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Briefing Report to the Chairman, Committee on Armed Services, House of Representatives

March 1987

NAVY CONSTRUCTION

Issues on the Proposed Move of the Naval Support Activity, Naples, Italy

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National Security and
International Affairs Division

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The Honorable Les Aspin
Chairman, Committee on Armed Services
House of Representatives

Dear Mr. Chairman:

This report responds to the Committee's request in House Report 99-718, dated July 25, 1986, that we review seismic, security and cost issues pertaining to the Navy's plan to relocate the Naval Support Activity from the Agnano area of Naples, Italy, to a new location in Capua, Italy, some 25 miles away. Your office also asked us to assess mission capability at Agnano and to evaluate a study that the House Committee on Appropriations directed the Navy to perform on the proposed move.

The support facilities in Agnano are leased by the Navy. The Navy wants to move from these facilities because the current site is threatened by seismic activity, is susceptible to security threats, and has other drawbacks that make it inadequate.

The facilities are located in a volcanic crater. The area is subject to the threat of bradyseismic earthquakes--periods of low intensity tremors resulting from underground volcanic activity--as well as the threat of a volcanic eruption. Two recent episodes of bradyseismic activity occurred from 1970 through 1972 and from 1982 through 1984. Like much of Italy, the area is also subject to the threat of tectonic earthquakes--earthquakes that result from movements of the earth's surface, such as in California.

The Capua area is subject only to tectonic earthquakes. Navy studies conclude that even though Capua is located 15 miles closer to the main tectonic fault line than is Agnano, the overall tectonic threat is no higher than at Agnano. In addition, the new buildings to be constructed at Capua would comply with current seismic construction codes. Our review of seismic risk studies showed that some of the assumptions used by the Navy consultant may overstate the risk at Agnano. Nevertheless, it is clear that the Agnano buildings lack adequate seismic protection.

Navy studies show that recent seismic activity around Agnano did not structurally damage the Naval Support Activity's buildings, and that the period of seismic activity that caused nonstructural damage ended in 1984. However, Navy analyses also show the buildings lack features needed to withstand earthquake forces that can be reasonably expected to occur in the future. In addition, the buildings were constructed with substandard materials, workmanship and design. Navy studies conclude that the buildings are not in imminent danger of collapse; however, if they are to be occupied on a long-term basis they need to be seismically upgraded and functionally improved.

There are a number of security concerns at Agnano, including poor access to the base, being surrounded by high ridges and urban development, and a lack of a "clear zone" around the base. The Navy believes these concerns would be difficult to overcome. The design for the new base would provide better security, including features that the Agnano buildings lack.

In addition to its security concern, the Navy also states that the Agnano compound no longer effectively supports its operations in Naples. In particular, the Navy believes that a new command, control, communications and intelligence building and hospital are essential because of space limitations and functional deficiencies. While Agnano can be expanded to provide these facilities, other problems would not be resolved:

--The Navy would be purchasing or leasing substandard 25-year-old buildings that would have to be upgraded and renovated at considerable expense and disruption.

--After such an investment, many of the existing security problems, including topography, urban encroachment and poor access, would remain.

--The base would still be subject to the threat of a volcanic eruption.

--There is no assurance that necessary land for expansion could be acquired.

--The base would be poorly laid out.

The Navy estimates it will cost a total of $358 million to build and equip a new base at Capua and $448 million to develop equivalent facilities by purchasing, upgrading, and expanding Agnano. The Navy's cost estimate for a new base at Capua did not include all costs associated with the relocation. After considering these costs, as well as making certain foreign exchange and inflation adjustments to the Navy's estimates to make them comparable with each other, we found it would cost $27.9 million less to move to Capua than to purchase, upgrade, and expand Agnano to provide equivalent facilities.

The enclosed appendixes provide more detailed information on the condition of the buildings at Agnano, the comparative seismic threat at Agnano and Capua, security issues, and our analysis of the cost estimates. They also discuss a Navy report to the House Committee on Appropriations on the relocation, which your office requested we evaluate. Our review included a visit to the Naples Support Activity, a review of pertinent documentation, discussions with Navy officials responsible for planning the relocation and interviews with seismologists in Italy and a representative of the principal owner of the buildings at Agnano.

The views of directly responsible officials were sought during the course of our work and are incorporated in the report where appropriate. We did not obtain the Department of Defense's comments on a draft of this report. Our work was performed in accordance with generally accepted government auditing standards.

Unless you publicly release its contents earlier, we will make the report available to other interested parties 7 days after the issue date. At that time copies of the report will be sent to appropriate congressional committees; the Secretary of Defense; and the Secretary of the Navy. Copies will also be made available to other parties upon request.

Sincerely yours,

Frank C Conahan

Frank C. Conahan
Assistant Comptroller General

Contents

ABBREVIATIONS

AFSOUTH	Allied Forces Southern Europe
C3I	Command, Control, Communications and Intelligence
CINCUSNAVEUR	Commander-in-Chief, U.S. Naval Forces, Europe
GAO	General Accounting Office
NATO	North Atlantic Treaty Organization
NAVCAMSMED	Naval Communications Master Station, Mediterranean

THE NAVAL SUPPORT ACTIVITY

The Navy plans to move its Naval Support Activity Naples, Italy, from leased facilities in the Agnano area to a new facility it plans to construct near Capua, about 25 miles north of the present site. The relocation is currently estimated by the Navy to cost $358 million, and would be funded over a 5-year period.

Accordingly, the Navy plans to move because the Agnano site

--is seriously threatened by seismic activity,

--is susceptible to terrorism and security threats,

--lacks sufficient space and has other drawbacks which make it no longer adequate to support its mission, and

--is more costly to bring up to Navy standards than to relocate.

