drought means a late-arriving and shortened wet season ahead this year, followed by another “normal dry season” So, over the next 16-18 months there will be a very low probability of normalizing our surface and groundwater supplies. Coupled to the potential stresses on water supplies from lack of rainfall and recharge, there is the situation of our own making: I refer to the 8.5 MGD of additional groundwater production that is targeted over, coincidentally, the next 18 months. At the end of 18 months from now we may be closing in on what the aquifer can yield without sacrificing quality.

A well that pulls up brackish water cannot be rejuvenated easily, quickly, or cheaply. As we have no comprehensive monitoring program in place for signaling day to day, weekly, monthly or longer cyclical changes in our aquifer, (and in most of our surface water supplies as well) the day could arrive in the near future when a production well or an entire well field will be producing water that is undrinkable, and that portion of the shrinking aquifer will have to be abandoned for years.

It is incumbent for you to make some tough decisions here and now to protect our water supplies, and I consider this bill to be a strong first step. Some people will be unhappy. But, I would rather be known as a Senator who made a few hundred (even a couple of thousand) citizens a little unhappy now, than a Senator who made 140,000 fighting mad later. Thank you.

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TESTIMONY

Submitted by:

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waste. However, the government must take the lead for the community. Bill 487 empowers Guam Waterworks Authority on behalf of the government of Guam to take the lead in instituting measures for the wise use of water and to prevent waste and abuse of this vital resource.

Richard Quintanilla, the Authority's General Manager, and his staff, are working very hard in putting together a water management plan for this community. With the support of the Governor, a Committee consisting of military, GovGuam, and private businesses was formed last year to develop a plan that would address the concerns of all three important sectors. This Committee has been meeting often and is now in the process of putting together a final draft for the Governor's consideration. It is encouraging to know that Bill 487 will give the Committee's Plan the clout it needs to be effectively implemented in our island.

Madame Chair and members of this Committee, thank you for your interest in the Guam Waterworks Authority. Bill 487 is just one example of your continued support of our activities and programs. Si Yu'os maase.

Respectfully submitted,



ROMAN QUINATA
Acting Chairman



CARL T.C. GUTIERREZ
Governor of Guam
Maga' Iåhi

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March 4, 1998

MADELEINE Z. BORDALLO
Lt. Governor
Tiñente Gubetnadora

BENEDICT J.G. REYES
Deputy Director
Sigundo Direktot



JUAN B. ROSARIO
Director
Direktot

Senator Joanne M.S. Brown
Suite 200 Biscoe Bldg.
130 Aspinal Street
Agana, Guam 96932

Dear Senator Brown:

Subsequent commitments preclude me from attending your public hearing on Bill 487. However, please accept my written testimony in support of your measure. Allow me to explain the chief elements of your legislation that I strongly support for solving the island's water crisis.

First, your bill offers the island's first ever comprehensive water management strategic plan. This is essential as the community prepares for the onslaught of the climatic phenomenon called, El Nino, that precipitates severe water shortages in our region.

Furthermore, your bill mandates equity and fairness in the utilization of scarce water resources between the military and civilian sectors. The equitable distribution of water resources ensures collective support of this legislation.

Moreover, your bill not only addresses the present crisis, but also provides a long-term water resources management plan that reduces the island's vulnerability to drought and short-term water shortages.

Lastly, but not the least, I firmly support the adoption of the drought condition standards and low groundwater level conditions and severity alert condition of readiness developed by the Navy Public Works Center.

Sincerely,



JUAN B. ROSARIO