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CABINET

MINISTERIAL COMMITTEE ON ECONOMIC STRATEGY

COMPUTERISATION OF PAYE

Memorandum by the Lord President of the Council

I was asked (E(80)25th, item 2) to arrange for the CCTA to prepare a full and up to date technical assessment of ICL's proposals, taking account of the CPRS suggestions (E(80)70); it is annexed. It has been prepared in consultation with officials of the Inland Revenue, Department of Industry and the CPRS. I hope colleagues will find it helpful; I would particularly draw their attention to the conclusions in section 10.

2. I was also invited to consider whether, in addition, an urgent independent assessment could be commissioned. I discussed this with the Chancellor of the Exchequer and the Secretary of State for Industry; we agree that this is likely to take some months and my colleagues are not agreed about its necessity or who should do it. My own view is that it is very doubtful whether such an assessment will help us more significantly than CCTA with the decision we have to take. For example what the CCTA assessment says about being unable to tell until 1981 whether or not ICL can provide a feasible system could only be echoed by an independent assessment. I have therefore taken no action on this at present.

3. The technical issue is not clear cut; ICL could, given time, probably produce a feasible solution. There are aspects of it which are still being developed and cannot be demonstrated at least

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until the middle of next year. CCTA see no reason why ICL should not do most of this development successfully, but until they have, there must remain uncertainties about ICL's ability to produce a system to do the PAYE job; there is however a particularly high risk that ICL may not be able to meet the serviceability requirement in full. And because of limitations in the products which ICL have available their solution will be a bit more difficult to operate than solutions other companies might offer. It should just about do the job, but there are likely to be a lot of teething problems for the first few years and it will probably not meet the Inland Revenue's requirement fully.

4. But it will take ICL longer than other companies, who may nevertheless have problems. It is difficult to say how long. CCTA say there is a high risk of at least a year's delay; this delay is likely to occur largely in the systems development and pilot implementation stages between 1982 and 1984. It will arise partly on account of the work mentioned above, but mainly because much of the software will be being used operationally on a large scale for the first time and because ICL have never put together so large or complex a system of this kind before. All companies have had difficulties in putting the bits of their large systems together for the first time, but the other companies can now show them working (eg large banking systems).

5. There is also a new point which I must draw to my colleagues attention. CCTA has just received from ICL a revised estimate of the cost of their proposal; this amounts to £42.5m, compared with their earlier figure of £33.5m and is largely accounted for by the additional equipment included in their latest proposal. CCTA have also received recently from IBM a proposal using British built processors estimated to cost £24.8m and based on their current list prices. After adjustment to ensure that the comparison is not being in any way unfair to ICL, CCTA consider that the ICL price is likely to be at least 30% (or about £10m) greater than IBM's; on earlier evidence CCTA consider that it is likely in the open tender situation that some other manufacturers would quote lower prices.

6. We have a straight choice therefore between, on the one hand, a year or so's delay and a significantly more expensive, feasible (but not the best) solution if we go to ICL, and on the other hand, commercial damage to ICL (difficult to quantify) if we go to open tender. (But if we decide to go to ICL, we must ensure any contract we place does not commit us to the company until they have demonstrated the feasibility of their system.)

7. I do not believe that we can avoid a straight choice. If we favour ICL, a consortium with Logica is desirable, but will not avoid the delay or do much to remove the warts from the ICL solution. If we decide on open tender there is nothing we can do to reduce damage to ICL in the short term; the scope for the use of British systems houses for various aspects of the project is limited and, although useful for the successful firms, will not help ICL.

8. One possibility which we might consider if we decide to go to open tender is to stipulate that all suppliers who want to be considered must include a minimum British content (or an undertaking to increase the value of their development or production work in this country to an equivalent extent); this would be impractical to enforce contractually but the multinationals would be unlikely to renege on such a commitment and it would provide positive benefit to the UK from the order.

9. My conclusion therefore are:

a ICL can probably just about do the job, but we shall not be able to be at all certain until this time next year; even then the Inland Revenue will probably experience considerable teething problems and may have to accept a solution which does not meet their requirement fully.

b ICL will take at least a year longer than would other manufacturers with more experience of this kind of system who can base their proposal on proven products.

c The ICL solution is likely to cost at least 30% more.

10. This means in effect that, at present, ICL do not meet any of the criteria of the procurement policy; they may be able to meet the performance criterion in about a year's time (subject to some concessions by the Inland Revenue) but they seem unlikely to meet the delivery or cost criteria. In principle therefore we should, under the strict terms of the procurement policy, proceed to open tender.

11. I invite my colleagues to decide whether we should acquire the computer system for PAYE by open tender or by single tender to ICL.

C.S.