In November 1982, the House Committee on Appropriations indicated that it was concerned with the adequacy of the facilities in Naples. These concerns centered on escalating lease costs, crowded and dispersed facilities, and the lack of adequate family housing. The Committee requested the Navy to submit a plan showing how it intended to address such problems. In February 1985 the Navy submitted a report, Upgrading the Naples Complex: An Overview, and concluded that it needs to relocate and build a base in the Naples area.

In early 1983 the Navy decided to pursue development of a site to replace Agnano because of increasing costs of the leases and mission problems. However, by January 1984 seismic activity also became a serious concern. As a result, the Navy decided to ask for fiscal year (FY) 1987 military construction (MILCON) funds to begin relocating the facilities away from Agnano. The Navy's FY 1987 MILCON budget requested $66.9 million for the first phase of a new command, control, communications and intelligence (C3I) complex; hospital; and school.

The House Committee on Armed Services recommended that funds be denied because it did not believe construction should be initiated for a new naval base overseas at a time when the defense budget was being drastically reduced. Also, the committee was concerned over the conflicting testimony it received on the seismic danger, new base security, and the benefits expected from relocating the complex.

BACKGROUND ON THE NAVAL SUPPORT ACTIVITY, NAPLES

Naval Support Activity, Naples, was established in 1951 to provide support to U.S. personnel assigned to North Atlantic Treaty Organization's (NATO's) Allied Forces Southern Europe (AFSOUTH) headquarters and to coordinate fleet services. For several years, the Support Activity leased various facilities throughout the area. In 1963 the Navy began consolidating its activities at the present site in the Agnano area. All the buildings were acquired through the lease construction method; that is, they were built by the landowner to meet the general requirements of Navy, then leased back.

By 1968 the Agnano facilities consisted of seven major buildings. Since then the Navy's presence has grown and it has leased additional facilities. For example, the school was relocated, and a Navy exchange warehouse, gymnasium, post office, and athletic field have been added. Currently, the Navy has 24 leases for about 60 facilities. In 1986 the total cost of these leases was about $3.8 million.

The Navy leases family housing facilities at Pinetamare, Italy, about 18 miles from Agnano; cargo facilities in the Port of Naples; and outdoor recreation facilities at Carney Park, several miles from Agnano. The Navy also has an agreement to use facilities at the Capodichino municipal airfield, and is relocating its supply operation from Agnano to Capodichino. In addition, the Navy has communications activities located at the NATO headquarters nearby, and homeports the Sixth Fleet flagship about 40 miles north of Agnano.

As of September 1986, there were about 9,200 U.S. military, civilian, and dependent personnel in the Naples area. The primary mission of the Support Activity is to provide service to Navy personnel in the Naples area. As a result, the Agnano base is the location of community support activities such as shopping facilities, schools, hospital, and other services. NSA also operates public works, supply, and controller departments to maintain the facilities and base infrastructure. In addition, C3I and Naval Security Group Activity facilities are located at Agnano. Table I.1 is a breakdown of the population by major activity.

Table I.1 Activities and Population

Activity	Military	Civilian	Dependent	Total
AFSOUTH	790	--	947	1,737
U.S. National Staffs	523	13	724	1,260
Naval Support Activity	466	143	782	1,391
Naval Communications Master Station	647	20	751	1,418
Naval Security Group Activity	207	--	230	437
Naval hospital	275	27	467	769
Miscellaneous tenants	178	33	288	499
Subtotal, Naples	3,086	236	4,189	7,511
Sixth Fleet Flagship and Gaeta	751	27	987	1,765
Total	3,837	263	5,176	9,276

THE RELOCATION PLAN

In total, the Navy's relocation involves 24 separate construction projects to be funded over a 5-year period. It estimates that construction costs would be about $252.1 million, including $43.1 million in nonappropriated funds. Relocation, start-up, and equipment costs would bring the total cost of the relocation to over $358 million. Fiscal year 1988 funds totaling $54.9 million are being requested by the Navy for the first two projects--the first phase of a C3I complex and a hospital.

The relocation will involve moving virtually all the functions now located at Agnano to the new base. In addition, the Naval Communications Master Station, Mediterranean (NAVCAMSMED), which now occupies space in the NATO compound, will move to the new base. The only activity that will not move is the supply department, which is being relocated to Capodichino airfield, where new supply warehouses and an air cargo terminal are to be constructed. The estimated cost of these projects is $12.9 million.

Some facilities are planned for Capua which Agnano currently does not have. For example, the Navy plans to construct up to 10 senior officer quarters, explosives storage structures, military working dog kennel facilities, and a bowling alley.

OBJECTIVES, SCOPE, AND METHODOLOGY

The Chairman, Committee on Armed Services, requested us to provide a comparison of the seismic threat at the current and proposed locations, an analysis of the costs of relocating versus upgrading the present facilities, and an analysis of the security issues. The committee requested this review because of the conflicting

testimony it received on these issues. In a later meeting with committee staff, we were also asked to assess mission capability at Agnano and evaluate a study that the House Committee on Appropriations had directed the Navy to perform on the proposed relocation.

