NEW FILE

CDE TM 8

Copy No. 5 of 6 copies

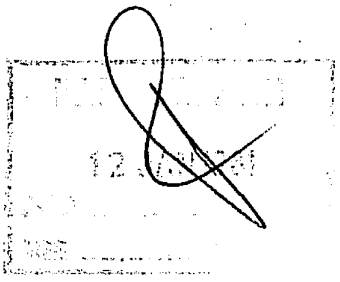
1

5TM
7 Dec 89
OC

CAVE
CDE

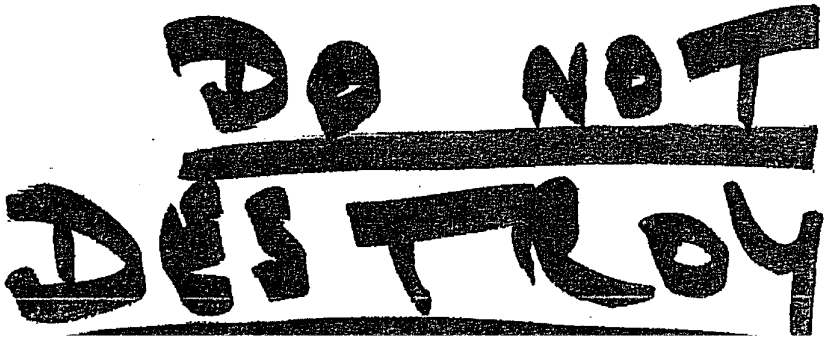
CLOSURE OF CDE NANCEKUKE

Technical Memorandum No. 8



November 1980

Chemical Defence Establishment,
Porton Down, Salisbury, Wilts.



with compliments

from

TECHNICAL INFORMATION SECTION
Procurement Executive, Ministry of Defence
CHEMICAL DEFENCE ESTABLISHMENT
Porton Down, Salisbury, Wilts.
Telephone Idmiston (0980) 610211 ext.

CDE TECHNICAL MEMORANDUM No 8
DATE: NOVEMBER 1980

CLOSURE OF CDE NANCEKUKE

1. SUMMARY

The closure of CDE Nancekuke has been completed within the time scale predicted in the original plan.

The cost of the closure is estimated to have been £907K, corrected to 1975 prices, compared to a forecast cost of £824K at 1975 prices. This has been offset by the revenue from recovered disposable silver of £1.5 million.

Non-industrial staff were satisfactorily placed according to their wishes in practically all cases, either by transfer or by voluntary premature retirement. At closure 2 staff were redundant.

Industrial staff were allowed to leave on redundancy terms as they obtained alternative work. No one was made compulsorily redundant before closure.

Medical surveillance of staff engaged on dismantling and demolition showed that personnel did not suffer from any chemical hazard. Unfortunately one serious accident was recorded involving physical injury.

Clearance certificates, specifying that everything left was safe to handle, have been signed for all buildings, including former air raid shelters used by CDE Nancekuke.

A photographic record of the site has been prepared, with a list of buildings, including bunkers, giving their uses and their fate.

A number of areas on the site where equipment or chemicals have been buried have been marked on the site map as areas not to be disturbed in future years.

Documents relating to the ecology and conservation of the site did not indicate any adverse effect from the presence of CDE Nancekuke.

DOE were asked to arrange for the demolition of all buildings not required by future users of the site and for the filling in and landscaping of various areas.

Use of the site by the RAF commenced in January 1979 and by Pattern Recognition Munitions Ltd in March 1979.

CLOSURE OF CDE NANCEKUKE

CONTENTS

CONTENTS (contd)

CDE TECHNICAL MEMORANDUM No 8
DATE: NOVEMBER 1980

CLOSURE OF CDE NANCEKUKE

2. INTRODUCTION

The 1976 Defence White Paper (Cmd 6432) announced on 17 March 1976 the closure of CDE Nancekuke as part of a programme of Defence cuts. The staff were informed of this decision and the reasons for it by the Director CDE on the same day. The next few weeks however saw mounting opposition to the closure from both the Staff Organisations and the Trade Unions.

There followed a protracted period of consultation, argument and counter argument which lasted until 26 August 1977, when at a final meeting with the Trade Unions and Staff representatives, the Minister of State for Defence announced that the original decision to close CDE Nancekuke would stand and would be implemented immediately.

3.1 CLOSURE PLAN

Soon after the original decision, a plan was drawn up for the closure of CDE Nancekuke in an orderly and phased manner, with the object of achieving significant economies from FY 1978/79 onwards, leading to an annual saving of £500K on completion of the closure programme.

The plan envisaged the completion of the scientific programme by the end of FY 1977/78, mostly by 31 December 1977. This was to be followed by a second phase involving removal and decontamination of all plant and facilities, destruction of stocks of unwanted chemicals and disposal of surplus equipment and stores. A summary of the tasks for each building was given with estimated dates for completion. The proposed run down of non-industrial and industrial staff with suggested transfers to other establishments was outlined. It was thought that the closure could be completed by September 1980 provided a reasonably balanced workforce could be maintained and that morale did not reach too low a level.

3.2 REVISED CLOSURE PLAN

Because of the long delay between the announcement of closure and the end of the negotiations with the Staff and Trade Union representatives it became necessary to revise the original closure plan. Until the Ministerial decision had been made,

and whilst consultation was still in progress it would have been not only unethical to have asked the workforce to start dismantling plant, but any such request would have led to industrial action.

The revised closure plan is shown in Appendix 1. Those aspects of the revised plan which concerned the workforce (such as redundancy dates) were fully dealt with at Whitley meetings.

The revised plan reflected the extension of the scientific programme in many aspects by up to 1 year, permitting extra production of CS and Activated Charcoal Cloth, additional processing of Orasol Navy Blue and extended studies on the extraction and immobilisation of the enzyme cholinesterase.

The dismantling programme, which under the original plan would have been started in summer 1976 and would have run alongside the continuing work programme, was estimated to have been delayed by 34 weeks, assuming that the total strength of Craftsmen then available could be deployed on dismantling. The delay would be proportionately longer if lower numbers had to be used. No allowance was made to the staffing tables. It was decided to compensate for the delay later in the programme should it become necessary. Thus the estimated final closure date of September 1980 was not altered.

3.3 REDUNDANCY ARRANGEMENTS

From the original announcement of the closure in March 1976 one of the problems faced by management was the issue of when staff (particularly industrial staff) would be allowed to leave on redundancy terms. As Nancekuke was situated in an area where unemployment ranged from 10-15% the anxiety of the workforce was well understood. The Superintendent personally interviewed each member of the workforce, staff and industrial, to establish each individual's preference for the future with the object of trying to treat each person's problems as sympathetically as possible within the rules.

The main issue that emerged both from the interviews and from meetings with the Trade Unions was the timing of the declaration that a state of redundancy existed. In the event, because of the protracted consultations on closure, all of which took place after the announcement of closure rather than leading to it, a state of redundancy was not declared until 26 August 1977. The redundancy state was only declared for Industrial Staff. Non-Industrial Staff were to be dealt with either by transfer or by allowing Voluntary Premature Retirement for people over 55.

In the event, two non-mobile Non-Industrial Staff were made redundant. The effect of the delay was felt worst by the longest serving and most loyal members of the workforce who because they had so much to lose could not seek future work from the few jobs available. The people with short service lost little by resignation and were able to take advantage of the few jobs which were advertised. This soured the atmosphere surrounding discussions with the Trade Unions on redundancy.

The key problem in the selection of people for redundancy was the maintenance of a balanced workforce. The balance would not have been maintained had seniority across the board been the criterion for redundancy decisions. To overcome this problem the workforce was split into disciplines (Craftsmen, Experimental Workers etc) and seniority within the groups was proposed as the criterion of redundancy, using the numbers required by the closure plan to phase the losses over the whole closure period. This proposal was accepted by the Trade Unions. Redundancy lists were formally agreed for publication on 15 November 1977.

The formal announcement that a state of redundancy existed led to more requests to be allowed to leave voluntarily on redundancy terms than had been anticipated, in view of the high unemployment level in the area. As would be expected, those who found alternative jobs easiest to obtain were the skilled rather than unskilled or semi-skilled. To permit the maximum number of volunteers to leave and preserve a balanced workforce an agreement on flexibility was put to the Trade Unions.

Under this agreement, the management undertook to release people on redundancy terms when they obtained alternative work in exchange for flexible working by the workforce. The flexibility agreed committed craftsmen electricians with no electrical work to help with other dismantling work and craftsmen accepting management using semi-skilled labour (eg Experimental Workers) on minor dismantling of plant. Management did however reserve their rights under MOD Manual 9 to refuse redundancy where it would prejudice the plan to complete the closure by September 1980.

In the event, the flexibility agreement has been the main reason for the excellent progress made toward closure and for the maintenance of reasonable morale through a difficult period. The flexibility given by the workforce has far exceeded initial expectations and demarcation arguments have been insignificant. Management did not find it necessary to invoke their reserved rights to refuse redundancy on any occasion.

4.1 IMPLEMENTATION OF THE CLOSURE PLAN

The objective was to close the establishment in an orderly and phased manner achieving significant cost savings by FY 1978/79 onwards leading to the final closure by September 1980. The main elements in the implementation of the plan were:-

a. Management of the run down of personnel.

b. Dismantling and decontamination of chemical plant and buildings.

c. Maintenance of an adequate record of the use to which each building had been put and the treatment that building and contents had received leading to the signing of the clearance certificates.

d. Compilation of data referring to the surveillance of workforce employed on dismantling, smelting etc and the writing of a medical report.

e. Transfer and disposal of stores, equipment and chemical stocks.

f. Preparation of a site map showing areas on site not to be disturbed in future years along with a photographic record of the site.

g. Transfer of documents, files and drawings.

h. Collection of documents relating to conservation and ecology of the Nancekuke site.

4.2 MANAGING THE RUN DOWN OF PERSONNEL

The run down of mobile non-industrial staff was achieved by transfer to CDE Porton or to other establishments or by normal or Voluntary Premature Retirement. For non-mobile non-industrial staff the policy was to try to place them by direct management contact with other employers (eg local authority, police or public boards and other government establishments within travelling distance) or to invite the Regional Employment Officer to assist. The policy worked well and practically all the non-industrial staff were satisfactorily placed either by their own effort or with management support. Redundancy was declared for the two remaining non-industrial staff, 6 months before closure.

For industrial staff a state of redundancy was declared on 26 August 1977 some 17 months after the initial announcement of closure. Between the two dates 18 industrial staff resigned to take other jobs. They were mainly people with short

service who had little redundancy pay to expect, or people who were over 60. By 31 March 1978, the date the first redundancies were scheduled, the actual numbers were below those required on the closure plan. The extra reduction in numbers was compensated for by deferring the redundancy dates of others on an equivalent cost basis.

The rate of voluntary redundancy continued to be consistently greater than that required by the closure plan, and by 31 March 1979 (without increasing the overall cost) it was possible to defer the redundancy of all the remaining industrial staff until closure. A Table is given in Appendix 2 comparing the actual strength at 6 monthly intervals with that required in the revised closure plan, Appendix 1.