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31 July 1980

ANNEX

TECHNICAL ASSESSMENT OF ICL OUTLINE PROPOSAL TO SATISFY INLAND REVENUE (PAYE) REQUIREMENT

1 Introduction

1.1 In accordance with Government procurement policy ICL have been invited to produce an outline proposal to satisfy the Inland Revenue (PAYE) requirement. This note provides a technical assessment of this proposal covering in particular:

a the extent to which the ICL outline proposal satisfies the PAYE Operational Requirement in respect of system capacity, serviceability, operation and timescale, that is, meets the technical criteria of the procurement policy;

b the assessment of the additional risks inherent in an award to ICL (over and above those to be expected from any supplier commanding high confidence) and the identification of the phases of the system development and operation at which these risks may occur;

c the capability of ICL to demonstrate their proposal successfully in their stated timescale (ie by end of April 1981).

1.2 This note also considers points arising from the CPRS paper to Ministers on the PAYE procurement (E(80)70) and from subsequent Ministerial correspondence.

1.3 There are no clear black and white answers to these issues or to many of their component parts. This is primarily because ICL's proposal includes some elements which have yet to be designed and some others which have not been operationally tested; at this stage CCTA can only offer a technical judgement, based on their considerable experience, on the extent to which these factors will affect ICL's ability to meet the PAYE requirement. A more precise assessment will not be possible until ICL are in a position to demonstrate their

proposal in mid 1981 (see section 8) and even then, there will remain risks (particularly timescale) which it will still be difficult to assess with any more precision.

2 Requirement

2.1 The requirement is for the computerisation of the routine work of PAYE, coding and many associated tasks which are currently carried out in approximately 580 local offices. The proposed computer system will broadly reflect the present organisational structure of the Inland Revenue, which consists of 15 management regions. Computer systems will be located in 12 regional processing centres (RPCs); 4 smaller regions will share computer facilities. Each RPC will have a computer network linking it to all local tax offices in the region. Regional processing centres will be linked to each other to form a national network.

2.2 Local offices will be equipped with visual display units (VDUs) which will allow immediate on-line access to taxpayers records held at the RPC; each tax officer will have a VDU making a total of about 20,000. The computer system will model the current situation where tax officers maintain the records for an allocated block of taxpayers. Day-to-day changes to taxpayer records arising from new assessments or coding will be made by tax officers using the VDUs to access and update the centrally-held records. Bulk processes,eg end-of-year issue of tax returns and processing of deduction cards, will be carried out at the regional processing centres. The workload divides reasonably evenly between the daily on-line activity and the bulk processing requirement.

2.3 The average response time required at the local office VDUs is 5 seconds or less for 95% of the messages. Batch work must be completed within an 8 hour period each day.

2.4 Discussions of the requirement have been held with ICL over a period of some two years. The draft of the Operational Requirement

was issued to the company on 13 June 1980; this confirmed and supplemented the information conveyed in earlier discussions and documents.

2.5 The proposed timescale for the implementation of PAYE is:

National Development Centre	Oct/Nov 1981
System design development and test	Sept 1981-March 1983
Region 1 implemented	December 1983
Regions 2-12 implemented	January 1985-April 1987

3 ICL's Outline Proposal

3.1 ICL's latest outline proposal for the national PAYE system was formally submitted to CCTA and IR at a meeting on 18 June 1980 having been outlined informally to IR on 13 May 1980 and to CCTA on 6 June.

3.2 CCTA held intensive discussions with ICL about the proposal during late June; officials from DoI and IR were also present. There have since been further discussions and ICL have also submitted supplementary information.

3.3 The proposal outlined by ICL covers the hardware and software for 12 regional processing centres, the National Development Centre (NDC) and (tentatively) for a National Index Centre. It also includes proposals for terminal control equipment in all local offices and for the terminals themselves for the NDC. The terminals for the local offices are to be the subject of a separate procurement later.

3.4 The latest proposal, the form of which is dictated by the products which ICL have available or in development, is similar to its immediate predecessor (described in ICL's budgetary proposal of 7 March 1980) in that it remains modular in concept, with each regional processing centre comprising a number of sub-regional centres (SRCs) ie up to 5 separate computer systems, each dealing with part of the workload, in the larger regions. Dual processors are no longer proposed and hence there are more SRCs per RPC than in the earlier solution (a national

total of 47 in the 12 RPCs instead of 33); in addition it provides a "Standby" Centre (SBC) at each RPC. The 'standby' centre is normally intended to act as a communication node for inter and intra-regional messages but this activity is relegated in priority when this machine is functioning as a standby for a faulty SRC.