In performing our review, we analyzed documents on the seismic conditions at Agnano and Capua, the structural condition of the buildings at Agnano, security at both sites, and other issues affecting the Navy's ability to effectively carry out its mission at Agnano. We also evaluated the Navy's comparisons of the cost of relocating versus staying at Agnano, which are contained in the Navy's report to the House Committee on Appropriations. In addition, we received briefings from and interviewed officials from the Naval Support Activity, Naples; Headquarters, Commander-in-Chief, U.S. Naval Forces, Europe (CINCUSNAVEUR), in London, England; the Naval Facilities Engineering Command, Atlantic Division and U.S. Navy Headquarters. We also interviewed several experts in the fields of volcanology and seismology, as well as the principal landlord at Agnano.

Our review was performed between September 1986 and February 1987 in accordance with generally accepted government auditing standards. The views of directly responsible officials were sought during the course of our work and are incorporated in the report where appropriate. We did not request the Department of Defense to review and comment officially on a draft of this report.

SEISMIC AND STRUCTURAL ISSUES

According to the Navy, the threat of seismic activity and the structural condition of the leased facilities at Agnano require relocating to new facilities. The Navy states that its leased facilities at Agnano are deficient with respect to earthquake safety and were not built to withstand the seismic stresses that could reasonably be expected to occur. It predicts that over time, structural degradation of the facilities has the potential for complete structural collapse, with attendant risk to human life. The Commander, Naval Facilities Engineering Command, has characterized the situation of Agnano as life threatening and "a Mexico City waiting to happen".

We found that the U.S. facilities at Agnano:

--Do not meet contemporary U.S. and Italian seismic building standards. Further, the buildings contain numerous deficiencies in design, workmanship, and quality of material, which could render them vulnerable to earthquakes.

--Have not experienced significant structural damage to date and in the absence of seismic activity they are not in danger of structural collapse. As such, they are safe for occupancy and do not pose an imminent risk. Serious nonstructural damage has occurred, however, and is now being repaired.

--Can be seismically upgraded, but such a project would, according to a Navy consultant, be difficult.

--Face the threat of tectonic and volcanic earthquakes, and the potential for a volcanic eruption. The proposed location at Capua is outside the volcanic threat area, but still faces the threat of tectonic earthquakes.

In addition, the Navy's estimate of the seismic events reasonably expected to occur at Agnano may be overstated because of certain assumptions used by a Navy contractor to quantify the risk.

THE STRUCTURAL CONDITION OF THE AGNANO FACILITIES

Agnano's reinforced concrete buildings do not contain the seismic protection features of buildings built in the United States and Italy in the 1970s. Major improvements have occurred in U.S. and Italian seismic building design codes. Reinforced concrete buildings built before 1970 are, according to a Navy consultant, also of considerable concern in California today.

In addition, the Agnano facilities suffer from numerous deficiencies in design, workmanship, and quality of material. As a result, the Navy experienced numerous and significant construction and maintenance difficulties almost immediately after accepting the buildings: cracks in the walls, damage to exterior tiles, roof leakage and deficient water and power systems. In a 1970 report,[1] we attributed these problems to weaknesses in the Navy's management of the Agnano lease construction program.

The Navy's conclusion that its facilities are deficient with respect to earthquake safety stems from a series of structural assessments performed by Navy engineers and structural consultants. These studies, including one performed as part of a January 1987 report to the House Committee on Appropriations, all report fundamental weaknesses in the design and construction of the Agnano facilities. For example, each of the reports cites inadequate steel reinforcement in the concrete beams and columns and the lack of certain beams that are necessary to withstand seismic stresses. Overall, they state that earthquake stresses were probably not considered in the design and construction of the facilities.

Based upon these studies, the Navy concludes that the buildings are not expected to withstand the earthquakes that are reasonably expected to occur in the region. The January 1987 structural engineering study concluded that the buildings could totally or partially collapse if they were subjected to about one half of the ground acceleration the Navy seismic consultants believe could be experienced at Agnano from earthquake.

STRUCTURAL DAMAGE HAS NOT YET OCCURRED

The Agnano buildings have not yet sustained significant structural damage. However, cracks have been found in building columns, and serious nonstructural damage has occurred. The buildings are not at this time in any danger of structural collapse--as such, they are viewed as safe for occupancy and do not pose an imminent safety risk to their occupants.

Low level volcanic earthquakes experienced from 1982 to 1984 created cracks in the interior walls. The walls were not reinforced and were in danger of collapsing and injuring the occupants. Although the walls are nonstructural, they provide, according to engineers, a measure of rigidity between structural

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[1]Improved Procedures Needed for Obtaining Facilities for U.S. Naval Support Activity, Naples, Italy by Lease-Construction Method (B-167007), dated January 6, 1970

members and tend to take the load during earthquakes. Navy engineers concluded in an October 1984 report that if the tremors continued and the walls were not repaired, structural damage would occur. These engineers told us that because of the damage to the walls, the buildings will now be more vulnerable to structural damage if the tremors resume.

Damage to the walls has been or is being repaired. The Support Activity is completing a 3-year, $2.2 million program to repair nine buildings, including the administration building, high school, barracks, commissary and exchange facilities, warehouses, and other office buildings. The repair projects involve removing the existing plaster and placing wire mesh on both sides of the wall to prevent collapse. These repairs will not strengthen the buildings structurally, but will protect the building occupants. The NSA Public Works officer characterized the repairs as bringing the buildings back to their pre-1982 condition. The Navy Medical Command has not authorized any seismic repairs for the hospital because of plans to construct a new hospital.

RETROFITTING EXISTING BUILDINGS

In 1986, both the Navy and the Agnano lessor hired structural engineering consultants to evaluate the feasibility of seismically upgrading the facilities. Both consultants proposed adding reinforced concrete shear walls to provide the required measure of earthquake resistance, but sharply disagreed about the costs of upgrades.

The Navy consultant concluded that the buildings could be seismically upgraded, but that such a project would be difficult.