4.3 DISMANTLING AND DECONTAMINATION OF PLANT AND BUILDINGS

4.3.1 Buildings

Over a period of almost 30 years, MOS Nancekuke followed by CDE had occupied 96 buildings approximately half of which had been used either for chemical work or chemical storage. About 30 buildings were considered to need specialised attention, because they had been used for plant operation, as laboratories or for storage of bulk quantities of intermediates or chemicals with which difficult handling problems were encountered. A list was prepared of all buildings on the site. This is shown in Appendix 3 which also includes a list of bunkers used by CDE Nancekuke. These air raid shelters are shown ringed in brown on the site map. The list includes the size, construction and approximate year of origin of the buildings. Additional information on the chemical usage of buildings and the fate of buildings after closure, with the site of rubble from buildings already demolished, is given in Appendix 3 where appropriate.

4.3.2 Decontamination

Where buildings had contained plant used in toxic or hazardous operations, the policy had always been to decontaminate that plant once the production had ended. Consequently although plant was still in place in a number of buildings, it had received preliminary decontamination. Otherwise, the first step in the dismantling process was to fill the equipment as far as possible with the appropriate decontaminant usually aqueous or alcoholic sodium hydroxide or sodium hypochlorite. After an appropriate time, the plant was drained so that dismantling could commence.

After decontamination, detection equipment appropriate to the hazard was introduced into the plant cubicle to test for background activity before any joints were broken. Once it had been shown that no hazardous material was present,

personnel in full protective clothing commenced dismantling from the top downwards in each separate cubicle. As each joint was broken, the jointing materials were placed in decontaminant and the piece removed with each open end sealed with neoprene or other suitable material and transferred to a large bath of decontaminant as a further safeguard. The whole operation was monitored - the portable monitor probes being taken close to the joint being broken. DICE detectors backed up by RVD and the Schoenemann method detector were used in the case of the GB plant. A number of positive alarms occurred although the original decontamination had taken place more than 20 years earlier. When a positive reaction on the ionisation detectors was observed, it was checked by the RVD and Schoenemann methods. Where the contamination was shown to arise from an anticholinesterase agent, personnel were withdrawn from the cubicle until the ventilation system (off gases being scrubbed in a tower through which aqueous caustic soda flowed) reduced contamination to an undetectable level (usually a maximum time of one hour) or further decontamination had been completed with the same result.

The components of the plant were dismantled systematically making sure that every joint which decontaminants might not have reached was properly broken and retreated. Once the plant itself had been removed, all the connecting services were similarly treated, particular care being taken with service lines such as vacuum. Then followed the systematic decontamination of cubicle walls prior to their removal. Lastly the walls of the building and the drains were treated with decontaminant and washed through with water.

4.3.3 Disposal of Dismantled Material

All decontamination effluent was collected and treated at source or held in the main effluent tank at North Site where it was neutralised and tested against some of the local marine species (prawns, gobies). Only when the test indicated no effect was the effluent discharged into the sea, sometimes after further dilution. Access to the effluent shaft was secured and responsibility for the future safety of this outfall lies with PSA. The effluent system used at Nancekuke is shown in a series of drawings held by PSA Plymouth. A list of the relevant numbers is included with the site map held by TIS CDE.

All pipework associated with CW agents was decontaminated and deposited in the equipment dump, "A" on the site map. All effluent lines were decontaminated, thoroughly washed and removed to dump A except those parts which went under roads and were left in position. Where accessible the open ends were capped. The

locations of all these buried lines and all other remaining pipes are indicated in the documents held by TIS CDE. None of the remaining pipework has been associated with chemicals. Some, such as that for steam and heaters has been left in position for the RAF. All metalwork, cubicles etc which have been buried on site have been deposited in dump "A". All buried chemicals are in dump "B". Where asbestos was removed it was done using a wet process by operators wearing protective clothing and then packed into polythene bags. Those containing blue asbestos were buried in the Coucil Tip at Tolvadden in accordance with the 1969 Asbestos Regulations. The white asbestos bags were deposited into the chemical tip designated "B" on the site map.

4.3.4 Clearance Certificates

The original policy to issue certificates only for buildings which had been used for chemical purposes was amended to include all buildings. The clearance certificates held at CDE are illustrated in Appendix 4 and give in summarised form all the information needed regarding the decontamination and disposals from each building. For the purpose of building clearance certificates bunkers used by Nancekuke (13 in all) have been considered to be buildings (see Appendix 3) and either specific clearance chits have been written or clearance have been included in those of adjacent laboratories. The remaining bunkers were not used by Nancekuke. All 28 bunkers on the site (16 at South Site and 12 at Central Site) have been searched and cleared of extraneous material. Where relevant, certificates carried notification of buildings which had asbestos or asbestos-type material in their fabric and have been labelled accordingly. A separate list of boilers, calorifiers etc lagged with asbestos is given in Appendix 5. All clearance certificates were issued on the basis that everything left was safe to handle. A duplicate set of clearance certificates was sent to Safety Services Organisation PE as a reference to cover future questions. Safety Services Organisation PE visited the site during dismantling and indicated approval of the measures being adopted. When closure was complete they endorsed the signing of a clearance certificate for the site as a whole.

Before closure Director CDE appointed an independent Working Party to review the closure of Nancekuke (Safety Procedures). This recommended various additional procedures, now completed, to establish that safe conditions would be achieved as far as humanly possible.

4.4 MEDICAL SURVEILLANCE OF WORKFORCE DURING CLOSURE

From November 1977 until March 1978 North Site surgery was reactivated with direct alarm communication to all areas. Pupil size and pulse rate of all personnel involved were determined at the end of each day. Fortnightly estimations of cholinesterase activity were also carried out. No abnormal results were found. Blood samples were taken from those involved in handling lead on seven occasions between June 1978 to January 1979 including basal levels before commencement of lead smelting. All estimations were found to be well below the maximum acceptable level of 80 µg/100 ml. (Highest value found 52 µg/100 ml.) The estimations were undertaken by DAD, CDE.

The relevant documentation is held by Staff Admin "B" at CDE Porton under "Medical in Confidence" cover.

There was one lost time accident (20 days) due to "H" contamination in June 1976 and one minor incident on 27 January 1979 both involving the same man - a known "sensitive". In October 1979 an accident occurred during the dismantling of D8 (Control Tower) which resulted in the victim's absence from work until his retirement on 23 May 1980. A Board of Inquiry into the circumstances of the accident was held on 8 November 1979. In its report published in January 1980 the Board made recommendations which were implemented in subsequent dismantlings. A copy of the report is held by the Director, CDE Porton Down.

4.5 DISPOSAL OF STORES, EQUIPMENT AND PLANT

Stores and equipment were first offered to CDE Porton. Where there was no requirement for the items at CDE, disposal was arranged through the normal offer list procedure to other establishments. When there were no bids, final disposal was effected by public auction on site.

Plant was treated differently. CDE Porton had first call on any usable item but many of the large plant items were about 40-50 years old and were obsolete or damaged in some way. The policy adopted was to break up the plant for sale as scrap where its cleanliness could be guaranteed. When the previous use of an item was unknown it was first decontaminated, but as its cleanliness was often still uncertain the policy was to break it up and bury it in a deep quarry (dump "A") on site, or in one of two mineshafts (D or E). The burial areas have been designated on the site map.

When the metal of the plant was valuable (silver from the GB plant, or lead from vessel linings or cubicle floors), it was melted down under ventilated conditions and cast into ingots for sale. The silver ingots (3230.798 kg) were sent to CDE Porton for safe keeping and disposal. The lead ingots (17.84 tonnes) were disposed through Sales.

4.6 DISPOSAL OF CHEMICAL STORES

Stocks of laboratory chemicals were treated in the same way as stores in 4.5 above. When the chemicals were in partly-used packaging the general policy was to destroy them unless they were expensive.

Stocks of bulk chemicals retained as stores were dealt with by normal stores procedures. Bulk toxic chemicals or intermediates for toxic chemicals held, and their disposal are listed in Appendix 6. Much of these were stocks of World War II CW agents sent to Nancekuke for disposal rather than chemicals manufactured on site. General policy was to dispose by incineration when practicable or by chemical treatment as an alternative. Effluent arising after decontamination was treated as described under 4.3. Some of these bulk chemicals, particularly those containing arsenic (ca 380 kg of 5 different arsenicals) were transferred to CDE Porton to await development of a satisfactory method of destruction.

No chemical warfare (CW) agents nor agent residues, contaminated equipment or materials remained on site at closure. CW agents were either incinerated or treated with decontaminant and disposed of as effluent harmless to marine life.

Only small quantities of radio phosphorus-labelled materials were received at Nancekuke for research purposes. No other nucleotide was used. Supplies of radioactive starting materials were used up completely in the preparations. Apparatus used in this work, which ceased in 1964 was allowed to stand so that any contamination decayed naturally. After the elapse of the requisite time the apparatus was thoroughly washed on the soakaway behind R4. Laboratories using radioactive materials and the soakaway were monitored and in all cases were found to be free from contamination. There was no other soakaway used at Nancekuke.

A record of radioactive work at Nancekuke is held by TIS CDE.

4.7 PHOTOGRAPHIC RECORD AND SITE MAP

A photographic record of the various buildings on site, showing exterior and interior views as appropriate was made. A copy is held by TIS CDE.

A site map was prepared marking areas A, B, C, D, E, in which chemicals or equipment were buried. These designated areas covered with a specified depth of soil (see Appendix 7) should remain undisturbed in future years. Buildings shown on the site map are numbered for reference to the various closure appendices. Those built for CDE, those used for CW agent production or storage and old air raid shelters (bunkers) used by CDE Nancekuke are indicated on the map. Small areas containing buried innocuous chemicals and mineshafts to be fenced on the advice of Explosives Ordnance Disposal are also shown on the map. A copy of the map and list of materials buried (Appendix 7) were supplied to Safety Services Organisation. The areas will be suitably marked, fenced and maintained by DOE. Other amended copies of the site map were made for distribution to other interested parties at the discretion of the Director CDE. The site map is held by TIS CDE.

Technical Information Service

4.8 DOCUMENTS, FILES AND DRAWINGS

After thorough weeding out, all classified and unclassified documents and files were transferred to CDE Porton. The policy with drawings has been to microfilm those required to be retained by CDE and to transfer to DOE a drawing of each building for future reference. Unwanted material has either been burned or shredded.

4.9 DOCUMENTS RELATING TO CONSERVATION AND ECOLOGY

4.9.1 The Nancekuke site was surveyed by the MOD Conservation Officer, shortly after the announcement of closure. The report is attached as Appendix 8.

4.9.2 One of the recommendations of the report was that there should be a comprehensive study of the fauna and flora of the area. In partial fulfilment of this requirement a team visited Nancekuke in the summer of 1979 and their work is reported in Appendix 9.

4.9.3 Marine Algae Population in the Vicinity of Nancekuke

The Cornwall Sea Fisheries Detrimental Substances By-Law Part 1 Clause (j) which referred to the effect of effluent on food supply was considered to apply to the plankton content of the water in the vicinity of the cave where Nancekuke effluent was discharged. To investigate this matter a contract was awarded in 1974 to , consultant marine biologist. His work continued through the closure years leading to a final report in 1978. No evidence was obtained to show that Nancekuke effluent had any effect on the marine algae population in the vicinity. The relevant reports are held by TIS, CDE.

