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UNITED STATES GENERAL ACCOUNTING OFFICE
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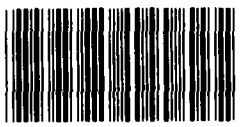

PROCUREMENT AND SYSTEMS ACQUISITION DIVISION

OCTOBER 10, 1980

B-199906

The Honorable Thomas A. Luken
House of Representatives

Dear Mr. Luken:

Subject: Army's Decision Not to Contract for Penetrator Production at the Feed Materials Production Center, Fernald, Ohio, Was Justified (PSAD-81-6)

At your request, we reviewed the appropriateness of the Army's decision not to contract with the National Lead Company of Ohio, a subsidiary of NL Industries, Inc., for production of depleted uranium core penetrators at the Department of Energy's (DOE's) Feed Materials Production Center, Fernald, Ohio.

SCOPE OF REVIEW

In accordance with discussions with your office, we focused on

--a cost comparison of the bids submitted in response to the fiscal year 1979 solicitation,

--the need for the Center as a producer of penetrators,

--whether the use of the Center would have avoided production delays, and

--the latest expenditure figures for the fiscal year 1978 and 1979 contracts.

We also (1) reviewed the history of the Army's efforts to improve its 105-mm. tank armament leading to the decision to develop a depleted uranium penetrator (XM774 round), (2) looked at correspondence from DOE stating its position and the conditions under which it might accept a production contract to use the Center, and (3) obtained information on

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the problems encountered by the first limited production contractor, National Lead of Albany (NLA), also a subsidiary of NL Industries, Inc., in performing under the terms of the 1978 contract. We also obtained data on the steps the Army took to overcome these problems.

With respect to the comparison of the bids submitted for the fiscal year 1979 solicitation, we did not review or evaluate the supporting data, as agreed with your office.

Our review was conducted at Picatinny Arsenal, U.S. Army Armament Research and Development Command, Dover, New Jersey.

The highlights of our review follow. Further details are presented in the enclosures.

COST COMPARISON AND BID EVALUATION-- 1979 SOLICITATION

A cost comparison between the proposal submitted by the successful bidder, Nuclear Metals, Inc. (NMI), and a cost estimate submitted by DOE for its Center shows that NMI's proposed costs were lower. (See enc. II, pp. 4 and 5.) NMI was the only private contractor to submit a proposal, although six firms had expressed interest and were solicited. (See enc. I, p. 3.) The letter transmitting DOE's cost estimate expressly stated that it was provided for comparative analysis of industry bids and was not intended as a proposal for production. Also, the estimate was based on less stringent specifications than were required and did not include a required statement of agreement to participate in the Defense Industrial Mobilization Production Planning Program for the core penetrators. DOE also reaffirmed its position of not competing with capable contractors interested in the work. (See enc. I, p. 3.)

THE NEED FOR THE CENTER AS A PRODUCER OF PENETRATORS

The Army has a mobilization base requirement for a second penetrator producer to replace NLA because its contract is being terminated. (See enc. III, p. 7.) This requirement reflects Army policy not to rely upon only one producer. (See enc. I, p. 2.) NMI has the necessary productive capacity to satisfy peacetime production. The Army has not determined if it will request DOE to submit a cost proposal to be considered in establishing the second production facility.

DOE has stated it would consider filling the Army's need only where private contractors will not or cannot fulfill the production requirements. An Assistant Secretary of the Army is considering certain options regarding final funding and extent of solicitation. (See enc. III, p. 7.)

The Center does not have the full capability to produce the cores, and time would be needed to facilitize the plant. The $5 million necessary to facilitize the Center at the time of the 1979 solicitation exceeded the $3.3 million NMI required. (See enc. II, p. 5.)

WOULD USE OF THE CENTER HAVE AVOIDED PRODUCTION DELAYS?

In our opinion, there was no effect on the timely delivery of the XM774 round because the Army went to commercial contractors rather than to the Center. We are unable to answer whether the Army could have avoided the problems it encountered on the interim M735A1 penetrator by using the Center since too much speculation would be required on our part. (For example, would the Center have been more successful in its development program?) However, a military decision was made not to use the round and proceed directly to the M774.

NLA, which was awarded the 1978 mobilization base contract, experienced difficulties meeting New York State health, safety, and environmental standards. These problems resulted in the closing of the plant in February 1980. The Army said that it had not anticipated these problems because the contractor had been producing penetrators for the U.S. Air Force under subcontracts. (See enc. III, p. 6.)

The problems at NLA did not delay the M774 penetrator program. The 1978 procurement was concerned with the M735A1 penetrator, an interim depleted uranium round to be replaced by the superior M774. When the decision was made not to use the interim round, the production part of the NLA contract was canceled. (See enc. III, pp. 6 and 7.)