3.5 The workload of each RPC is to be divided between the SRCs, each of which is a single S3 configuration, and the 'standby' centre which is also an S3 configuration. Each SRC would perform the processing for its share of the taxpayer records in the region and communication with up to 470 terminals in local offices through its own Christian-Rovsing (CR80) Front End Processor (FEP). The splitting of the processing in the way proposed will generate some additional workload in the form of messages between SRCs and the processing of these together with the normal inter-regional messages will be controlled via the SBC to which each SRC is connected via its FEP. The SBC would also be able to access the taxpayer database of an SRC but only when operating in a standby mode. The major characteristics of an RPC are shown in Appendix 1 which illustrates SRC and SBC configurations as it is proposed they could exist in the largest RPC.

3.6 The total basic hardware components are:

	SRCs	SBC	S3 Processors	CR80 (FEP)
RPCs	47	12	59	59
National Dev Centre	-	-	3	3
National Index Centre	-	-	(3)	(3)

3.7 Each SRC would operate under the control of the VME/B operating system and would also use ICL's data management (IDMS) and transaction processing (TPMS) software.

3.8 Involvement of other companies

ICL have made a number of suggestions concerning the involvement of

other companies in the development of their proposed solution. Specifically ICL have referred to:

a discussions with Logica on their partnership with ICL for the PAYE project. (An ICL/Logica proposal for this partnership was turned down by CSD Ministers until after the procurement decision has been taken because of the earlier involvement of the Chairman of Logica in the project Steering Committee.)

b discussions with several UK terminal manufacturers (VDU and printers) with a view to their joining a consortium;

c discussions with Racal-Milgo Ltd on the network management and control aspects of the system.

CCTA have no information of the respective roles of ICL or Logica in the proposed partnership at (a) or the precise nature of the arrangements which ICL propose for the consortia at (b) and (c).

4 System capacity

4.1 ICL have not carried out a full workload assessment (sizing) for the latest outline proposal but have based it on extrapolations of previous sizings. They have made estimates of the effect of increases in the workload, notified to them in March 1980, and included provision for CCTA's normal contingency allowances to cover any underestimates of the user workload. (ICL had in fact made valid assumptions about some of these allowances previously.) The revised workload was discussed with the company at some length in early April as was the basis for the calculation of the peak system loads.

4.2 It became clear during the detailed discussions immediately following the submission of the latest ICL proposal that the company had misunderstood the basis of peak system loads; the extrapolated sizing had been based on the latest peak workload figures but

incorrectly assumed that the peak activity lasted for 1 hour only and not the 4 hours advised by IR. The sizing had also concentrated on the processing of on-line transactions not taking full account of a number of other significant elements of the workload (eg daily and periodic batch, operational housekeeping tasks such as index maintenance and database reorganisation, network control overheads, and realistic inter and intra-regional traffic). While the processing of these elements would not necessarily adversely affect the system throughput in the four hour busy period they need to be quantified in order to establish whether the configurations proposed could accomplish the total system workload in the elapsed time allowed by the OR; it is by no means certain that they will.

4.3 Since the proposal was submitted and discussed the basis of the peak workload has been agreed between IR and ICL and the company have notified the results of preliminary calculations for some of the missing elements of the workload referred to in 4.2 (eg part of the batch work, inter/intra-regional traffic), but these are as yet insufficient to confirm the adequacy of the proposed solution.

4.4 It was made clear by ICL that the extrapolated sizing on which the proposal was based had included only 15% contingency for the peak period of on-line processing, which as a result of increases in the user workload would reduce to 10%. This contingency would necessarily have to accommodate any underestimations or inaccuracies in the company's assessment of their own system requirements; it is separate from the contingency mentioned in paragraph 4.1 above which covers growth or underestimation of the user's system. CCTA's past experience suggests that when the design of the manufacturer's own proposed solution is still at an early stage the level of contingency on that account should be not less than 25%.

4.5 It is understood that ICL have commenced the preparation of a full sizing which they expect to complete by the end of September 1980. This will include the total workload requirement and indicate the contingencies available.

4.6 Since:

a ICL's sizing is incomplete;
b their level of contingency is low:

it is CCTA's conclusion that at best the system capacity of the presently proposed RPC configurations is likely to prove marginal to meet the peak conditions as defined. In principle any shortfall could be overcome by the addition of further equipment with the consequence that the operational difficulties will be increased (see also section 6), provided that the company can satisfy us that the configurations can be viably extended. Greater confidence in the system capacity of the configurations can only be provided by completion of the detailed sizing currently in hand within the company and expected to be completed by the end of September 1980; it will not be possible to confirm this theoretical sizing before the practical demonstration in mid-1981 (see section 8).

5 Serviceability

5.1 Serviceability in the context of the PAYE project has to be considered from the point of view of:

a the terminal users in the local office;

b the operation at the RPC as a whole, including the batch operations.

(a) is dependent on the reliability of the S3 configuration (including the other elements such as the FEP) servicing a particular group of local offices, backed up by the standby system; (b) depends on an aggregate of all the S3 configurations at the RPC.