4.9.4 Dispersion of Effluent and the Effect of Effluent on the Discharge Cave

Reports on the dispersion of effluent from outfall and an inspection of the effluent cave are appended in Appendix 10.

4.9.5 Soil Analysis

It has been suggested that the presence of alkyl phosphonic acid residue in soil is indicative of the manufacture of G agents in the vicinity. The closure of Nancekuke afforded an opportunity to test this assertion and samples of soil etc were taken from areas around former G production and storage units on site. No evidence of phosphonate residues was found in the samples tested. This was confirmed in a more intensive investigation reported in CDE TN 436.

4.9.6 Leaching from Quarry Dumps

Streams and water courses emanating from quarry dumps have been analysed for contamination. All samples tested were found to be free of contamination. The work is reported in Appendix 11.

4.10 FINAL CLEARANCE OF SITE

Once all the buildings had been cleared and certificates signed that everything left is safe to handle DOE were asked to carry out the following work:-

a. Demolish buildings not required by future users of the site.

b. Make safe effluent shaft and adit at North Site.

c. Fill in effluent pits not dealt with by CDE.

d. Fence mineshaft in Landry's field, and fence and mark areas designated not to be disturbed.

e. Remove Braithwaite water tank between Control Tower and North Site.

f. Cover with earth and landscape all dumps including that at Utta Hollow.

g. Dispose of boilers at North Site and South Site.

A list of jobs to be done by DOE after closure was sent to SSO(PE) and is included in Appendix 12.

4.11 COST OF DECONTAMINATION AND CLEARANCE

The cost of decontamination and clearance work was estimated at £824K at 1975/76 prices. The figures do not include compensatory payments for redundancy or Voluntary Premature Retirement or the cost of transferring staff to other establishments. The final cost of decontamination and clearance was £1456K equivalent to £907K at 1975/76 prices.

Thus the actual costs of closure when corrected to 1975/76 rates are consistent with the costs forecast based on the revised closure plan (Appendix 1).

5.1 FUTURE USES OF THE SITE

The closure of Nancekuke, even if the majority of the workforce found alternative employment, meant the loss of about 180 jobs in an area where unemployment was already high. The management sought to ease the problem of job loss by trying to attract an alternative employer to the site. By nature of the facilities available and the expertise of the workforce, a chemical manufacturer would have been the ideal type of employer.

The availability of the site was first trawled by DS20 within the Ministry of Defence and then with other Ministries without attracting any interested future users. As there was no further government interest in the site an approach was next made to the local authority. This had a two-fold objective, first to offer the land for sale to the County Council and Kerrier District Council and to invite the County Council Development and Control Steering Committee to approve the plan to try to attract a chemical manufacturer to occupy and use the site on the basis of a lease from the local authority.

A large body of councillors were given a tour of the site prior to the meeting with their Development and Control Steering Committee and it was evident that there were differing views on the future of the site. When the Committee met they decided that it should revert wholly to agricultural use, with facilities for the restoration of the coastal road across the site and the maintenance of the cliff footpath. They considered that any industry wishing to come to Cornwall could be accommodated on their partly unoccupied industrial estate site in Redruth. They also asked that all the old World War II buildings on the site be demolished.

Late in 1976 the interests of a private firm, Pattern Recognition Munitions Ltd, who had been advised to set up their business in Cornwall by the Department of Trade and Industry, were brought to the notice of the management at Nancekuke by

Cornwall County Council. This firm, who wished to manufacture small arms ammunition and small guided missiles and to test-fire their product, could not be fitted into the local authority's industrial estate because of their specialist need for an isolated site. To accommodate Pattern Recognition Munitions Ltd, whose Director was promising the creation of 200-300 new jobs in Cornwall, the County Council Development and Control Steering Committee agreed to reverse their previous decision that Nancekuke should revert to agricultural use. Their change of view was only to apply to this particular firm whose needs could not be accommodated elsewhere and the decision required Pattern Recognition Munitions Ltd to remove all the old war-time buildings within 5 years and to maintain the coastal footpath. Any future building allowed was to be on the southern part of the site well below the skyline and away from the coast.

MOD agreed, in the interests of future employment, that CDE would co-exist with Pattern Recognition Munitions Ltd during the run-down with the intention that jobs with the firm would be available to CDE employees. Plans for the co-existence situation were completed and Defence Lands were invited to draw up the necessary lease for Pattern Recognition Munitions Ltd. It was proposed that the lease should run until CDE finally vacated the site, when local authorities would purchase it to continue the leases to Pattern Recognition Munitions Ltd and the tenant farmer whom Pattern Recognition Munitions Ltd were prepared to accept as co-occupants.

In April 1977 when arrangements were well advanced, the RAF declared an interest in the site to set up a radar facility. This would be manned by Service personnel and would offer only 5 civilian jobs. It soon became evident once the RAF plans were available in more detail, that there would be serious problems of compatibility between the requirements for radar, and a possible firing range to test missiles together with the presence on the site of electrically initiated explosive devices required by Pattern Recognition Munitions Ltd.

The problem of compatibility between the two potential future users of the site started to be resolved at the end of 1978 following a ministerial decision that the RAF could proceed with their planned radar station. A short-term lease was drawn up allowing Pattern Recognition Munitions Ltd to commence operations during the first quarter of 1979. From the point of view of managing the run-down of CDE's interest, the long delay in reaching a firm decision on the future use of the site was a constant embarrassment in contacts with the Trade Unions who needed to be kept well informed on matters affecting the future of their members.

5.2 RADIATION MEASUREMENTS

Prior to the radar installation becoming operational a series of measurements were made at various points on the site, assuming worst possible radiation positions, to assess the effect on personnel, flammable liquids and projected Pattern Recognition Munitions operations. It was concluded that there was no danger to CDE personnel or from ignition of flammable liquids. In case of doubt the RAF agreed to switch off the radar until the CDE operation concerned was completed.

A report published in June 1979 is held in TIS CDE.

5.3 EXPLOSIVES ORDNANCE DISPOSAL (EOD) SURVEY

In anticipation of Pattern Recognition Munitions use of Kerriack Cove area as a firing range the land was searched for explosives by an EOD team from RAF Wittering. No other area of the site was subjected to an EOD survey. It was decided that the amount of effort required to clear the site (Ref RAFASU/1501/2/9/EOD 5 7 79) was not justified. It is possible therefore that explosives used by the RAF before the advent of CDE Nancekuke in 1951 may have survived. No clearance chit was given when the site was vacated by the RAF after the Second World War. It is not known if there are any buried stores of explosives on site dating from this time. Explosives were used on site June-July 1980 by the Royal Engineers engaged in demolition work for CDE. A written assurance from OC Operations that all explosives were removed on completion of the task is held at CDE, together with the EOD survey report of 1979.

Flares and pyrotechnic devices received on site during 1951-1980 have been destroyed by incineration. None was left on site.

Pattern Recognition Munitions Ltd operating on site under a 2 year lease expiring mid-summer 1981, are using explosives. This will presumably come under the supervision of the Health and Safety Executive.

6.1 CLOSURE PUBLICITY

Parliamentary questions during the debate on Defence Estimates in March 1969 about the function of CDE Nancekuke lifted the veil of secrecy which had surrounded the Establishment since 1951.

Open days and more active co-operation with local bodies did much to reduce the impact of publicity. It was thought however that the announcement of closure would rekindle interest, debate and conjecture. Reference to closure publicity

will be found in Elizabeth Sigmund's book "Rage against the Dying" published by Pluto in 1980.

6.1.1 Parliamentary Questions

Parliamentary questions asked about Nancekuke during the closure phase were mostly concerned with the implementation of Nugent recommendations.

6.1.2 Press Articles

Press articles largely concerned the future use of the site but the visit of the Disarmament Committee tended to be reported in "doom-watch" fashion. The handover of the site to the RAF was only reported in local papers with the emphasis on the advent of the RAF and a passing mention of past controversy at CDE Nancekuke. All Press articles are contained in closure of Nancekuke file NSR/2/014, held at CDE.

6.1.3 Visit of the UN Committee on Disarmament

On 15 March 1979 Nancekuke was visited by a group of international scientists and diplomats of the Committee of Disarmament. The visit was organised by the Foreign Office. The purpose of the visit was to demonstrate how a nerve agent plant could be dismantled and that on-site inspection was essential to confirm that the buildings were no longer used for agent production. Notes on the visit are appended in Appendix 13. Reports of the Press and TV visit which followed on 5 April 1979 are contained in the closure of Nancekuke file NSR/2/014.

7. CLOSING CEREMONIES

The Director CDE visited Nancekuke on 30 September to close this CDE outstation. Before the official handover he took the opportunity to address a gathering of remaining staff. He emphasised that the closure of the Process Chemistry Division of CDE had been a necessary part of a programme of defence cuts and was not a reflection on the efficiency or ability of staff at Nancekuke. He paid tribute to the past efforts of the Division which had made a significant contribution to the defence of the country. The Director noted that management had been largely successful in their efforts to accommodate redundant staff and so blunt the impact of the closure.

Just before noon before a mixed audience of RAF and CDE personnel the site was handed over officially to , 11 Group, with ceremonial lowering of the CDE flag and the raising of the RAF standard to the accompanying roar of four Hawk jets flying low overhead. Director CDE gave a brief speech to which replied.

After a march-past by a flight of RAF officers and men, the salute being taken by , and , the company repaired to the library for a luncheon reception. In the course of the luncheon the passing of CDE Nancekuke and the advent of RAF Portreath were marked by the exchange of plaques between the two representatives and the offering of good wishes to all concerned.

8. CONCLUSION

CDE Nancekuke has been closed on the allotted date at a cost of £907K (corrected for inflation).

The original closure plan was drawn up by , S/DD, formerly S/PCD 1972-77, revised and set in motion by M S/PCD 1977-79, on the decision to implement, and completed by , Officer-in-Charge CDE Nancekuke 1979-80.

The successful outcome of the exercise reflects the wise management, good staff relations and the devoted loyalty of a conscientious workforce who upheld their reputation to "deliver the goods" even when confronted with such a doleful task.

The best wishes of former Nancekukians are extended to the officers and men of RAF Portreath for their future happiness and success.

Officer-in-Charge
CDE Nancekuke

September 1980

APPENDIX 1

REVISED CLOSURE PLAN

INTRODUCTION

1. In the original closure plan dated July 1976, an assessment was made of the effort and time required to close CDE Nancekuke. (Ref PCD/IT4079/601/76). The proposals were based on the assumption that an early start to the dismantling programme could be made.

2. In the event, the consultation process with the Trade Unions and Staff Side was not finalised until the end of August 1977. As it was not possible to proceed with direct closure work whilst consultation was in progress the original plan has had to be revised.