The other contractor, NMI, is the only producer to successfully deliver penetrators for the first two phases of the verification testing program. NMI has the capability to supply all peacetime needs. (See enc. III, p. 7.)

NMI reportedly had difficulty moving into initial production because of an unacceptably high iron and magfluoride content of Government-supplied "green salt." NMI apparently

solved the impurity problem through processing procedures and has no problem maintaining product quality without specialized equipment. (See enc. III, p. 7.)

STATUS OF ACTUAL EXPENDITURES FOR 1978 AND 1979 CONTRACTS

Both contracts provided for facilitization of plants with limited production. As of July 14, 1980, $3.23 million of the original $6 million funding for the NLA contract had been spent. Most of this expenditure was for facilitization. As previously noted, the contract is being terminated, and all work has been stopped. Subcontractors have been told to complete work but not ship to the Albany plant. Equipment already installed is expected to be transferred to the second mobilization producer when it is established. Also, the Army recovered $1,957,000 of the original $2,260,000 provided for production. The balance was spent for work started and for verification testing of the production process. (See enc. III, p. 6.)

The NMI contract totals $5.9 million, of which $1.5 million had been spent as of July 14, 1980. The facilitization portion totals $2.9 million. Also included is $1.1 million not contemplated at contract award but added later to accelerate core delivery in support of a March 1981 European deployment of the round. (See enc. III, p. 7.)

CONCLUSION

In our opinion, the Army acted reasonably in the 1979 procurement. We do not know if the Army will again request DOE to prepare a cost estimate and to commit the Center to the mobilization base. Unless DOE reconsiders its policy regarding competition with private industry and becoming part of the industrial mobilization program, it would be fruitless for the Army to request DOE to submit any kind of proposal unless the Army is unable to find private firms willing and capable of performing the work.

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As directed by your office, we did not obtain formal Army comments.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 5 days from the date of the report. At that time we will send copies to interested parties and make copies available to others upon request.

Sincerely yours,

W. H. Sheley, Jr.
Acting Director

Enclosures - 3

ENCLOSURE I

DEVELOPMENT OF THE DEPLETED URANIUM PENETRATOR

The Department of the Army has been undertaking a program to improve the standard 105-mm. tank armament since 1972. As part of this program, in September 1976, contracts were awarded to establish four production base facilities for the M735 projectile. Two of the facilities are for metal parts (Chamberlain Manufacturing, Waterloo, Iowa, and Flinchbough Products, Inc., Red Lion, Pennsylvania) and two are for tungsten alloy core producers (Teledyne-Nashville, Nashville, Tennessee, and Kennametal, Inc., Latrobe, Pennsylvania). All four mobilization base producers are currently producing M735 metal parts and tungsten alloy cores.

The Army's improvement program is now engaged in a project to replace the M735 round with the XM774 round. Instead of tungsten, the XM774 core is a depleted uranium kinetic energy penetrator called staballoy. The Army was required to establish new mobilization base production facilities for the staballoy cores and provide conversion of the metal facilities to accommodate XM774 production.

The staballoy penetrators have better performance potential at a lower cost. Tests of the uranium kinetic energy penetrators were conducted in 1975 by the United States, the United Kingdom, and the Federal Republic of Germany. These tests demonstrated the growth potential inherent in the standard 105-mm., tank-mounted M68 cannon. The M68 cannon has widespread usage since it is mounted on the M60 series, M48A5, and XM1 tank systems.

Since 1975 the Army Armament Research and Development Command has sponsored a development program for the XM774 depleted uranium penetrator. The bulk of the development was conducted by Battelle Northwest Laboratories and by Department of Energy (DOE) laboratories at Oak Ridge, Tennessee, and Rocky Flats, Colorado. This work developed the processes needed to initiate manufacture of the penetrators. DOE's Feed Materials Production Center, Fernald, Ohio, did extensive work to develop the production process. Producibility engineering and planning programs were conducted by Nuclear Metals, Inc. (NMI); National Lead of Albany (NLA); and Aerojet Ordnance and Manufacturing Company.

ARMY CONTRACTS FOR TWO
MOBILIZATION BASE FACILITIES

The Army's procurement plan called for two mobilization base production sources, each of which was to be capable of providing a monthly production capacity of 20,000 depleted uranium penetrators. Initially, each contractor was also to provide a limited production of over 20,000 penetrators from March 1979 to November 1979. The 1978 contract was negotiated with NLA for approximately $6 million.

The Assistant Secretary of the Army (Research, Development and Acquisition) limited the 1978 procurement solicitation for the penetrators to two commercial firms which were experienced in handling depleted uranium under Nuclear Regulatory Commission licenses (that is, NLA and NMI).