5.2 The minimum requirements for the PAYE project as defined in the Operational Requirement call for 97.5% availability at each regional processing centre; and a mean time between system incidents (ie those which lead to an interruption of normal operations) of at least

50 hours. The precise definition and interpretation of these requirements is being reviewed by IR/CCTA in the context of the type of solution put forward by ICL in order to ensure that they reflect correctly the level of service which terminal users will require.

5.3 During initial discussion of their proposal ICL quoted reliability figures for the S3 system significantly above those previously notified by the company to CCTA. ICL have submitted revised figures and there has been further detailed discussion of these. The figures now quoted for the performance which the early S3 systems are likely to achieve (around 100 hours between system incidents) are regarded by CCTA as credible and are more consistent with their earlier understanding; these, without the standby facilities (see 5.4 below),are equivalent to 20 hours between system incidents for a large regional centre, compared with a requirement for 50 hours. ICL predict further long term improvements but have pointed out that these are less certain as they are dependent on field experience in the future. Details have also been provided of an extensive reliability improvement programme, which will be taking place over the next two years.

5.4 In order to achieve the required level of serviceability the ICL proposal includes the provision of an automatic 'switch to standby' feature which has yet to be designed by the company. The effectiveness of this feature will depend upon the provision of facilities which can distinguish between types of system incidents and avoid unnecessary invocation of the standby system. This may well prove difficult to implement satisfactorily and the level of improvement to be achieved by the reliability improvement programme is unlikely to make this standby feature unnecessary. The risk of ICL's proposal failing to satisfy the PAYE serviceability requirements is therefore high.

5.5 The overall serviceability level which ICL are likely to achieve will also depend on:

a quantification and confirmation in practice of the time taken to achieve automatic switchover, this is presently, somewhat loosely, defined by ICL as "a few minutes";

b the effect on overall serviceability of switching back from the SBC to the SRC once a fault has been repaired;

c the practical and effective application of the criteria to activate the automatic standby procedures.

5.6 Whilst the levels of serviceability required by PAYE are no more stringent than those which could in principle be satisfied by other manufacturers the risks to successful implementation of an automatic 'switch to standby' system are such that,should single tender to ICL be recommended, it might be preferable to review the PAYE currently stated requirement and to see if the lower level that would be provided without this feature could be acceptable and preferable to the introduction of a potentially complex switching mechanism.

5.7 CCTA therefore consider that, although the latest computer system serviceability figures quoted by ICL are credible and improvements are planned, it is unlikely that these will be sufficiently high to meet IR's current serviceability requirement without an automatic 'switch to standby' arrangement. The successful implementation of a 'switch to standby' system seems therefore essential to the full satisfaction of the PAYE serviceability requirements; but ICL have not yet satisfied CCTA that this can be achieved. The earliest that it will be possible to form a more precise view on this will be at the time of demonstration (see section 8), but even then this 'switch to standby' system may only exist in a very crude form.

6 Operating the Computer Systems

6.1 In formulating the Operational Requirement for PAYE it was recognised that within a region a number of approaches to workload and database sharing were feasible and that the solutions proposed

would need careful consideration, having regard to the way in which they satisfied the overall system requirements and the ease of operational management.

6.2 Full consideration of the operational aspects of the proposal will not be possible until it is better defined. ICL for their part have indicated some advantages for their proposal, notably:

a it uses standard modules of processing power which can be fully tested and proven in the first region;

b it is flexible and allows for variations in the size of the regions and for future growth by the addition of extra SRCs;

c failure at SRC level would only affect the terminal users connected to the failed SRC.

6.3 However a preliminary examination by IR/CCTA has highlighted the following potential problem areas, which will assume even greater significance if the configuration has to be enhanced to overcome any system capacity shortfall. The problem areas include:

a The division of each RPC into a number of independent SRC configurations, each requiring individual operator control, will increase the complexity of the overall management task leading to possible confusion during stress conditions, particularly during standby modes of operation.

b Each SRC will be responsible for processing most of the elements of its share of the regional load but will be dependent on the SBC for standby operations and inter/intra regional messages.

c The SBC is to provide not only standby facilities within and RPC but is also to carry out operational work. An

automatic switchover will involve the interruption of the handling of inter-regional messages to and from its own SRCs and other RPCs. This will introduce further operational management complexities.

d Because of the discrete nature of the SRC configurations it will be difficult to balance the inevitable fluctuations in resource requirements arising from day to day changes in the work patterns of district offices connected to particular SRCs.

These problems to a large extent derive from the presence of a SBC also performing independent work.

6.4 When more detail is available it will be necessary to weigh the advantages claimed by ICL against the potential problem areas highlighted above in order to determine more fully the operational implications of the ICL design. It is clear however that there may be system capacity shortfall and manpower overheads associated with the design and these will need to be assessed.