3. The effect of the delay was estimated on 23 May 1977 as 20 weeks (NSR/2/014/374/77 refers). It was stated that each further week delay in reaching a decision would set the plan a further week behind schedule up to the end of September 1977. Thus by the end of August the original plan was 34 weeks behind schedule when calculated on the basis of a Craftsman strength of 17 and assuming it was made up at the start of the programme when the numbers were maintained.

4. The original run-down plans have been revised to take account of the changes which have occurred since the original plans were drawn up. Adjustments have been made to the times and numbers redundant to balance losses of personnel who have left either by resignation or voluntary redundancy. There has been no adjustment to compensate for the delays under para 3.

5. A further adjustment has been made for staffing extra work under Phase 1, where the work programmes have been extended under the heading of repayment.

Phase 1

a. The current work programme items with expected end dates are given in Annex A.

b. Much of the chemicals and equipment required at Porton has been identified and weekly deliveries are in progress.

Phase 2

a. Destruction of stocks of chemicals in addition to those covered under Item 5 Annex A is expected to continue until late 1979.

b. and c. Will continue until closure.

6. Tasks Involved

A revised summary of tasks for each building together with updated estimates for dates of completion is given at Annex B.

7. Effort Involved and Likely Run-Down of Staff

The likely run-down and transfer of non-industrial staff to Porton during Phase 1 is revised in Annex C. The staffing and run-down requirements for Phase 2 in revised form is shown in Annex D and Fig 1.

8. The requirements for industrial staff for Phases 1 and 2 are given in Annex E and F and Fig 1.

9. It is hoped that given the continuing co-operation of the workforce and provided that key people are not lost too early in the Phase 2 run-down, that closure can still be achieved by September 1980. Should this not be the case it would be necessary at a later date to make a further adjustment to take account of the time lost under para 3.

10. Comment

To maintain the scheduled closure date the losses of staff in the early part of the run-down have been balanced by retaining somewhat larger numbers at the end. The estimated overall manpower cost is virtually unchanged.

Superintendent PCD

9 December 1977

ANNEX A

WORK ITEMS STILL IN PROGRESS - PHASE 1

Item No	Building No	Task	Estimated Completion Date
1	D19	Production of activated charcoal cloth	November 1978
2	D5	Production of CS	July-August 1978
3	D4	Extraction of cholinesterase from horse serum (Work scheduled to transfer to CDE August 1978)	June 1978
4	R4-R5	Immobilisation of cholinesterase for NAIAD (Work scheduled to transfer to CDE August 1978)	June 1978
5	P11	Destruction of CW agents by incineration (Does not include destruction of chemicals arising from Phase 2 work)	July 1978
6	R1 and 2	Analytical support for Items 1, 2 and 4 and effluent testing	July-August 1978
7	P2	Classification of Orasol Navy Blue	July-August 1978

ANNEX B

TASK SUMMARY - DECONTAMINATION AND CLEARANCE WORK - PHASE 2

(Revised December 1977)

Building No	Task	Estimated Completion Date
1	MT Office	September 1980
2	General stores/handle disposal	September 1980
3	Solvent stores - disposal	September 1980
5	Glass/Enamel stores - disposal	August 1979
6	Supervisors Offices	September 1980
7	Alcohol store	January 1978
8 & 9	Electrical/Instrument Shop - Engineering support	September 1980
10	Main Workshop - Engineering support	September 1980
12	MT Garage - Transport service	September 1980
14, 15 & 16	Toilets/Change Rooms/Mess Rooms	September 1980
17	Gas bottle store	January 1980
19	POL Store - vehicle fuel/oil supply	September 1980
24	Solvent Store - disposal	September 1980
48	PSA Workshops	September 1980
49	Conference Hall - disposal	May 1978
50	Change Rooms	September 1980
51	P2S storage	June 1978
52	Canteen - disposal	September 1980
54	Store South Site	September 1980
55	Domestic Water reservoir	September 1980
56	Domestic water pumphouse	September 1980
62	Guard Dog House - disposal	September 1979
63	Admin Building	September 1980
64	Sub station and storage - disposal	September 1980
67	Laundry Services	September 1980
75	Laboratory store - disposal, transfer	March 1979
87	MDP Offices	September 1979
88	Medical services - disposal	March 1980
89	Fire services - disposal	September 1979
91	Guard Dog House - disposal	September 1979
99	Store South Site	September 1980
104	Boiler House - disposal - asbestos	December 1978
105	Standby Generator House - emergency power	September 1978
106 & 107	Sub station - disposal	September 1980
108	Process Water Pump House - disposal	September 1980
368	Plant store - disposal, scrap	September 1980
424	Sub station A (Main 11 kv)	September 1980
431	Tank farm - disposal	December 1979
447	Chlor liquor store - disposal	December 1978
448	Mess Room	September 1980
1000	Process Services - disposal	July 1979
1001	Calorifier and Toilets, Garage area	September 1980
1004	MDP Main Gate	September 1980
1005	MDP Porthtowan Gate	September 1979
1006	Alcohol Store	September 1978
-	Dam Pump House - process water supply	September 1980

Building No	Task	Estimated Completion Date
P1	G Plant - decontamination, disposal	July 1979
P2	Decontamination - disposal	March 1980
P3	Agent storage - decontamination, disposal	March 1979
P4	Agent storage - decontamination, disposal	May 1979
P5	Laboratory - decontamination, disposal	July 1979
-	Safety Support Services	September 1980
P6	Laboratory - disposal	July 1979
P9	G Laboratory - decontamination, disposal	March 1979
P10	Storage - disposal	November 1979
P11	Incinerator - destruction - disposal	January 1980
P12-19	Storage 1 disposal	September 1978
P20	Storage - disposal	September 1978
P21	Agent storage - decontamination	December 1979
D1	Offices	December 1978
D2	Laboratory - disposal	December 1978
D3	Laboratory	December 1978
D4	Disposal - decontamination	December 1978
D5	Decontamination - disposal	December 1978
D6	Disposal	December 1979
D7	Disposal	December 1978
D8	Disposal	March 1979
D9	Autoclave laboratory - disposal	July 1979
D10	Storage - disposal	November 1979
D11	Stability store - disposal	November 1979
D12	Stability store - disposal	November 1979
D14	Irritant store - decontamination, disposal	December 1978
D15	Stability store	November 1979
D16	Disposal	December 1979
D17	Disposal	December 1979
D18	Old Shelter (alongside D16)	March 1979
D19	Disposal	April 1979
R1	Analytical support services - disposal	August 1980
R2	Effluent testing - disposal	August 1980
R3, 4 & 5	Laboratories - disposal	December 1978
R6 & 7	Laboratory stores - disposal	February 1979
R8	Autoclave house - disposal	December 1978
R9	Marine laboratory - effluent control - disposal	August 1980

CLEARANCE OF BUILDINGS - COMPLETION DATES

Bldg No	Date
1	July 1980
2	August 1980
3	July 1980
5	July 1980
6	August 1980
7	January 1979
8	August 1980
9	October 1979
10	July 1980
12	August 1980
14	July 1980
15	July 1980
16	July 1980
17	August 1980
19	March 1980
24	August 1980
48	August 1979
49	August 1979
50	September 1980
51	February 1979
52	August 1979
54	August 1979
55	July 1980
56	July 1980
62	January 1980
63	July 1980
64	March 1980
67	July 1980
75	July 1980
87	October 1979
88	July 1980
89	October 1979
91	January 1980
99	August 1979
104	July 1980
105	March 1980
106	March 1980
107	March 1980
108	July 1980
368	September 1980
424	March 1980
431	January 1979
447	November 1979
448	August 1979
1000	July 1980
1001	August 1980
1004	July 1980
1005	July 1980
1006	July 1980
DPH	October 1979
P1	August 1980
P2	July 1980
P3	July 1980
P4	August 1980
P5	August 1980
P6	August 1980
P9	August 1980
P10	May 1980
P11	May 1980
P12	March 1979
P13	March 1979
P14	March 1979
P15	March 1979
P16	March 1979
P17	March 1979
P18	March 1979
P19	March 1979
P20	March 1979
P21	January 1979
D1	July 1980
D2	February 1979
D3	February 1979
D4	February 1979
D5	February 1979
D6	May 1979
D7	January 1979
D8	May 1980
D9	May 1980
D10	June 1979
D11	June 1979
D12	June 1979
D14	January 1979
D15	June 1979
D16	January 1979
D17	January 1979
D18	July 1980
D19	March 1980
R1	September 1980
R2	January 1979
R3	January 1979
R4	January 1979
R5	January 1979
R6	September 1980
R7	September 1980
R8	April 1980
R9	April 1980

ANNEX C

PHASE 1 - RUN-DOWN OF NON-INDUSTRIAL STAFF ON PROGRAMME WORK

Transfer refers to CDE Porton

Grade	In post 1 4 76	In post 30 9 77	Required after 31 3 78	Redeployed on Phase 2 between 30 9 77 & 31 3 78	Required after 30 9 78	Redeployed on Phase 2 between 30 9 77 & 30 9 78	To leave or transfer between 1 4 77 and 30 9 78
SPSO	1	1	0.2	0.8	Nil	1	
PSO	4	2	0.3	0.7	Nil	1	1 (1 Transfer)
SSO	9	8.5	3	4.5	Nil	5.5	3 (2 Transfers)
HSO	10	7	2	3.0	Nil	1	6 (3 Transfers)
SO	2	1	Nil	Nil	Nil	Nil	1
ASO	4	3	1.5	0.5	Nil	1	2 (2 Transfers)
PTO II	1	1	0.1	0.9	Nil	1	
PTO III	2	1	Nil	1.0	Nil	1	
PTO IV	1	1	0.1	0.9	Nil	1	
PGS 'C'	1	1	Nil	1.0	Nil	1	
PGS 'D'	1	1	0.1	0.9	Nil	1	
SSG 'C'	1	1	0.1	0.9	Nil	1	
EMO	1	1	0.1	0.9	Nil	1	
SEN	1	Nil	Nil	Nil	Nil	Nil	
EO	1	1	0.1	0.9	Nil	1	
CO	3	2	0.2	1.8	Nil	2	
CA	2	1	0.1	0.9	Nil	1	
S/T	2	2	0.3	1.7	Nil	2	
Insp	1	1	Nil	Nil	Nil	Nil	1
Sgt	4	4	1	3	Nil	1	3
Const	20	12	2	10	Nil	9	3
TOTALS	72	52.5	11.2	34.3	Nil	32.5	20 (8 Transfers)