This is because

- --uncertainty exists due to a lack of confidence in the building's structural quality;
- --strengthening the building foundations to accommodate the new shear walls is complicated; and
- --reinforcing concrete structures and joining new and old building structures is difficult and is further complicated by the age and poor condition of the Agnano buildings.

In addition, the consultant stated that the process of installing the shear walls would be disruptive, and at times dangerous, requiring that buildings be evacuated during parts of the process.

The Navy consultant estimates the upgrade cost at $132 million. One reason for the high cost is because of the degree of seismic

protection proposed for the hospital and administration building. These two buildings would be upgraded to "continuous operations" standards--ensuring not only that the structure and occupants are protected, but that the utilities, communications and infrastructure would continue to operate. Without this additional level of protection, the Agnano seismic upgrade is estimated to cost $87 million. All other buildings would be upgraded to ensure the integrity of the structures and the safety of the occupants.

Because the consultant's report provided no detail on how the seismic upgrade costs were estimated, we asked the consultant to describe the assumptions and methodology used. We were told that professional experience and past U.S. Navy cost data were used to estimate the costs. However, no additional details were provided.

A structural engineer hired by the lessor proposed retrofitting the existing buildings for $10 to $15 million. His plan also proposes the building of concrete shear walls, and would, according to the engineer, bring the buildings into conformance with current Italian building codes.

We found the plan prepared by the lessor's engineer was insufficiently detailed to allow an assessment. A Navy engineer told us that the shear wall construction is a sound approach, but that the plan is deficient because it:

--recognizes only the need to provide horizontal building strength where no beams currently exist, not the need to strengthen the existing horizontal beams;

--assumes the buildings foundations are already sufficiently reinforced; and

--contains no provision to upgrade the hospital and administration building to "continuous operations" standards.

NATO's AFSOUTH headquarters upgraded three buildings to meet current Italian seismic standards. A comparison with Agnano is not possible because NATO's buildings are smaller, older and (according to NATO officials) have sustained greater seismic damage than Agnano's buildings. These projects were carried out by the NATO landlord, and AFSOUTH officials could not provide a cost estimate. However, during the last 4 years when the buildings were upgraded, the total amount spent at AFSOUTH on this and other maintenance work was about $3.3 million. Consequently, the cost of the upgrade project was less than $3 million.

SEISMIC CONDITIONS AT AGNANO AND CAPUA

Agnano and Capua face, as does most of Italy, the threat of tectonic earthquakes. Tectonic earthquakes result from the collision of two plates of the earth's crust, like the San Andreas fault in California. But the Agnano area, because it is located within an area of localized volcanic activity, faces two additional geological hazards: volcanic tremors known as "bradyseisms" and the threat of a volcanic eruption.

According to the Navy's January 1987 study, the seismic threat at both Agnano and Capua can be mitigated using standard engineering and construction practices by either upgrading the existing facilities or constructing new ones. No engineering solution, however, can protect the buildings from the effect of a volcanic eruption.

Tectonic earthquakes

The Navy believes high-energy tectonic earthquakes pose the most serious threat to its personnel and facilities. Italy's major tectonic fault line is located in the Apennines Mountains, about 50 miles from Agnano and about 35 miles from Capua. The preponderance of earthquakes in Italy emanate from this fault.

A 1984 study by Navy structural engineers stated that 25 tectonic earthquakes centered within 100 miles of Agnano registered at least 5.0 on the Richter scale since the early 1900s. Several were strongly felt at Agnano. The 1980 Naples earthquake was centered some 50 miles from Naples, measured 6.5 on the Richter scale, killed 5,000 people, and caused considerable damage. The earthquake was felt at Agnano and caused minor damage, producing 70 percent of the force which the Navy's 1987 study says could cause a partial or total collapse of its facilities.

In addition to the major Apennine tectonic fault, east-west fault lines known as the Anti-Apennine trend also run near both Agnano and Capua. According to experts, little is known about these faults' level of activity and role in tectonic events in Southern Italy.

Bradyseismic earthquakes

The Agnano base is located within an active volcanic area known as the Phlagraen Fields, a pool of volcanic magma formed during a violent volcanic eruption 35,000 years ago. Movement of the magma causes the ground to rise, resulting in bradyseismic earthquakes. These are localized and moderate earthquakes, unlike tectonic earthquakes, and hundreds have occurred in a single day.

Scientists do not have a clear picture of when bradyseismic earthquakes have occurred and how strong they were. They have, however, traced the uplift of the ground, which causes the tremors. Dramatic rises in the earth and increased seismic activity preceded the last volcanic eruption in the Phlagraen Fields, in the 1500's. Following that eruption, the ground steadily subsided until 1970, when the volcanic activity and ground uplift began anew.

The first bradyseismic crisis in modern times occurred from 1970 to 1972. The ground rose 5-1/2 feet, while tremors were felt at Agnano they were not seismically significant. The uplift and tremors stopped for 10 years, but resumed again in late 1982. This time the tremors were more intense. By the spring of 1983, an earthquake measuring 3.0 on the Richter scale had occurred, and in October 1983, a 4.2-magnitude event occurred. In April 1984, almost 500 tremors occurred within 6 1/2 hours. Between 1982 and 1984 the ground uplifted almost 6 feet. It slowed in October 1984, and by December 1984 the tremors and uplift had stopped. Since then, the ground has subsided slightly, and tremors have not resumed.