6.5 CCTA consider that the solution proposed by ICL is workable but will, at least in the first few years, present difficulties in operation. A more precise assessment will be possible at the time of demonstration (see section 8), but the difficulties may not become fully apparent until the first region is in operation in 1984.

7 Timescale

7.1 The ICL proposal requires the use of much equipment and software which has not been used previously in comparable operational circumstances and some of which is still in development.

7.2 The status of the main system components is:

a The S3 processor on which the ICL proposal is based is a development of the smaller more reliable end of the 2900 range. Four pre-production S3s are being used for product approval trials. First customer deliveries are due in the second quarter of 1981. CCTA are confident that these dates will be met.

b The CR80 front end processor is already available as a device but requires some additional software facilities. CCTA are confident that ICL will implement these without difficulty.

c The discs (FDS640) proposed for the storage of the main database have not yet been subject to internal validation by ICL. No dates are yet available for the release of these devices although ICL have indicated that they could be demonstrated in August 1981.

d The versions of the basic system software proposed (VME/B, IDMS and TPMS) are currently becoming available on controlled release. Some further software development would be necessary however before the proposed system could be demonstrated (see section 8), but these are estimated by ICL to be no more than 3 man years of resource. CCTA do not expect this to present any difficulty.

7.3 The PAYE project will be the first really large project on which much of the systems software will be used operationally. For this reason it will not be stable or have previously run under as stressful conditions and exposed to much random data or operator interaction. It is inevitable therefore that significant work will be necessary to remove software faults and the redesign of problem areas will be continuing after the time of demonstration, causing delays and interference to the smooth development of the PAYE system and its initial operation. This situation will also lead to more system failures in the early years than a user might reasonably expect if he were using operationally proven products.

7.4 There are also aspects of the outline design, which, when examined more closely, are almost inevitably going to reveal further problems and result in development effort. ICL have little previous experience with communication based computer systems of this scale; this was recognised by Ministers when the demonstration and proving of the ICL large transaction processing system (now known as ADNET) received support from DoI in 1979. Nevertheless it is common knowledge that all other companies have had to overcome significant difficulties in their first customer development and application for this environment; it is no criticism of ICL to expect that they will also meet problems.

7.5 It is CCTA's conclusion that since the proposal is based upon much new equipment, much software not yet used operationally on the scale required for PAYE, and a design that has not yet been fully developed in detail there is a high risk of slippage to the Inland Revenue's timescale, probably in excess of one year. This slippage will be above that which one might expect for a project of this size when operationally proven products are available and is most likely to occur during the period of development and initial operation of the first RPC, that is between 1982 and 1984; there could, however, be some further problems when subsequent regions are added to the network. There are also likely to be more system failures in the early years than might be expected from the use of operationally proven products.

8 The Demonstration

8.1 IR/CCTA require demonstration of the ICL proposal in order that there can be confidence that the company's outline proposal, and the hardware and software on which it is based, is likely to satisfy the PAYE requirement. It is recognised that the demonstration will not eliminate the need for ongoing development to overcome errors and deficiencies which will only become evident within an operational environment.

8.2 ICL originally indicated that they would demonstrate their ability to satisfy the system capacity and facility requirements of

the PAYE system by 31 March 1981. To this end they proposed to make available two S3/CR80 configurations which they would use to represent one SRC and one SBC. These configurations would be used to simulate the processing on the SRC of its share of the regional workload and on the SBC the processing of a full region's load of inter-regional messages. ICL consider it unnecessary to build a whole region to demonstrate their capacity to meet the whole requirement. However, because of concerns expressed over this point by IR/CCTA they have revised their original proposal and now intend to demonstrate the connection of multiple SRCs to the SBC (by the use of magnetic tape units to simulate the load from additional SRCs); ICL expect to be able to demonstrate this additional aspect of the demonstration by 30 April 1981.

8.3 In making their proposals for demonstration ICL have made it clear that currently planned hardware and software developments must be completed before demonstrations can be undertaken (see 7.2(d)). They have also made it clear that the configurations offered could not include the FDS640 disc drives, proposed for database storage in the live system, but that appropriately loaded EDS 200s would be offered in their place. The full demonstration configuration is not planned to be available until approximately 3 months before the scheduled date for running the demonstration. This leaves little time to resolve system capacity and any other deficiencies revealed during the final system integration and preparation of the demonstration. ICL have recently confirmed their earlier estimates of the work to be undertaken to prepare the software for use in the demonstration. CCTA believe that the necessary enhancements to the software and the work (ADNET) currently being done under the DoI development contract may prove greater than ICL's estimate; but against this it has to be recognised that the ADNET team are very familiar with their tool.

8.4 A diagram of the configurations offered for demonstration is at Appendix 2.

8.5 The company are undoubtedly confident of their capacity to mount a satisfactory demonstration successfully by end of April 1981 (including the simulation of additional SRCs), but they recognise that availability of equipment (particularly S3 machines) puts a tight constraint on the timescale.