ANNEX D

PHASE 2 - NON-INDUSTRIAL STAFF ON DECONTAMINATION/CLEARANCE WORK REQUIREMENTS and RUN-DOWN

Transfer refers to CDE Porton

Updated December 1977

Grade	In post 30 9 77	Rqd after 31 3 78	To leave between 30 9 77 and 31 3 78	Rqd after 30 9 78	To leave between 1 4 78 and 30 9 78	Rqd after 31 3 79	To leave between 1 10 78 and 31 3 79	Rqd after 30 9 79	To leave between 1 4 79 and 30 9 79	Rqd after 31 3 80	To leave between 1 10 79 and 31 3 80	Required to Closure	To leave at Closure
SPSO	1	0.8	-	1	-	-	1 ?	-	-	-	-	-	-
PSO	2	0.7	(1 Trans)	1	-	1	-	1	-	-	1	-	-
SSO	8.5	4.5	1	5.5	2 (2 Trans)	5	0.5	5	-	5	-	5	5
HSO	7	3	2	1	4 (3 Trans)	1	-	1	-	1	-	1	1
SO	1	Nil	1	Nil	-	-	-	-	-	-	-	-	-
ASO	3	0.5	(1 Trans)	1	(1 Trans)	1	-	1	-	1	-	1	1
PTO II	1	0.9	-	1	-	-	(1 Trans)?	-	-	-	-	-	-
PTO III	1	1	-	1	-	1	-	1	-	1	-	1	1
PTO IV	1	0.9	-	1	-	1	-	1	-	1	-	1	1
PGS 'C'	1	1	-	1	-	1	-	1	-	1	-	1	1
PGS 'D'	1	0.9	-	1	-	1	-	1	-	1	-	1	1
SSG 'C'	1	0.9	-	1	-	1	-	1	-	1	-	1	1
EMO	1	0.9	-	1	-	1	-	-	1	-	-	-	-
SEN	Nil	Nil	-	Nil	-	-	-	-	-	-	-	-	-
EO	1	0:9	-	1	-	1	-	1	-	1	-	1	1
CO	2	1.8	-	2	-	2	-	2	-	2	-	2	2
CA	1	0.9	-	1	-	1	-	1	-	1	-	1	1
S/T	2	1.7	-	2	-	1	1	1	-	1	-	1	1
Insp	1	Nil	1	Nil	-	-	-	-	-	-	-	-	-
Sgt	4	3	-	1	3	1	-	-	1	-	-	-	-
Const	12	10	-	9	3	5	4	-	5	-	-	-	-
TOTAL	52.5	34.3	7 (2 Trans)	32.5	13 (6 Trans)	25	7.5 (1 Trans ?)	18	7	17	1	17	17

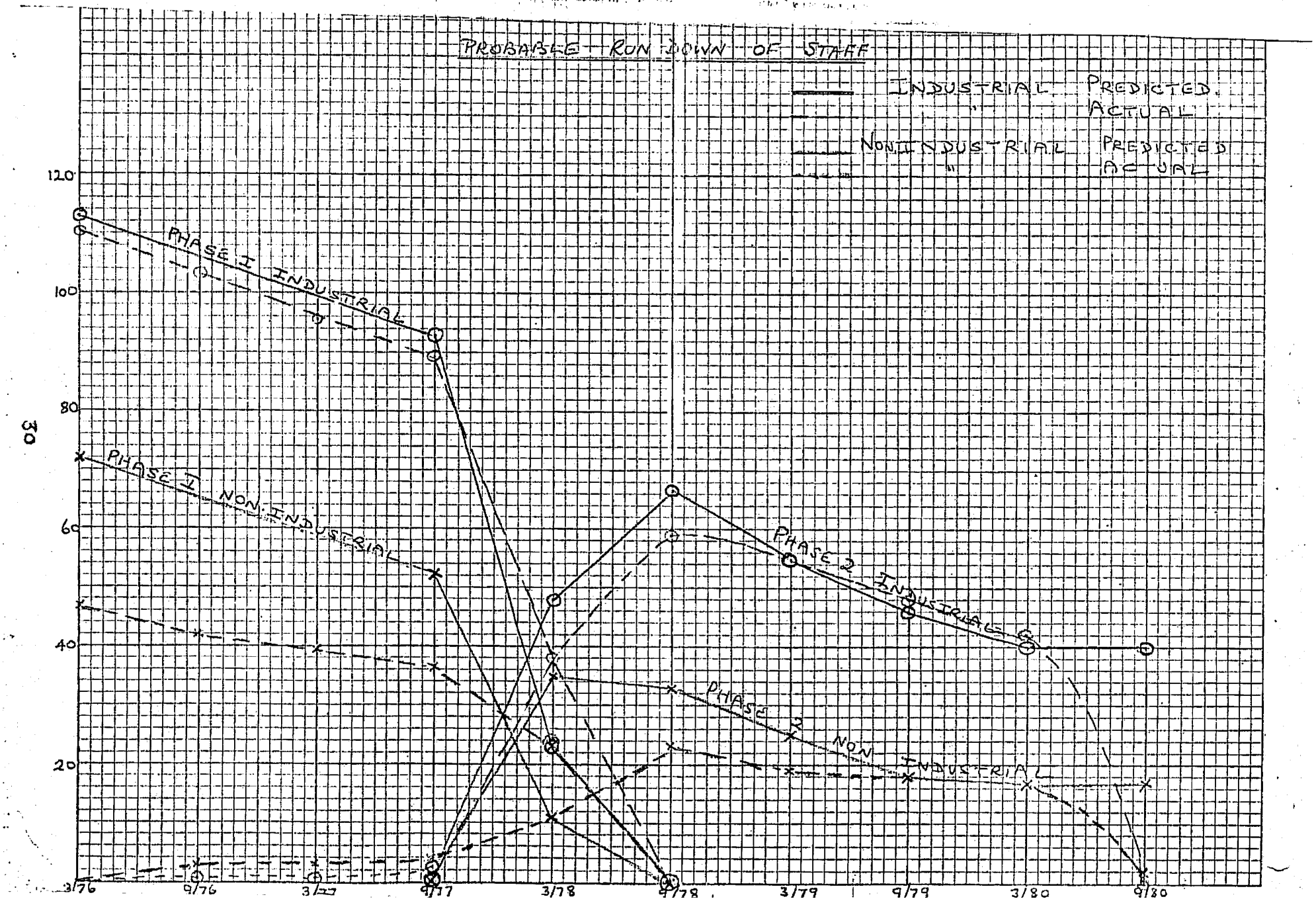
PCD DEPLOYMENT FIGURES

The figures used in the attached graph were obtained as follows.

The deployment on close-down and reprovision (allocated numbers at the beginning of the FY 1976/77) was reassessed to allow for the fact that only about 2/3 non-industrial staff and 1/2 industrial staff booked their time. The resulting figure was deducted from the actual strength. Phase 1 and Phase 2 are shown running simultaneously on the graph. The destruction of agents has been regarded as a predominantly Phase 2 task.

All effort after 9/78 has been regarded as devoted to Phase 2.

Period Ending	Data from Staff Admin		Adjusted Computer Data	
	Non-Industrial	Industrial	Non-Industrial	Industrial
31 Mar 1976	47	111		
30 Sep 1976	45	104	3	1/2
31 Mar 1977	42.5	96	3	1/2
30 Sep 1977	40.5	93	4	3.5
31 Mar 1978	34.5	62	11	24
30 Sep 1978	23.5	59		
31 Mar 1979	19	55		
30 Sep 1979	18	48		
31 Mar 1980	17	42		
30 Sep 1980	2	Nil		


PROBABLE RUN DOWN OF STAFF
INDUSTRIAL PREDICTED
ACTUAL
NON-INDUSTRIAL PREDICTED
ACTUAL
120
100
80
60
40
20
PHASE 1 INDUSTRIAL
PHASE 1 NON-INDUSTRIAL
PHASE 2 INDUSTRIAL
PHASE 2 NON-INDUSTRIAL
3/76
9/76
3/77
9/77
3/78
9/78
3/79
9/79
3/80
9/80

ANNEX D

COST OF DECONTAMINATION AND CLEARANCE

Financial Year	Cumulative Cost £K				Inflation Factor
	Forecast Cost (Corrected to 1975/76 Rate) Original Closure Plan	Forecast Cost (Corrected to 1975/76 Rate) Revised Closure Plan	Actual Cost (Uncorrected)	Actual Cost (Corrected)	
1975/76	2.	-	2	2	
1976/77	15	-	29.6	28.3	1.05
1977/78	140	226	183.2	142.6	1.28
1978/79	455	506	611.5	429.5	1.11
1979/80	640	709	1195	767.5	1.16
1980/81 (half)	711	824	1456	907.5	1.25

ANNEX E

PHASE 1 - RUN-DOWN OF INDUSTRIAL STAFF ON PROGRAMME WORK

Transfer refers to CDE Porton

Grade	In post 1 4 76	In post 30 9 77	Required after 31 3 78	Redeployed on Phase 2 between 30 9 77 & 31 3 78	Required after 30 9 78	Redeployed on Phase 2 between 30 9 77 & 30 9 78	To leave by 31 3 78
CFN	26	17	2	10	Nil	12	5
CFA	9	6	1	4	Nil	5	1
EW	34	31	9	14	Nil	23	6 (+ 2 moved to other jobs†)
General Workers	24	23*	4	12*	Nil	16*	7
Stores	5	5	1	3†	Nil	4†	2
Drivers	6	5	1	5‡	Nil	6‡	-
Fire	7	6	5	-	Nil	5	1 (Retirement)
TOTAL	111	93	23	48	Nil	71	22

* Includes 2 Casuals to become Unestablished February 1978

† Includes EW transferred to Storeman

‡ Includes EW transferred to Driver

ANNEX F

PHASE 2 - INDUSTRIAL STAFF ON DECONTAMINATION/CLEARANCE WORK REQUIREMENTS AND RUN-DOWN

Transfer refers to CDE Porton

Grade	In post 1 4 76	In post 30 9 77	Rqd after 31 3 78	To leave between 30 9 77 and 31 3 78	Rqd after 30 9 78	To leave between 1 4 78 and 30 9 78	Rqd after 31 3 79	To leave between 1 10 78 and 31 3 79	Rqd after 30 9 79	To leave between 1 4 79 and 30 9 79	Rqd after 31 3 80 to Closure	To leave between 1 10 79 and 31 3 80	To leave at Closure
CFN	26	17	10	5	11	(1 Trans)	11	-	11	-	11	-	11
CFA	9	6	4	1	5	-	4	1	4	-	3	1	3
EW	34	31	14	6†	20	3	11	9	8	3	5	3	5
General Workers	24	23*	12	7	15‡ (+ vacancy)	1	14∇	2	14Δ	1Δ	12	2	12
Stores	5	5	3	2	4	-	4	-	4	-	4	-	4
Drivers	6	5	5	-	6	-	6	-	5	1	5	-	5
Fire	7	6	-	1	5	-	5	-	-	5	-	-	-
TOTALS	111	93	48	22	66 (+ vacancy)	5x	55∇	12	46	10 (-Gateman)	40	6	40

*Includes 2 casuals to become unestablished February 1978.

†2 Transferred to other jobs, 1 Storeman, 1 Driver not included in the 6.

‡Vacancy for Mess Room Attendant from 30 9 78.

xOnly 4 to leave if vacancy filled.

∇Assumed vacancy filled.

ΔGateman to be recruited September 1979 when MOD Police leave.