In March 1978 the Army provided $100,000 to DOE for a technical engineering and cost study to be conducted by the National Lead Company of Ohio (NLO). The resulting Omnibus Engineering Study was transmitted to the Army with the DOE comments in August 1978. The study concerned the use of DOE's Center for manufacturing depleted uranium penetrators.

While the Army said the DOE/NLO effort significantly advanced the state of the art of depleted uranium core penetrator production, the Army decided to award the 1978 contract to a privately owned and operated firm. This decision was made because of several factors, including DOE and Defense policies which generally are against competition when goods and services are available in private industry and the fact that DOE did not agree to commit the Center to become part of the industrial mobilization base.

Following the award to NLA in September 1978, the Army and DOE gave further consideration to using the Center for production of the penetrators. The Army initiated a review of the NLO study and the DOE comments so that it could develop data and procedures to evaluate the Center on a competitive basis with privately owned and operated firms. Also, Army and DOE representatives met to discuss the use of the Center. The parties agreed that there were no major outstanding issues, but no firm agreements were made to commit the DOE facility to this work.

In May 1979 the Assistant Secretary of the Army approved the second mobilization plant in accordance with Army policy to rely on more than one producer. He noted that available sources were limited to a few candidates due to the highly specialized technology required for processing depleted

uranium into a finished staballoy product. This time, however, he directed that comparisons be made between an updated DOE/NLO cost estimate and private industry responses to the solicitation. Also, he directed that the solicitation expressly state the Army's intention to make these comparisons with the possibility that the solicitation would be canceled if the DOE/NLO estimate were lower than the most favorable private company offer.

The solicitation provided that the DOE in-house cost estimate, based upon the work statement, was to be submitted to the contracting officer in a sealed envelope at least 2 days before the closing time for receipt of priced proposals. DOE was asked to include a statement of agreement to participate in the Defense Industrial Mobilization Production Planning Program for XM774 cores.

In the letter transmitting the cost estimate to the Army, DOE stated that the cost estimates were being provided for the Army's use in a comparative analysis of industry bids and that they were not intended as a proposal to produce the penetrators. The letter also stated that the Under Secretary of Energy had expressly reaffirmed that it was DOE's policy to encourage reliance upon competitive private enterprise to supply the products and services needed by the Federal Government. The letter went on to conclude that since private enterprise had demonstrated the ability to supply the penetrators to Defense specifications, DOE did not believe it would be necessary to produce the penetrators in its facilities.

Also, DOE's submission was not sealed; it was received August 17, 1979, rather than August 14, 1979; and it did not contain an agreement to participate in the mobilization program. The submission was also based upon a specification of 100 parts per million iron chemical content rather than the 50 parts per million that was specified in the solicitation. The submission stated that to meet the 50 parts per million requirement would result in added cost to the program. For these reasons the Army's contracting officer determined that the DOE cost estimate could not be considered.

Although six firms had expressed interest in the work, NMI was the only firm to respond to the Army's request for proposals and was determined to be technically acceptable. NLA was not eligible to bid because it was already in the program. The 1979 contract negotiated with NMI provided $2.9 million for the facility and $1.9 million for limited production.

ENCLOSURE II

COMPARISON OF NMI PROPOSAL AND DOE/NLO COST ESTIMATE

The Army's 1979 request for proposals originally was issued with the requirement that the comparison between the DOE/NLO estimate and proposals by private contractors be in accordance with Office of Management and Budget Circular A-76. This circular, which establishes policies for acquiring commercial or industrial products and services needed by the Government, requires that full costs be used in preparing in-house cost estimates. However, the circular does not apply to Government-Owned, Contractor-Operated facilities, except in the case of a new start or an expansion. These exceptions would not cover the Center in this case since the magnitude of the capital investment or operating expenditures was not over the necessary thresholds. Subsequently, request for proposals amendment #001, dated July 25, 1979, deleted the reference to the circular with the intent of using only incremental cost of the Government-Owned, Contractor-Operated plant for comparison. This was the comparison basis we recommended in our prior report to you. 1/

The incremental cost basis provides for allocating only additional "out-of-pocket" costs that would be incurred by adding the penetrator production to existing production. The full cost concept provides for allocating a portion of the overhead and labor cost already being borne at the facility (for example, depreciation). The cost estimate submitted by DOE/NLO showed both out-of-pocket and full cost. The DOE comments included a recommendation that the full cost of production be used for comparisons.

Both the incremental ($6 million) and full cost ($7 million) estimates submitted by DOE/NLO were higher than the cost proposal submitted by NMI ($5.3 million). The comparisons are shown below.

1/"Procurement of Depleted Uranium Penetrators for the Air Force," PSAD-79-88, June 13, 1979.