8.6 CCTA consider that ICL's revised demonstration proposal is sufficient to prove the company's capacity to provide a feasible system for PAYE. However, CCTA concludes that there is significant risk that ICL will not be able to mount this demonstration at the end of April 1981 for logistic and developmental reasons; but have reasonable confidence that the delay should not exceed 2-3 months. If the demonstration is based on ICL's present proposal there is a risk of it failing to provide adequate system capacity (see section 4). This will not be serious provided that the company can satisfy CCTA that the configuration can be viably extended. The demonstration is, however, unlikely wholly to resolve uncertainties about ICL's achievement of the full serviceability requirement and the likely problems in operating the computer systems. Even if the demonstration is successful this will not alter CCTA's judgement there there is a high risk of at least a year's slippage in the Inland Revenue's timescale, primarily during the period of development and initial operation of the first RPC. The precise consequences of an unsuccessful demonstration are difficult to judge at this stage.

9 CPRS Proposals relating to ICL

9.1 The proposal that ICL should be required to work with a software company has merit and it should be noted that they have already proposed a partnership with Logica (see section 3.8). Such a collaboration could augment ICL's internal level of experience and increase the company's awareness of the practical implementation of large scale network based projects. This could in turn increase confidence that ICL would be capable of putting forward and implementing an acceptable system design. It would not, however, remove all the technical doubt raised in section 7, relating to ICL's ability to integrate the necessary software and hardware to

meet the PAYE timescale. Any reduction in the estimated delay of at least one year is unlikely to be substantial.

9.2 The proposal that software and systems companies should participate in the applications development and project control is consistent with Inland Revenue's and CCTA's present intentions. The most appropriate firm to undertake the application systems development is the Computer Sciences Corporation, a UK subsidiary of a large US systems house which has been closely involved in these aspects with the Inland Revenue for the last two years. Inland Revenue and CCTA also intend to contract out the overall project control task; this is likely to go to a British consultancy or systems company. Any contracts arising from these areas would be separate from the main hardware contract The involvement of systems companies in this way is likely to increase only marginally the UK content of the project, but responsibility for the overall project control would provide considerable benefit for the successful company.

9.3 The CPRS also refer to the possibility that, if the procurement were undertaken by open tender, a mandatory requirement for a bid by a multinational computer manufacturer seeking the prime contract might be a partnership with a UK software systems company. It is difficult to discern any technical justification for such a partnership since an important criterion for selecting a multinational manufacturer will be that he can offer proven products; the obvious role for a systems house of developing operating software is therefore unlikely to exist. The advantage would be solely in the prestige value to the systems house of being seen to have been involved. More appropriate ways of involving systems houses are those outlined in paragraph 9.2 above.

9.4 The point referring to possible limitation by the successful supplier of the opportunities for UK based terminal suppliers to participate has already been taken into consideration in the planning of the management of this procurement. Stringent safeguards will be laid down in the Operational Requirement and repeated in the invitations to tender for this project to prevent any such action. The opportunity for UK based terminal companies to participate will be safeguarded and their contribution to the overall UK content of the project could be significant.

9.5 CCTA consider that a consortium between ICL and a software company would increase confidence in ICL's ability to propose and implement an acceptable system. It is, however, unlikely that it would lead to any substantial reduction in the risk of delay of at least one year. Employment of software companies in system development and project control is planned but will not significantly increase the British content.

CONCLUSIONS

10.1 CCTA conclude that, subject to the risks and consequences described in paragraphs 10.2 and 10.3 below, ICL are likely, given time, to provide a technically feasible system for PAYE. This conclusion is at present based on CCTA's assessment of ICL's outline proposal, in the light of their considerable knowledge and experience of the company and its products. A firmer conclusion will not be possible until ICL are able to demonstrate the feasibility of their proposals, and this is unlikely to be until the middle of next year; even then there will be important aspects of the proposed solution (especially those in 10.2.2 and 10.2.3 below) about which some uncertainty will remain, and a successful demonstration will in no way reduce the risk of delay (see 10.3).

10.2 CCTA consider that the main risks in the proposed solution at present are:

10.2.1 System capacity The system capacity of the configurations currently proposed is likely to be marginal in relation to the peak loads. In principle any shortfall could be overcome by the addition of further equipment, provided that the company can demonstrate that this is viable. This should be possible, but the solution may increase the operating difficulties (see 10.2.3).

10.2.2 Serviceability Achievement of the serviceability levels required by the PAYE requirement depends on an automatic 'switch

to standy' feature which ICL have yet to design. CCTA consider that this will be difficult and that the risk of failure is high. The consequence of this will not be that the system will not work, but that the user will have to live with a lower level of service; the precise extent of the shortfall will depend on the success of ICL's other work to improve the reliability of their equipment on which it is too early to form a view.