APPENDIX 2

COMPARISON OF ACTUAL RUN-DOWN OF STAFF AND INDUSTRIALS WITH CLOSURE PLAN (REVISED VERSION PCD/IT4079/551/77)

Staff	1 4 76 In Post †	30 9 77 In Post *	31 3 78		30 9 78		31 3 79		30 9 79		31 3 80		30 9 80 Closure	
			Reqd in Plan	Actual	Reqd in Plan	Actual	Reqd in Plan	Actual	Reqd in Plan	Actual	Reqd in Plan	Actual	Reqd in Plan	Actual
Non-Industrial														
Scientific	30	22.5×	16.5×	20.5×	9.5×	10.5×	8	8	8	7	7	6	7	5
Technical	6	5	5	5	5	4	4	4	4	4	4	4	4	3
Admin/Stores/ Medical	11	8	8	8	8	8	7	7	6	7	6	7	6	5
Police	25	17	16	13	10	13	6	6	-	-	-	-	-	
Total	72	52.5	45.5	46.5	32.5	35.5	25	25	18	18	17	17	17	13
Industrial														
Craftsmen	26	17	12	11	11	10	11	8	11	7	11	7	11	1
Semi-skilled and unskilled	85	76	59	54	55	49	44	47	35	41	29	35	29	19
Total	111	93	71	65	66	59	55	55	46	48	40	42	40	20
OVERALL TOTAL	183	145.5	116.5	111.5	98.5	94.5	80	80	64	66	57	59	57	33

† Closure announced 17 3 76

* State of redundancy declared 26 8 77 for non-industrial staff

× 1 SSO part-time

APPENDIX 3

BUILDINGS DATA

No	Building Description	Size		Construction (see key)	Year of Origin *Built for Nancekuke	Chemical Usage (see key)	Fate (see key)	Rubble
		Floor Area m^2	Height m					
1	MT Office	372.	4.6	1	1940		DOE2	
2	General & Fine Chemical Store	825	4.6	1	1940		DOE2	
3	Solvent Stores, Fine Chemical Stores	20	2.4	1	1940	E	DOE2	
5	Glass/Enamel Stores	203	4.6	1	1940		DOE2	
6	Supervisor's Office	122	4.6	1	1940		DOE2	
7	Alcohol Store	100	4.6	1	1940	E	PRM	
8	Electrician's Workshop	264	4.6	1	1940		DOE2	
9	Instrument Shop	42	4.6	1	1940		DOE2	
10	Main Engineering Workshop	436 605	7.9 4.6	2 1	*1956 1940		PRM/ RAF	
12	MT Garage	315	6.7	3	*1970		RAF	
14	Toilets - Central Site	45	2.6	4	*1964		RAF	
15	Change Rooms - Central Site	74	4.6	1	1940		RAF	
16	Mess Room - Central Site	116	4.6	1	1940		RAF	
17	Gas Cylinder Store	84	4.6	1	1940		DOE2	
19	POL Distribution Point	-	-	5	-		RAF	

No	Building Description	Size		Construction (see key)	Year of Origin *Built for Nancekuke	Chemical Usage (see key)	Fate	Rubble
		Floor Area m^2	Height m					
24	Petrol, Lubricant, Solvent, Bulk Chemical Store	130	4.6	1	1940	E	DOE2	
48	PSA Workshop	354	4.6	1	1940		RAF	
49	Conference Hall	333	4.6	1	1940		RAF	
50	Change Rooms - South Site	496	4.6	1	1940		RAF	
51	Store for P2S Chemicals	260	4.6	1	1940	F (P2S)	RAF	
52	Canteen	830	4.6	1	1940		RAF	
54	Store Cobbler's Shop	107	4.6	1	1940		RAF	
55	Domestic Water Reservoir	137 x 10^3 ℓ		6	*1970		RAF	
56	Domestic Water Pumphouse	18.6	3.5	7	*1952		RAF	
62	Guard Dog House (Squash Court)	72	5.3	1	1940		RAF	
63	Administration Building	680	4.6	1	1940		RAF	
64	Substation and Archives	65	4.6	8	1940		RAF/DOE Substation	
67	Laundry and Boiler House (S Site)	L 172 BH	5.8 6.7	1 9	*1952		DOE2	
75	Laboratory Store (Bunker)	70	2.5	10	1940		RAF	
87	MDP Offices	122	2.6	11	*1966		RAF	

No	Building Description	Size		Construction (see key)	Year of Origin *Built for Nancekuke	Chemical Usage (see key)	Fate (see key)	Rubble
		Floor Area m^2	Height m					
88	Medical Centre	184 343 283	4.6 Boiler + Lab+Carage 4.6 Hospital 3.0 Store etc	1 1 9	1940		RAF	
89	Fire Services	60	5	1	1940		RAF	
91	Guard Dog House	18	3.5	1	1940		RAF	
99	South Site Store	74	3	12	1940		RAF	
104	Boiler House Refrigeration and Compressed Air Generator	250 168	7.6 4.6	13	1940		DOE2	
105	Standby Generator House	66	4.9	9	*1952		RAF	
106	Substation	22	2.9	9	*1952		RAF	
107	Switch House	13	3.2	9	*1966		RAF	
108	Process Water/Pump House	Reservoir 15 x 10^6 l 26	3.6	14 9	*1952		DOE2	
368	Hangar - Plant Store	2524	8.8 Eaves 11.9 Ridge	2	1940 resheeted 1976		RAF	
424	Substation A (main 11 kV)	132	2.8	9	1940		RAF	
431	Tank Farm	50	-	15	1940	E	REs	N Site Eff. Pits
447	Mess Room	74	3.0	1	1940		RAF	
448	Chlor Liquor Store	74	3.0	12	1940	E	DOE2	

No	Building Description	Size		Construction (see key)	Year of Origin *Built for Nancekuke	Chemical Usage (see key)	Fate (see key)	Rubble
		Floor Area m^2	Height m					
1000	Pump House - Plant Services	279	3.0	16	*1952		CDE/DOE2	
1001	Calorifier and Toilets	70	2.5	10/1	1940		RAF	
1004	MDP Picquet Post - South Site	12	2.5	17	*1960		RAF	
1005	MDP Picquet Post - Porthtowan Gate	26	3.5	1	1940		RAF	
1006	Alcohol Store	18	2.7	1	1940	E	DOE2	
	Dam Pump House	12	2.4	7	*1975		RAF	
P1	GB Plant - Process Building	420	12.3 (3rd Floor) 14.8 (Tank Room)	18	*1952	ABCF (P2S)	DOE2	
P2	GB - Process Building	233	6.1	18	*1952	ABcF	DOE2	
P3	GB Storage	45	5.6	16	*1956	A	DOE2	"A"
P4	GB Storage	45	5.6	16	*1956	AB	DOE2	"A"
P5	Laboratory, Medical Station, Canteen	360	3.4	19	*1952	acf (PXO)	DOE2	
P6	Laboratory	72	3.7	19	*1952	acf (BH)	DOE2	
P9	Laboratory	43	5.6	1	*1956	AEF (BH)	RE	"B"
P10	Tank Farm					B	DOE2	
P11	Destructor (Incinerator)					Acf (P2S)	DOE2	

APPENDIX 3 (contd)

No	Building Description	Size		Construction (see key)	Year of Origin *Built for Nancekuke	Chemical Usage (see key)	Fate (see key)	Rubble (see key)
		Floor Area m^2	Height m					
P12	Store	119	3.1	9	1940	E	DOE1	"F"
P13	Store			9	1940		DOE1	"F"
P14	Store			9	1940		DOE1	"F"
P15	Store	150	3.1	9	1940	E	DOE1	"F"
P16	Store			9	1940	BC	DOE1	"F"
P17	Store			9	1940	E	DOE1	"F"
P18	Store	100	3.1	9	1940	AE	DOE1	"F"
P19	Store			9	1940	E	DOE1	"F"
P20	Store	136	5.5	1	1940	A	DOE1	"F"
P21	Bunker	20	2.5	10	1940	Ad	PRM	
D1	Office	50	3.7	20	1940		DOE2	
D2	Laboratory	22	5.9	21	1940	ab	DOE2	
D3	Laboratory	22	5.9	21	1940	ae f (see clearance certificate)	DOE2	
D4	Laboratory	44	5.9	21	1940	af (ChE)	CDE/RE	Walls "A"
D5	Process Building	200	5.9	21	1940	abCf (P2X)	CDE/RE	Floor "B"
D6	Laboratory	175	7.8	1	1940	ACf (P2S)	DOE2	

No	Building Description	Size		Construction (see key)	Year of Origin *Built for Nancekuke	Chemical Usage (see key)	Fate	Rubble
		Floor Area m^2	Height m					
D7	Process Building	140	5.8	1	1940	af (P2S)	PRM	
D8	Control Tower Laboratory	154	9.2	22	1940	acdf (P2S)	RE	"B"
D9	Autoclave Room	51	4.5	1	1940	C	RE	"B"
D10	Storage	60	4.5	1	1940	B	RE	"B"
D11	Stability Hut	19.5	2.5	1	1940	a	DOE2	
D12	Stability Hut	24	2.5	9	*1955	acdf (P2S)	DOE2	
D14	Security Store	67	4.6	7	*1971	AC	RAF	
D15	Stability Hut	15	2.5	7	*1963	a	DOE2	
D16	Process Building	312	10.7	2	*1960	F (P2X)	DOE2	
D17	Process Building	93	6.1	23	*1966	F (P2S)	DOE2	
D18	Store (Bunker)	20	2.5	10	1940	BE	RAF	
D19	Process Building	315	8.0	3	*1970	F (Charcoal Cloth)	PRM	
R1	Laboratory	382	5.2	1	1940	abcde f (all)	RAF	
R2	Laboratory	85	2.5	9	1940	abcde f	PRM/RAF	
R3	Laboratory	25	2.5	9	1940	abcde f	PRM/RAF	

No	Building Description	Size		Construction (see key)	Year of Origin *Built for Nancekuke	Chemical Usage (see key)	Fate (see key)	Rubble
		Floor Area m^2	Height m					
R4	Laboratory	45	2.5	9	1940	+ acd f (see clearance certificate)	PRM/RAF	
R5	Laboratory	40	2.5	9	1940	+ ad	PRM/RAF	
R6	Laboratory Store	6.7	2.6	1	1940	C	DOE2	
R7	Solvent Store	25	3.6	1	1940	E	DOE2	
R8	Autoclave Room)	100	3.1	1	1940	E	RAF	
R9	Marine Laboratory)					abcdef	RAF	
	Bunker No 1			10	1940		RAF	
	" No 10			10	1940		RAF	
	" No 12			10	1940		RAF	
	" No 13			10	1940		RAF	
	" No 15			10	1940			
	" No 16			10	1940			
	" No D20			10	1940	E	RAF	
	" No D21			10	1940	E	RAF	
	" No D22			10	1940	E	RAF	
	" No D23			10	1940		RAF	

BUILDINGS DATA

KEY TO COLUMNS

(NB. "Current and Previous Uses" of buildings have been omitted as they appear in the building certificates. Numbers have not been given to the certificates since they follow the same sequence as the order given in the list.)