Scientists consider it highly unlikely that bradyseismic tremors would ever exceed 4.5 to 5.0 on the Richter scale, a moderate magnitude. Navy engineers do not believe that bradyseismic tremors can cause catastrophic damage to NSA facilities, but are concerned about the potential cumulative effect of several strong tremors over a short period of time. Over the long-term bradyseismic activity can be expected to occur at Agnano, which equals, but probably does not exceed the magnitude of those earthquakes already experienced.

Volcanic eruption

According to the United States Geological Service (USGS) representative in Naples, the volcanic area around Agnano is active, and an eruption some time in the (perhaps distant) future is inevitable. An eruption would be preceded by increased seismic activity, chemical changes, and dramatic ground uplift. According to the USGS representative, these phenomena were observed during 1970 to 1972 and 1982 to 1984 and should be viewed as a long-term warning of a possible volcano eruption in the area. Scientists are not able to predict when a volcanic eruption will occur with any degree of certainty. The warning time given is measured in days or weeks.

Agnano is located about 2 to 3 miles from the center of the area which scientists view as the most probable site of a future eruption. Capua is located outside the Phlagraen Fields areas and faces neither the threat of bradyseismic earthquakes or a volcanic eruption.

COMPARING THE SEISMIC RISK AT AGNANO AND CAPUA

The Navy has done two studies to quantify and compare the relative seismic risks at Agnano and Capua. A third study reviewed the seismic risk at just Capua and established the criteria for seismic resistant design at the new base. For Capua, the studies concluded that there is a risk of tectonic earthquakes, but new buildings can be designed to withstand expected forces. As discussed below, one Navy study concludes that the seismic risk at Agnano is greater then it is at Capua. Another study concludes the risk at the two locations is about the same.

The Navy's most recent study, performed under contract at the direction of the House Committee on Appropriations states that seismic activity that would cause the partial or total collapse of Naval Support Activity facilities can reasonably be expected to occur at Agnano. According to the report, such seismic stress has a 41-percent chance of occurring within a 50-year period. Over a 100-year period, the probability increases to nearly two in three chances. The report further states that the expected seismic activity at Agnano is more serious than that at Capua.

To compile its estimate, the contractor made certain assumptions on the recurrence and strength of bradyseismic and Anti-Apennine earthquakes. Based on discussions with scientists, we believe some of these assumptions may have been in the nature of "worse case" scenarios and could overstate the seismic risk at Agnano. For example, the contractor assumes that:

--Bradyseismic earthquakes will occur in 10-year cycles for the foreseeable future.

Scientists we interviewed believe that bradyseisms are tied to a resumption of volcanic activity in the area but intervals of recurrence cannot be predicted. Bradyseisms accompany rapid ground uplift. As ground levels declined between the 1500s and 1970s, the area may not have experienced any significant bradyseismic activity for 500 years.

--Bradyseismic earthquakes registering 4.5 on the Richter scale will occur every 10 years.

Scientific data shows that tremors of that magnitude did not occur during the 1970 to 1972 crisis; a tremor of 4.2 in October 1983 is the highest recorded bradyseismic tremor in modern times.

--Bradyseismic tremors could register 6.0 on the Richter scale.

Scientists we talked with, including the Director of Italy's Vesuvius Observatory and the USGS representative in Naples, agree that bradyseisms will not exceed 5.0 on the Richter scale. In response to our question on this matter the contractor stated that assuming 6.0 Richter tremors does not appreciably increase the seismic risk at Agnano.

--The Anti-Apennine fault is capable of generating an earthquake of 7.0 Richter magnitude, and could be responsible for over half of the earthquakes in the Agnano area.

Many unknowns surround the effect of the Anti-Apennine trend. As the contractor states in another section of the report, "their overall role in the tectonic stress regime in Southern Italy is not well defined and their level of activity is not clear". The USGS representative in Naples told us that scientists do not know precisely where the transverse faults in southern Italy are or how active they are.

Some Italian and U.S. seismologists have questioned whether there is much of a risk from tectonic earthquakes at Agnano. For example, the Director of Italy's Vesuvius Observatory stated that a high-energy tectonic earthquake in Agnano is impossible. This is because of Agnano's distance from the Appenine fault and because of the volcanic area the Navy is located in. An earlier study done by the Naval Civil Engineering Laboratory in March 1986 concluded that seismic threat at both locations is basically identical and the probability that both areas would experience the same magnitude earthquake within the same time intervals is the same.

SECURITY ISSUES

Between fiscal years 1984 and 1987 the Navy will spend about $1.97 million to improve security at Agnano. Most of these projects involve improving or replacing fences, gates, and lighting around the perimeter of the base. The Naval Support Activity is also making security improvements to leased senior officers quarters and has added more Marine and civilian guards to patrol the base. The Navy believes that it is vulnerable to terrorist attacks at Agnano because

- --access to the base is restricted to congested roads which can easily be closed through natural or man-caused events;
- --the base is surrounded by high ridges which expose buildings and personnel; and
- --the "clear zone" around the base is insufficient and high rise buildings have been constructed adjacent to the base.

The Navy has concluded that these problems cannot be adequately solved at Agnano and that the only reasonable solution is to relocate.

ACCESS TO THE BASE

The base is located in a volcanic crater surrounded by high ridges on three sides. Until recently, the only access to the base was from a single, two lane, dead-end road that also served other industrial, commercial, and residential activities located in the crater. However, in the fall of 1986 construction of a second road began which will link the current road serving the base to a major road located outside the crater.