10.2.3 Difficulties in operation The nature of ICL's solution, which is largely constrained by the products which they have available or in development, will cause management difficulties at the computer centres; there is a particular risk of confusion, because of operational complexity, in periods of stress such as when part of the equipment fails.

CCTA does not consider any of these risks is such as to lead to a total failure of the system to do the PAYE job, but they could, if they are not overcome, confront the user with a series of problems, such as frequent system breakdown, particularly in the early years, and may mean that the user does not have a system which is in accord with his requirement.

10.3 In addition, CCTA conclude that there is a high risk that ICL will be at least a year late in meeting Inland Revenue's timescale; this delay will be on top of that which might be expected for a project of this size when operationally proven products are being used. The company proposal is based on much new equipment, much software not yet used operationally on the same scale, and a design that has not yet been fully developed in detail; on top of this the company have little previous experience with computer systems of this kind or on the scale required for the PAYE project. All other companies have experienced significant difficulties in their first customer development and application in these circumstances. This delay will primarily occur during the application system development and the initial operation of the first regional processing centre,

that is, between 1982 and 1984, but there are likely to be some further problems when subsequent regions are added to the network.

10.4 In terms of the present procurement policy therefore ICL cannot at present demonstrate that they can offer satisfactory performance (that is meet the user's requirement) or satisfactory delivery (that is provide a robust system at the time when the user needs it to begin his development). On the basis of the intensive discussions which CCTA have held with ICL about their outline proposals and their own detailed knowledge and experience of the company over many years, CCTA consider that there is a high probability that ICL will be able to mount a successful demonstration of the feasibility of their proposed system by June/July next year. This will not resolve all doubts but may enable CCTA to confirm that, provided the risk of a number of shortcomings can be accepted by the user (see paragraph 10.2 above), ICL will be able to meet the performance criterion of the procurement policy. Whatever the outcome of the demonstration, CCTA considers that there will remain a high risk of at least a year's delay and the position will remain that ICL will still be unable to meet the delivery criterion as defined above.

10.5 CCTA have not received detailed proposals from other manufacturers and have not undertaken similarly detailed discussions with them. But although they have not had the opportunity to see the operational requirement, a number of them have kept in close touch with CCTA and the Inland Revenue's project team. On the basis of their knowledge of the products of these companies, and of working systems similar to that required by the Inland Revenue (eg banking systems), CCTA consider that a number of other manufacturers are likely to be able to meet the PAYE requirement in full with proven products.

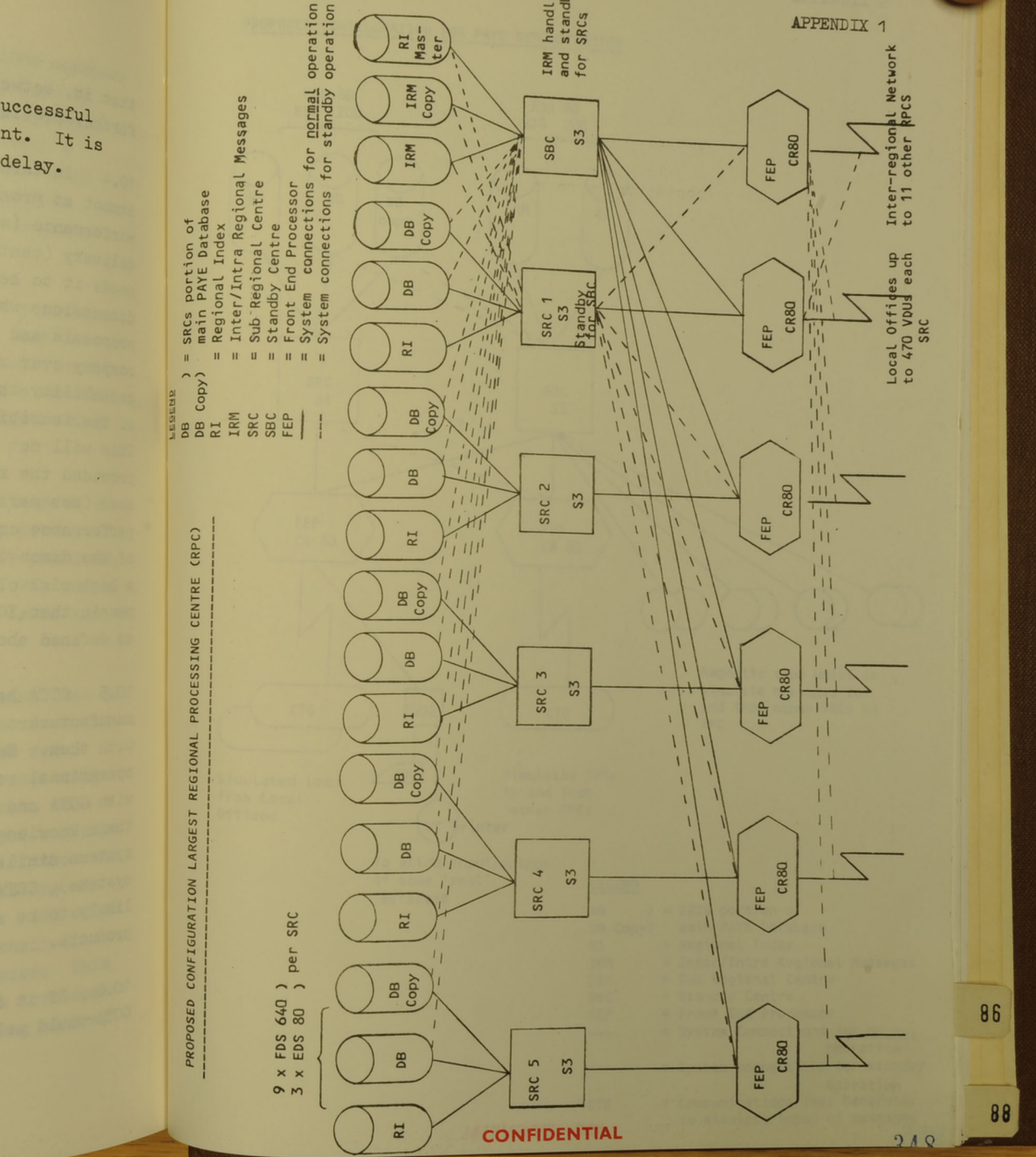
10.6 If it is decided that ICL should undertake the PAYE project, CCTA would welcome collaboration between ICL and a systems