Key to Buildings Constructions

1. Single block walls, asbestos sheet roof.
2. Steel frame aluminium sheet roof and sides.
3. Steel frame steel sheet roof and sides.
4. Cavity block walls. Boarded and felted roof.
5. 1 petrol + 1 diesel oil pumps + U/G tankage.
6. Concrete with concrete slabs over. Part U/G.
7. Cavity block walls. Flat concrete roof.
8. Single block walls. 47 m^2 concrete, 18 m^2 asbestos cement roof.
9. Single block walls concrete roof.
10. Underground.
11. Cavity block walls. Roof T & G timber + timber covering + insulating material.
12. Nissen Hut, asbestos cement sheets.
13. Steel frame, steel deck roof, asbestos cement sheet sides.
14. Braithwaite Tank.
15. Tank Flats (Outside).
16. Steel frame, asbestos cement sheet covered.
17. 1 m dwarf block wall. Timber frame and glass, wood felted roof.
18. Steel frame. Concrete walls. Steel decking roof.
19. Cavity block walls. Steel decking roof.
20. Single block wall. Timber and felt roof.
21. Single block walls. Steel truss. Timber and felt roof.
22. Single block walls. Timber and felt roof. Timber internal stairways.
23. Steel frame, cavity block wall, asbestos cement sheet roof.

Chemical Usage

Capital letter denotes production or bulk storage.

Small letter denotes small scale preparation, analysis, stability tests or physico-chemical studies.

A a CW agents

B b CW agents intermediates

C c Riot agents or their intermediates

D d Chemicals of biological activity

E e General chemicals

F f Site products or intermediates (for identification of products see Appendix 4).

KEY

* Built for CDE

\+ Radiochemicals

FATE OF BUILDINGS AND LOCATION OF RUBBLE

KEY

DOE1	Demolished by DOE contractors before closure September 1980.
DOE2	DOE instructed to demolish after closure September 1980.
CDE	Demolished by CDE before closure.
RE	Demolished by Royal Engineers before closure.
CDE/RE	Demolished by CDE and RES.
A	Rubble deposited in quarry marked "A" on site map.
B	Rubble deposited in chemical dump marked "B" on site map.
F	Rubble deposited in Utta Hollow marked "F" on site map.
PRM	Occupied by Pattern Recognition Munitions Ltd on a two year lease expiring around June 1981.
RAF	Taken over or to be taken over by RAF or DOE on behalf of RAF.
PRM/RAF	Occupied or partly occupied by PRM but building required by RAF on expiration of lease.

APPENDIX 4

CLEARANCE CERTIFICATES

Copies of A/198 clearance certificates covering all the buildings on the site are held by TIS CDE. They are in the form illustrated overleaf.

BUILDING CLEARANCE CERTIFICATE

Building No Bunker 1 Site Area Central

CURRENT USE AT CLOSURE

Gas Mask Store

PREVIOUS USES

None

DECONTAMINATION

a. Plant Not applicable

b. Cubicles

Not applicable

c. Drains

None required

d. Building

None required

DESTINATION OF CONTENTS *Tick box or boxes*

a. Transferred to CDE ☑
b. Disposed of through D Sales ☐
c. Sold as Clean Scrap ☐
d. Buried on Site ☐

BUILDING *Tick box or boxes*

a. Demolished by CDE ☐
b. Demolished by DOE Contractors before September 1980 ☐
c. Taken over by PRH Ltd ☐
d. Taken over by RAF ☑
e. Left empty for Demolition by DOE Contractors after September 1980 ☐

Everything left is safe to handle.

Signature ..... *Date* 8 September 1980

A/198

APPENDIX 5

LIST OF LAGGING CONTAINING ASBESTOS REMAINING AT NANCEKUKE AT CLOSURE

Building	Equipment Lagged	Remarks
48 DOE Building	Hot water cylinder	Labelled asbestos. Taken over by RAF
50 Change Rooms South Site	Hot water cylinder and pipes	" " Taken over by RAF
52 Canteen South Site	Hot water cylinder and pipes	" " Taken over by RAF
54 Store South Site	Calorifier and pipes	" " Taken over by RAF
63 Admin Building	Hot water cylinder and pipes	" " Taken over by RAF
R1 Research Laboratory	Hot water cylinder and pipes	" " Taken over by RAF
R4 Laboratory	Square ducting from heater	" " Taken over by PRM Ltd
67 South Site Boiler House	Boiler	" " To be disposed of by DOE
104 North Site Boiler House	Boiler	" " To be disposed of by DOE
Central Site Change Room	Hot water cylinder	" "
Boiler House to Runway	Main steam line	
Control Tower	Tee to main line junction 80 ft	

RESTRICTED

APPENDIX 6

BULK CHEMICAL STOCKS - DISPOSAL

Chemical	Quantity	Disposal
HT	591 x 1 litre iron bottles	Each container drilled with 2 holes, HT removed under vacuum and bulked prior to disposal by incineration. Each container decontaminated with sodium hypochlorite.
	5 tonnes (ca 900 gals)	Transferred to 40 gallon drums and disposed of by incineration.
	37 kg	Disposed of by incineration. Containers and vessels decontaminated using sodium hypochlorite, jointing materials burned and vessel joints treated with bleach paste.
CN	4.7 tonnes in drums	Mostly in the form of a solid lump which had to be broken up and packed into polythene bags (ca 0.5 - 1 kg per bag) for feeding into the incinerator.
	376 x 2.5 kg glass bottles (Italian) 0.75 tonnes (Belgian and Italian)	Glass bottles were broken so that the contents could be bagged. Containers (broken or otherwise) were fired and buried quarry.
CNK	7.90 tonnes	Bagged and incinerated as for CN. Kieselguhr removed from incinerator after several drums had been burned and buried in quarry.
BBC	ca 270 litres	Burned in incinerator
BBC(V) (10% Chlorinated Rubber 1% Methyl methacrylate)	ca 540 litres	Burned in incinerator
CS	285 kg	Fines from production runs. Bagged in 0.5 - 1 kg lots and incinerated.
P2S	1.1 tonnes	Rejected tablets (pink) from which P2S could not be recovered. Dissolved in water, decolourised by sodium hypochlorite. Discharged through effluent system.
DM	45 kg	Transferred to CDE Porton
Excelsior	136 kg	Transferred to CDE Porton
DA	51 kg	Transferred to CDE Porton
DC	102 kg	Transferred to CDE Porton

Chemical	Quantity	Disposal
DCX	45 kg	Transferred to CDE Porton
Lewisite	ca 180 litres	Transferred to CDE Porton
Arsenic chloride	31 litres	Hydrolysed in water, product oxidised by sodium hypochlorite. Diluted into effluent system so that level of sodium arsenate discharged was less than 234 ppm, the level toxic to the local marine species.
Methylphosphonic-dichloride	5.8 tonnes	Transferred to CDE Porton
Ethylphosphonic-dichloride	0.68 tonnes	Transferred to CDE Porton
Methylphosphonic-difluoride	0.27 tonnes	Transferred to CDE Porton
Methylphosphonous-dichloride	1.11 tonnes	Transferred to CDE Porton
Ethyl 2-diethylamino-ethyl methylphosphonite (Transester)	0.15 tonnes	Transferred to CDE Porton
Di-di mixture $MePOCl_2/MePOF_2$	4.68 tonnes	Transferred to CDE Porton
Ethyl chloroacetate (Impure)	500 litres	136 litres transferred to CDE Porton 364 litres incinerated
Chloroacetic acid	13.5 litres	Incinerated
Cyclohexanol	26 kg	Destroyed by incineration
2 Methyl cyclohexanol	9 kg	Transferred to CDE Porton
Tri n butylamine	23 kg	Destroyed by incineration
Triethylamine	149 kg	Destroyed by incineration
Sesqui mixture $CH_3AlCl_2/(CH_3)_2AlCl$	9.5 kg	Transferred to CDE Porton
Ethyl Di-di mixture $EtPOCl_2/EtPOF_2$	ca 7 kg	Destroyed by hydrolysis and neutralisation followed by dilution

APPENDIX 7

BURIALS OF EQUIPMENT AND CHEMICALS

Equipment Dump (Quarry). Marked "A" on Site Map

Chemical Plant
Service Pipework
Cubicle Fronts
Structural Steelwork

All equipment has been decontaminated before dumping but as complete cleanliness could not be guaranteed (eg where contact with CR may have occurred, or where the original use was in doubt, or where in the case of reaction vessels there may have been leakage between vessel and jacket which could not be completely decontaminated and it was not considered safe to offer for sale or scrap). Such equipment was buried to a depth of six feet and the area designated as a site not to be disturbed.

Chemical Tip Marked "B" on Site Map

Asbestos (white)	348 bags
Cylinders 21" x 4.5" diameter (origin unknown)	1
Quinoline Tars	7.25 kg
Arsenic trioxide	20 kg
DDT Powder (15%)	7 kg
Red Squill Rodenticide	18 kg
'Anti' Rodenticide	10 kg
Castor Oil Beans	178 kg
Hydroxylamine Hydrochloride (coloured)	10 kg
Kieselguhr	

Tip covered to a depth of 10 - 12 ft.

Pits Behind Building D11 - North Site Marked "C" on Site Map

Pit 1. 4' deep containing approximately 200 g of insoluble antimony salts.

Pit 2. Trench 18' long, 3' wide, 8' deep.

a. Fungicides, herbicides, zinc sulphate (1 kg), phenol solution 50% (2 gallons), copper salts, various small quantities of powders and highly coloured liquids ex Rosewarne Experimental Station. Total 20 lbs gross.

b. Carbonaceous residues from pit used for burning alcohol containing P2S - 30 - 40 lbs.

c. Amide from the hydrolysis of bromobenzylcyanide (Run 177). Sulphuric acid hydrolysis product from bromobenzylcyanide (Run 185). Approximately 150 lbs total.

d. 2 x 7 gallons mixed solvents and aqueous arsenical residues containing waste from preparations of phenoxarsine oxide (7 gallons plus 7 gallons aqueous).

Pit 3. Trench 18' long, 3' wide, 8' deep.

Ammonium oxalate	450 g
Uranium nitrate	100 g
Red phosphorus	100 g
Antimony oxide	5 g
Mercuric chloride	20 g
Mercuric oxide	100 g
Mercury thiocyanate	50 g
Arsenic pentoxide	100 g
Arsenic trioxide	100 g
Antimony potassium tartrate	100 g
Aqueous slurry containing estimated 40% CR	35 gal
Rentokel - Diazinon Jacquer, jellied (O O Diethyl O-2-isopropyl 4 methylpyrimidyl thiophosphate - action less severe than parathion)	4 gal

Pit 4. Trench 18' long, 3' wide, 8' deep.

Rubber gloves from P^{32} preparations (P^{32} half life ca 14 days). Pre-1964.

Pits filled in with soil to a depth of 4 ft.

Mine Shaft Dumps (Kerriack Cove Valley. Marked "D" and "E" on Site Map)

Two mineshafts in Kerriack Valley, both free from adits were used as dumps for plant equipment from Sutton Oak which had never been used at Nancekuke. The original uses of this equipment were unknown but it had been decontaminated before being sent to Nancekuke on the closure of Sutton Oak. The equipment was generally about 50 years old and obsolete. Because of doubts about its previous use and treatment it was buried. These mineshafts were topped up with earth and have been designated as areas not to be disturbed.