Navy officials believe that the access to the base poses a significant security risk to naval personnel because the single access road limits their ability to vary senior officers' routes to and from the base. They believe this increases the potential for a kidnapping or assassination. Navy officials also state that the existing access road to the base, as well as the one under construction, can easily be closed by landslides, labor disputes, accidents, or other problems. According to Navy officials, in February 1986 a mudslide completely blocked the access road for several hours, and access was partially blocked for another day and a half because the road was restricted to one lane traffic. In another incident, workers involved in a labor dispute blocked the road restricting access to the base.

We observed access to the base, discussed the problem with both Navy officials and the principal lessor and observed potential sites for additional roads. We found that access to the base was less than ideal, particularly during rush hours.

A Naval Security and Investigative Command (NSIC) team performed a security assessment of the base in October 1986. It reported that the road under construction is too steep and too narrow to be very useful as a secondary means of access to the base. We asked CINCUSNAVEUR security officials their opinion about the usefulness of the road. They repeated the NSIC concerns and also noted that the road contains choke points and appears to be a stopgap measure that will partially alleviate but not resolve the access problem. Information we obtained from the Navy shows that the road varies in width from 10 to 20 feet, includes a 17-percent grade, and is largely unpaved.

TOPOGRAPHY

The Navy believes that the location of the base in a crater surrounded by high ridges on three sides poses a security problem. The Navy is concerned that anyone with a variety of weapons, such as a rifle, or another type of stand-off weapon, could attack the base from the ridges.

Naval Support Activity officials told us that they cannot do anything to correct the security problem caused by the ridges because (1) they do not control that area, (2) U.S. security personnel are not permitted to carry arms outside the base, and (3) it is impractical for personnel to continually patrol the area. We observed that the ridge locations could afford a convenient vantage point for hostile actions. The agent-in-charge of the Naples Naval Investigative Service (NIS) office told us that the ridges are a concern, but not a great concern. He stated that the ridges become a factor primarily during change of command ceremonies, which are held outdoors in front of the command and control building, and that during these ceremonies security personnel do patrol the ridges.

LACK OF CLEAR ZONES AND ENCROACHMENT

Current Navy regulations call for a "clear zone" of 50 feet -- 20 feet outside the perimeter fence and 30 feet inside the fence. Most of the perimeter at Agnano does not meet this criteria. As a result, security officials are concerned that intruders could penetrate the base undetected or plant explosives on the base. Navy officials also believe that the presence of five - and six-story apartment buildings near the fence compounds the problem because of the vantage points these buildings provide. According

to Navy officials, most of this construction has taken place since the Navy located at Agnano.

When we visited the base we observed that many buildings had been constructed close to or abutting the perimeter fence and commercial enterprises are located adjacent to the fence. These conditions make it difficult for security personnel to patrol. We also observed that five - and six-story apartment buildings are located in close proximity to the base (about 500 feet away, according to Navy calculations). We noted, however, that even though there are obvious problems regarding clear zones and encroachment, this problem is not unique to NSA, Naples. For example, CINCUSNAVEUR Headquarters is located on a busy central London street with virtually no clear zone.

Along the side of the base which faces the road, we found vehicles were in the no-parking zone in front of the base. This situation, which persisted throughout our visit was also observed by the NSIC security assessment team. The NSIC report stated:

> "...During the course of this study, three vehicles were noted parked along this roadway both day and night. An examination indicated they had been abandoned; one had a bottle gas cylinder in its trunk...[1]

We discussed this issue with Naval Support Activity officials who told us of unsuccessful attempts to get authorities to enforce the ban on parking in front of the base.

UPGRADING SECURITY AT AGNANO

Support Activity security officials and the NSIC team believe that there are no cost-effective security upgrades that would justify staying at Agnano. Their view is that there are existing conditions that cannot be changed, such as topography, the road network, and commercial and industrial areas abutting the activity, and that as a result the base should relocate away from Agnano.

NSIC officials told us that additional security features could be built at Agnano. For example, it is possible to construct a blast wall around the base, but construction would be expensive because the wall must be one meter thick to be effective. Further, the wall would present a negative image to the community and could not be built high enough to protect the base from attacks with a rifle or other weapons from the ridges or apartment buildings.

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[1] Bottle gas cylinders have been used as explosive devices by terrorists in bombings of U.S. facilities in Germany.

With regard to improving access to the base, the principal lessor has suggested additional road sites, but his ability to build these roads and to acquire the necessary land is not clear. Road construction would involve a significant engineering and construction effort and land would have to be obtained from a number of individual landowners.

As part of its security assessment, NSIC also assessed the plan for an expanded Agnano. Under this plan, the Navy proposed to build a hardened C^3I building and an associated antenna site and a hospital. Most existing major buildings would be retained except for some office space outside the main base. NSIC found that the plan would not appreciably improve the security posture at Agnano. For example, the C^3I complex would be located under the volcanic ridge and, even though hardened, would still be subject to attack from high ground or buildings. Further, the C^3I complex would wrap around existing commercial and residential structures and would still be affected by encroachment. In some areas, security would be improved, but overall NSIC concluded that serious security vulnerabilities would still exist.

SECURITY AT THE NEW SITE

The security problems at Agnano would not be present at the new site in Capua primarily because the area selected is flat, semirural, and has access to two major roads. Because the base would be built to Navy specifications, the buildings and the layout will include security features. In addition, senior officers are to be housed on base which increases their security. In May 1986 an NSIC physical security assessment team reviewed the plan for the new base. The team made a number of recommendations to improve perimeter and gate security and security of the C^3I building.

One concern at the new site relates to the road that traverses part of the base. The NSIC team recommended that the plan to construct a pedestrian overpass to connect the school area with the rest of the base be deleted. However, Commander Fleet Air, Mediterranean (COMFAIRMED) did not accept this recommendation because it would require using vehicles to get between the school and the rest of the base.