company. This would increase their confidence in a successful implementation of a system to meet the PAYE requirement. It is unlikely however substantially to reduce the risk of delay.

Civil Service Department
Central Computer and Telecommunications Agency

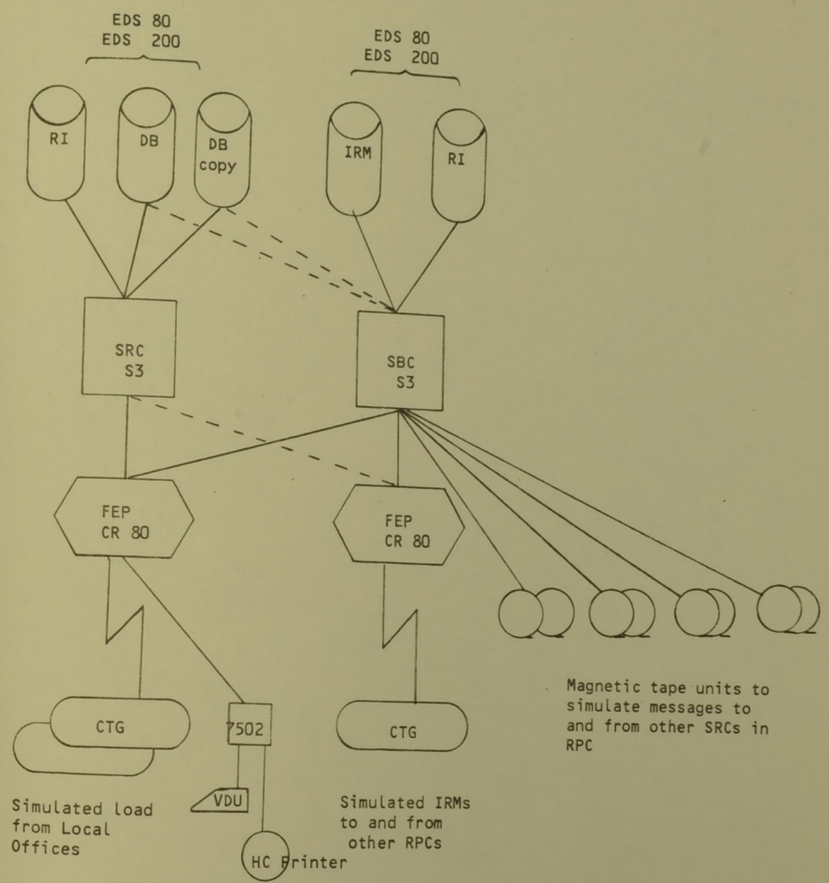
31 July 1980

APPENDIX 1



CONFIDENTIAL

PROPOSED CONFIGURATION FOR PAYE DEMONSTRATION



LEGEND

DB) DB Copy)	= SRC's portion of main PAYE Database
RI	= Regional Index
IRM	= Inter/Intra Regional Messages
SRC	= Sub Regional Centre
SBC	= Standby Centre
FEP	= Front End Processor
——	= System Connections for normal operation
---	= System connections for standby operation
CTG	= Communications Test Generator to simulate input of messages

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