ENCLOSURE II

	Facility cost	Production cost	Total cost
NMI proposal	$3,302,000	$1,970,000	$5,272,000
DOE/NLO estimate:			
Incremental cost	5,000,000	1,039,000	6,039,000
Over (under)	1,698,000	-931,000	767,000
Full cost	5,000,000	2,084,000	7,084,000
Over (under)	1;698,000	114,000	1,812,000

Predictably, the incremental cost of production for the DOE/NLO plant ($1 million) was less than the full production costs at NMI ($2 million). However, this was more than offset by the cost of establishing the facility ($5 million vs. $3.3 million). NMI's lower cost for facilitization was principally the result of its large investment in facilities. Also, NLO pointed out that while certain of its production areas are in excess of DOE and Army requirements, specific additional capabilities would have to be added to support the desired penetrator production rate, primarily in the area of heat treating, machining, and inspection (certification).

Comparing of the estimates by specific cost elements was difficult because of the different format and wide variations in costs of the presentations. We should also point out that the quantities of material and labor in the DOE/NLO estimate were never validated by DOE technical personnel before submission to the Army. There were also unsubstantiated percentage factors applied by DOE/NLO to material, labor, and engineering for contingencies based upon their experiences.

ENCLOSURE III

PROBLEMS ENCOUNTERED

AND CURRENT STATUS

NLA has been experiencing difficulties in meeting New York State health and safety standards. The New York State Departments of Labor, Health, and Environmental Protection judged conditions both within and outside the NLA plant to be unsatisfactory. These agencies found 13 major violations, including uncontrolled generation of dust. These problems and extensive publicity in New York State concerning environmental problems (for example, the Love Canal) had an impact. The Albany plant closed down in February 1980 following a declaration by the New York State Commissioner of Environmental Conservation that he would seek an injunction to keep the plant closed until it demonstrated it could meet appropriate uranium emission standards set forth by the State. On March 5, 1980, the Army issued a stop work order which also called for subcontractors building equipment to complete the items, but not to deliver them to the Albany plant. The Army said it had not anticipated these problems because the contractor had been producing penetrators for the U.S. Air Force under subcontracts.

While the plant has been allowed to reopen, no work is being done on the depleted uranium cores nor does the Army contemplate that any additional work be done at this plant. Agreement has been reached between NL Industries and the Army to terminate the contract for default. It is intended that all facilitization equipment will eventually be transferred to a new, yet to be selected, mobilization base contractor because there is still a requirement for two mobilization base sources.

The NLA contract called for delivery of 29,000 depleted uranium penetrators for the M735A1 round beginning in March 1979 and ending in November 1979. The penetrator requirements for the M735A1 round were canceled, however, and a contractual amendment provided for canceling the M735A1 requirement and reducing the $6 million contract amount to $4 million. The Army recovered $1,957,000 of the original $2,260,000 funding provided for production. The balance was spent for work already begun and for the verification testing to show that the XM774 penetrators could not only be fabricated as a laboratory product, but also in a production mode with comparable performance. As of July 14, 1980, a total of $3.23 million had been spent on the NLA contract. NMI and DOE/NLO were also awarded separate contracts in support of the verification testing program.

ENCLOSURE III

The problems at NLA have resulted in the Army relying on one producer, NMI, and it was decided to accelerate the XM774 fielding date for the penetrators from the second quarter of fiscal year 1981 to the first quarter. As of February 1980, NMI was the only producer to successfully deliver penetrators for the verification program. NMI will be able to meet its share of the desired mobilization base production capacity of 20,000 units per month, which exceeds the 40,000 annual peacetime need.

The NMI contract was increased by $1.1 million to provide for the accelerated delivery of the penetrators to support a March 1981 European deployment for the XM774 round. This requirement was not contemplated at time of contract award and brought the total contract amount for NMI to $5.9 million, of which $1.5 million had been spent as of July 14, 1980.

NMI reportedly had difficulty moving into initial production due to a "green salt" problem. The green salt is a Government-furnished material (uranium tetrafluoride) used to obtain the depleted uranium metal used in the production of uranium penetrators. The green salt was said to have been unacceptably high in iron and magfluoride content, a problem which NLO had equipment to handle but NMI did not. We queried both the Army and NMI and were told that after identification of the high iron content, some straightforward procedural changes by NMI led to consistent production of material with low iron content. NMI said it does not have a quality problem with the green salt and does not require any special equipment to acceptably process Government-supplied green salt.

The Army mobilization base requirement still calls for two sources, but as yet, the Army has not solicited any proposals for the second source. The Assistant Secretary of the Army (Research, Development and Acquisition) has been advised of options, but his decision whether to include DOE in a 1980 solicitation for the second source and whether funds will be available is still pending.