Another concern is the possibility of encroachment and construction of multistory buildings, leading in time to the same problem existing at Agnano. The Navy is considering the acquisition of additional land that would provide an added buffer zone between the base and the surrounding community.

SOME FACILITY PROBLEMS COULD AFFECT NSA'S MISSION

The Navy states that in addition to the seismic and security problems at Agnano, the compound suffers from overcrowding, contains substandard buildings which were not designed for the purposes they are now serving, and is poorly laid out. As a result, the facility no longer effectively supports its mission, and even if the Navy stays, a new C3I complex and a hospital will have to be built.

We found that the buildings used for C3I operations have space constraints and do not have the hardening features that would be designed into a new C3I building.

The hospital also has a number of long-standing design problems and deficiencies and the top three floors of the hospital are not being used. Hospital officials said that these problems have caused an increase in the number of patients that must be treated at other medical facilities.

C3I FACILITY DEFICIENCIES

The Navy conducts most C3I operations in the Naples area from two buildings. One houses the U.S. command and control staffs and the following force commanders and staffs:

--Mobile Logistics Support Force (Commander Task Force 63).

--Ballistic Missile Submarine Force (Commander Task Force 64).

--Area Antisubmarine Warfare Force (Commander Task Force 66).

--Maritime Surveillance and Reconnaissance Force (Commander Task Force 67).

--Attack Submarine Force (Commander Task Force 69).

--Commander, Fleet Air Mediterranean.

The other building, located nearby at the NATO headquarters, houses the Naval Communications Master Station, Mediterranean (NAVCAMSMED), which supports Navy communications between Northern Europe and Africa.

The Navy identified the following problems with its current facilities:

--There is no space available to install planned equipment upgrades.

--Direct satellite communications access from Agnano is not possible because of the topography of the crater. The additional communications links required to overcome this problem increase the system's vulnerability.

--Buildings do not provide the requisite survivability and sustainability in the event of a contingency.

As a result of these problems, the development of a new and hardened C3I facility has become a priority military construction project of the U.S. European Command.

During our tour of the C3I facilities at Agnano and at the nearby NATO headquarters, we discussed facility problems with operational commanders. The operational commanders we spoke to were not able to recall an operational mission being degraded by the condition of facilities at Agnano. CINCUSNAVEUR officials also could not identify any such problems which had been reported to higher headquarters. Our visit to Agnano and discussions with commanders there confirmed some potential problems. For example, space, particularly in the Operational Command Center and NAVCAMSMED, is limited. In the Operational Command Center rest rooms and fire escapes have been converted to administrative space and several people share the same desk. In NAVCAMSMED, storage space is being converted to house additional communications equipment. According to NAVCAMSMED officials, its space problem will become more critical because of plans for equipment upgrades.

Another problem cited by the Navy in operating at Agnano is the lack of certain hardening features that would provide the survivability and sustainability needed in a contingency. CINCUSNAVEUR officials told us that Naval Support Activity, Naples, is the wartime command post for several important organizations, and, that in accordance with NATO and Defense guidance, such facilities should have survivability and sustainability features.

NAVCAMSMED officials said that the location of the command and control building in the crater increases the vulnerability and complexity of the communications network because communication out of the crater is by a single microwave link to a mountain top relay point. Communications are relayed from there to NAVCAMSMED. However, NAVCAMSMED officials stated that there have been no breakdowns in the system to date.

FUNCTIONAL AND OPERATIONAL PROBLEMS OF THE HOSPITAL

The Naples hospital is responsible for serving the Sixth Fleet and the local U.S. community. It is also responsible for patients referred from clinics and another hospital located in Greece and elsewhere in Italy.

In November 1984 the Support Activity decided to close the top three floors of the hospital. This decision was taken because of concerns about not being able to quickly evacuate people in an emergency. As a result of this decision, a number of functions were transferred to other locations in the area, and the hospital's capability was reduced from 55 to 37 beds.

The effect, according to hospital officials, has been to increase the number of patients evacuated to U.S. hospitals in Germany. However, statistics provided by the Navy Medical Command, European Region, show that the number of patients transferred from Naples to Germany for calendar years 1984 through 1986 remained relatively constant, while the number of patients sent to the United States steadily increased as shown in table IV.1.

Table IV.1: Patients Transferred

	1984	1985	First 3 quarters of 1986
Naples to Germany	974	976	756
Naples to United States	245	295	372

In addition, hospital officials also noted the following problems:

--Nursing stations which do not allow a view of the entire floor or meet a requirement of the Joint Commission on Accreditation of Hospitals.

--Access to the emergency room precludes the use of a stretcher. In our 1970 report, we identified this as a problem and noted that the design had been approved by the Bureau of Medicine and Surgery, U.S. Navy.

--The central oxygen system is inoperative requiring the use of bottled oxygen. We noted in the 1970 report that the contractor had not been able to make this system operable.

APPENDIX IV

--Electrical, heating, ventilating and air conditioning systems are considered inadequate to meet peak demand loads in the operating room and other clinical support areas. In addition, the Navy Facilities Engineering Command determined that the existing electrical and mechanical systems are substandard and may jeopardize the hospital's accreditation.

According to the Navy Medical Command, there are nine essential projects that need to be accomplished to correct serious functional deficiencies. The estimated cost of these projects is $3.5 million.

During our visit to the hospital, we observed some of the design deficiencies noted above. We also noted numerous instances of cracked plaster and crumbling concrete.

COST TO BUILD NEW BASE

COMPARED TO UPGRADING AGNANO

The House Committee on Appropriations directed the Navy to study the feasibility of upgrading the Agnano facilities, expanding onto adjacent land, and entering into long-term lease arrangements. The Navy submitted its study in January 1987. In addition to studying the feasibility of staying at Agnano, the study compared the cost of

- --relocating all activities to the new base to be constructed in Capua;
- --structurally upgrading the existing buildings and expanding and improving Agnano to replicate as closely as possible facilities to be constructed at Capua, or
- --structurally upgrading the existing buildings but not expand the Agnano base. (The Navy estimated the cost of this alternative at our request).

The Navy estimates it will cost $358.4 million to build a new base at Capua, but $448.4 million to expand and upgrade the Agnano facilities. The Navy also estimates that upgrading the existing buildings and leasing them on a long-term basis without expanding the base would cost about $340.9 million. According to the Navy, staying at Agnano will not resolve its long-standing concerns or meet its future needs, regardless of whether an expansion program is undertaken.

We analyzed the Navy's comparative cost estimates and identified about $28.9 million in costs that are associated with the proposed move to Capua that the Navy did not consider. Also, to accurately compare the cost of relocating to Capua to staying at Agnano, we needed to make inflation and foreign exchange rate adjustments so that the cost of the alternatives could be evaluated on a comparable basis. After making these adjustments and adding in the other costs we identified, we found that the Navy's estimate of the cost to relocate is about $27.9 million less than the $448.4 million the Navy estimates it would cost to get equivalent facilities at Agnano. We also found that the alternative of structurally upgrading the facilities and leasing them on a long-term basis without expanding to meet the Navy's stated mission would have a comparative cost of $301.7 million.

COST OF A NEW BASE AT CAPUA

The Navy estimates it would cost $358.4 million to relocate to Capua. This estimate (see table V.1.) generally assumes an exchange rate of 1500 lira to one U.S. dollar and includes construction, relocation, equipment and other miscellaneous costs as follows:

Table V.1: Estimated Cost of Moving to Capua

Cost	($ in millions)
Construction	
Navy sponsored projects	$150.6
DOD school	26.9
Naval hospital	30.0
Military Construction Estimate	$207.5
Family housing	1.5
Nonappropriated funds	43.1
Total	$252.1
Relocation and equipment	
Hospital	6.9
School	2.4
C^3I	71.5
Other	25.5
Total	$358.4

We identified $28.9 million in other costs associated with the relocation that were not included in the above cost estimate. These include the cost of

--Security. The Navy estimates additional security needed during construction would cost about $3.8 million.

--Architectural and engineering services. The Navy estimates that design work remaining will total $10.9 million.

--Military sales credits. The Government of Italy would purchase the land at Capua. In turn, DOD would provide military sales credits as a form of reimbursement. We estimate the value of these credits at about $12.7 million.

--Lease terminations. The buildings which would be vacated must be returned to their original condition. The Navy estimates these costs at $1.5 million.

To compare the Navy's cost of moving to Capua to staying at Agnano, we made foreign exchange rate, inflation and other minor

adjustments to make the two estimates comparable. Considering these adjustments, and adding the additional costs discussed above to the Capua estimate, the cost of moving the base increased to about $420.5 million. This is about $27.9 million less than the Navy's estimate of $448.4 million to build equivalent facilities at Agnano.

UPGRADING AND EXPANDING THE CURRENT FACILITIES

The Navy estimates that the cost to stay at Agnano, purchase and upgrade existing facilities, and expand onto adjacent land is $448.4 million. This expansion plan provides for a new C3I building and a new hospital. It also envisions converting the high school to an administration building. Activities now housed in leased facilities outside the base would be moved into the space vacated in the former C3I and school buildings. A new school would be built and many buildings now on base would be demolished to provide for security clear zones an better traffic circulation.

In estimating the cost of this Agnano option, the Navy assumed a replication of the facilities planned for Capua. Consequently, this estimate includes not only the costs of a new C3I building and a new hospital, but the costs of other projects, such as a new school and additional bachelor enlisted quarters. These projects may not be essential if a decision is made to stay at Agnano. As a result, while this estimate is useful for comparing the relative costs of replicating the Capua facilities at Agnano, it does not necessarily provide a basis for deciding what the cost of staying at Agnano might be.

We also reviewed the Navy's cost estimate to upgrade existing facilities at Agnano without obtaining more land or constructing new facilities. This option assumes continuation of leasing arrangements for 25 years. Again, we made the necessary foreign exchange, inflation and other minor adjustments to the Navy's estimate of $340.9 to make the cost comparable to the other options. The comparative cost estimate for this option is $301.7 million.

EXPANDING AGNANO LEAVES SOME PROBLEMS UNRESOLVED

The Navy believes that upgrading and expanding the Agnano facilities is not feasible and has a number of specific drawbacks. For example:

--The Navy would be purchasing or leasing substandard buildings that would have to be upgraded at considerable expense and disruption.

--The existing security problems, such as topography, poor access and encroachment would remain.

--The base would still be subject to the volcanic eruption threat.

--The Navy has no assurance that necessary land could be acquired.

--The layout of the base would be poor because of the topography and the development around the base.

While upgrading and expanding Agnano could resolve some of the Navy's concerns, other concerns will not be resolved. For example, construction of a new C3I building and hospital could answer the Navy's mission needs. A hardened C3I facility and demolition of buildings located inside the base perimeter could improve security by providing additional clear zone space. Seismically upgrading the buildings could resolve the safety concerns now present. However, expanding and upgrading Agnano does not resolve the security concerns raised by the ridges or address the volcanic eruption threat.

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