APPENDIX 8

EXTRACT FROM CONSERVATION REPORT BY

REPORT ON VISIT TO NANCEKUKE
1st April 1976

LOCATION:

1. This is a Research and Development Establishment located on 873 acres of freehold land and 12 acres of foreshore just north of Portreath. 607 acres are let for agricultural purposes now in the hands of a single farmer.

ACTIVITIES:

2. Process research division of the Chemical Defence Establishment which was established in 1952. The requirement being to produce and handle, in experimental quantities, the full range of extremely toxic agents which might be used in war. This also means the disposal of such waste associated with this work.

HABITAT:

3. Most of the area as had been mentioned is grazed or cultivated. There are, however, some wild areas providing some interesting habitat.

a. Old Tin Minings: situated in gully running toward the coast in the north end of the area. Damming has taken place in order to retain the water in a lagoon. Interesting cliff habitat with old tin mine workings. The stream running down the valley provides increased vegetation in its upper sources.

b. Rubbish Tip: woodland stunted growth and various vegetation.

c. Main Stream Valley: Damming to provide a water reservoir for the establishment. A pumping station also installed. Woodland, mostly ash, covers the banks of this valley. The top dam has formed a very useful pond which has been stocked with fish and is surrounded by luxuriant plant growth. Iris, daffodils and woodland, other bog plants. The valley is heavily wooded with a good age stand of trees.

d. Grassland and agricultural land.

e. Small coniferous copses around administerial buildings and typical Cornish walls.

This is a key area in the Nature Conservancy Council NCC review.

WILDLIFE:

4. There is a considerable variety of habitat, but except for grassland and agricultural land, it is not in great quantities. The remoteness of it and its freedom from human beings provides interesting sites for a number of species.

a. Birds: Buzzard undoubtedly nest and owls are present in the wooded gully and farm area. The streams should attract grey and yellow wagtail as well as the common birds like wren, dunnock, robin etc. Heron come to feed at the fish pond. Green plover, larks, partridge frequent the open areas with suitable habitat along the cliffs for wheat ear and stonechat, tree creeper, nuthatch, all the tits and the usual finch could well be added to the list.

b. Flora: Coastal plants in the uncultivated areas follow the usual pattern. Very little of any vegetation appearing on the old tin mine workings. It is for its flora and bird life that it is listed as a key area by the NCC.

RECOMMENDATIONS:

5. Survey of Wild Life: The country is in danger of losing its entire coastal habitat as a result of the continuous coastal walks. Areas of outstanding scientific interest should clearly be avoided and protected. There is a very real need for a comprehensive study to be carried out of the fauna and flora and a sensitivity map produced highlighting the areas of outstanding importance. Careful consultation and due consideration should be given before any type of development takes place. This should take place between the appropriate bodies involved. But first let us produce a catalogue of the important fauna, flora and habitat of the area so that some or all of these can be preserved from destruction.

APPENDIX 9

CONSERVATION REPORT ON INSECTS OBSERVED

BY _____, RAMC MILLBANK

Robber flies or assassin flies

DIPTERA
BRACHYCERA
ASILOIDEA
ASILIDAE

(1) Dioctria baumhaueri Meigen
? informis (Harris)

A slender, dark, predatory fly that is somewhat local in its distribution. Records of prey show a fairly high proportion of ichneumons and this insect can be watched darting at its prey from hedgerows or grasses, clasping it firmly in the powerful legs that literally form a cage. A species of cool, temperate woodlands.

Hover flies, drone flies, flower flies

CYCLORRHAPHA
ASCHIZA
SYRPHIDAE

SYRPHINAE
SYRPHINI

(2) Episyrphus balteatus (Degeer)
scitulus (Harris) (♀)
scitule (Harris) (♂)

A common and generally distributed fly often taken in large numbers from cow parsley and the like. The thorax is greenish and the abdomen banded with yellow and black. Many of the specimens I have looked at have been dusted with pollen. The larvae feed voraciously on aphids.

CHEILOSINI

(3) Cheilosia illustrata (Harris)

Dark and somewhat bee-like this insect has a conspicuous brown cloud across the wing. Common and generally distributed. Larvae in plant stems or roots.

ERISTALINI

(4) Eristalis (Eoseristalis) hoticola (Degeer)
lineatus (Harris)
cinctus (Harris)

A great lover of the flowers of ragwort, this bee-like insect with a brown and orange abdomen is often seen in large numbers. Like C. illustrala the wing sports a brownish cloud. The larvae are sometimes called "rat-tailed maggots" and may be found in pools containing decaying organic matter.

(5) Eristalis (Eoseristalis) pertinax (Scopoli)
fossarum Meigen

A large bee-like brown and orange species with larvae similar to those of E. horticola. Common and generally distributed.

SCHIZOPHORA
ACALYPTERATAE

LAUXANIIDAE

A single yellowish species of this largely retiring family was found in the cool, damp hedgerows near the dam.

AGROMYZIDAE Leaf miners

Some three species were collected but have not as yet been identified beyond family level. They may be deferred until further collections in the area are made in 1980 and access to reference material is obtained (there are about 300 species on the British list).

Parasite flies

CALYPTRATAE
TACHINOIDEA
TACHINIDAE

The larvae of this quite fascinating family are internal parasites of other arthropods.

ERNESTIINI

(6) Gymnocheta viridis (Fallén)
Gymnochoeta, variant spelling

A fairly large, brilliant metallic green fly that lays its eggs in places likely to be frequented by such moths as the Black Arches and Small Dotted Buffs. The active larvae bore into the host very quickly. Common.

SARCOPHAGIDAE Flesh flies
SARCOPHAGINAE

(7) Sarcophaga spp (2)

Two large species were noted and are to be referred for specialist attention. These flies are greyish with prominent dark longitudinal thoracic markings. The abdomen has an obvious 'chequer-board' pattern that shifts from dark to light according to the angle of light falling on it, dark squares becoming light and vice versa. Brick red eyes and big feet are other 'give aways' in this handsome genus. Larvae normally develop in carrion and cases of human myiasis are on record. Common.

CALLIPHORIDAE Blow flies. Blue Bottles, Green Bottles etc
CALLIPHORINAE

(8) Calliphora vicina Robineau-Desvoidy.
? minimus (Harris)
erythrocephala (Meigen) preocc.

(9) Calliphora vomitoria (Linné)

The two common blow flies. Both species were taken from a decaying sheep carcass.

(10) Lucilia bufonivora Moniez

A metallic green to greenish blue fly that lays its eggs on the nares and eyes of toads. The larvae burrow into the living amphibian and death usually results. Locally common.

(11) Lucilia richardsi Collin

A common green bottle.

(12) Lucilia sericota (Meigen)
? pervenio (Harris)

Another common green bottle often the cause of 'strike' in sheep.

(13) Pollenia rudis rudis (Fabricius) Common.
? remigro (Harris)

(14) Pollenia varia (Meigen) Common.

MUSCOIDEA
MUSCINAE
MUSCINI

(15) Mesembrina meridiana (Linné)

A large, striking shiny black species with orange bases to the wings. Commonly seen basking in the sunshine and visiting umbelliferous flowers.

HYDROTAEINI

(16) Hydrotoea irritans (Fallén)
? clemens

An all too common and infuriating 'sweat fly'. It is well named 'irritans'.

PHAONIINAE

(17) Phaonia pallida (Fabricius) Common.

(18) Phaonia variegata (Meigen) Common.

(19) Helina spp.

Three species from this difficult genus are to be referred for specialist opinion.

(20) Graphomya maculata (Scopoli)
compuncta (Harris)

APPENDIX 10

THE DISPERSION OF EFFLUENT IN THE VICINITY OF NANCEKUKE'S EFFLUENT OUTFALL

Information about the dilution of effluent in the vicinity of the outfall was required in order to evaluate safe discharge concentrations.

A simulated effluent consisting of 7,000 mg/l of isopropyl alcohol IPA in water was discharged and samples of the sea water in the vicinity of the effluent outlet were taken.

MATERIALS AND METHOD

1. Preparation of simulated effluent

Eighty-five gallons of IPA commercial reagent was pumped into the effluent tank (20,000 gallon capacity) simultaneously with 14,000 gallons of process water. During the discharge 3 samples were taken from the outlet pipe to measure the concentration of IPA and to check its uniformity.

2. Sampling Method

Samples other than surface samples were taken using a stainless steel/plastic bilge pump. An eight metre length of 12.5 mm bore PVC tubing was attached to the inlet of the pump. To the other end of the tube a 5 lb lead weight was fastened and a 7 m length of cord graduated to measure depths of ½, 1, 2, 3, 4, 5 and 6 metres. Two full strokes of the pump were sufficient to clear the pump and tube between samples. The samples were collected from the pump outlet in 60 ml glass stoppered bottles.

3. Analysis of samples

Samples were analysed by GL chromatography.

4. Sea and Meteorological Conditions

At 0900 hrs there was a light to moderate offshore wind (force 2-3 south east). The sea was flat apart from a very light ½ m (trough to peak) westerly swell. It was decided to go ahead.

In late afternoon the wind backed E by NE and freshened to force 4-5 causing a slight choppiness on the sea. The swell also increased although still fairly light to a height of 1 m (trough to peak). This made conditions in the inflatable boat unpleasant and caused inaccuracies in both the site and depth of sampling.

RESULTS

Samples were taken at the mouth of each cave entry and at two equidistant points about 60 feet offshore from the main entrance. The depths, times and measured concentrations of IPA are shown in Table I. Discharge was started at 1605 hrs. In all 27 samples were taken.

DISCUSSION

The minimum dilution found was one of 9X on the surface at the cave mouth; at all other sites and depths there was found to be more dilution, the minimum dilution at 1 metre being 27X. The absence of effluent on the sea bed is encouraging as the less mobile animals of the benthos are more susceptible than the pelgalgie fish which can rapidly vacate an undesirable environment. The surface slick must however be regarded with caution as on a very calm day this could extend for a considerable distance. The absence of IPA at sites 4 and 5 confirms that the western end of the cave is a potential clean sea water source.

CONCLUSION

Under the normal sea conditions effluent discharged from Nancekuke is considerably diluted before leaving the vicinity of the cave. Contamination is principally of the surface waters with little if any of the benthos. The present accepted standard that an effluent should be non-toxic at a dilution of 3X appears quite adequate for all but the calmest of days. A further exercise on such a day would enable the hazard of a surface slick to be more accurately assessed.

and

CDE Nancekuke
20 June 1973

ACKNOWLEDGMENTS

The Royal Navy, HMS Drake, Plymouth, kindly provided an outboard-powered inflatable boat of the Gemini type and a crew led by

was responsible for the GLC analyses and Messrs and assisted with the sample-taking.

TABLE I

Sample No	Site	Depth m	time	IPA mg/l	Dilution X
1	1 (main entrance)	S	16.15	Nil	-
2		1		Nil	-
3		2		Nil	-
4	1	S	16.25	178	40
5		1		36	197
6		2		32	222
7	1	S	16.35	780	9.1
8		1		122	58
9		2		34	209
10	2 (offshore E)	S	16.45	5	1,420
11		1		Nil	-
12		2		Nil	-
13		3		Nil	-
14	4 (first exit)	S	16.55	Nil	-
15	5 (second exit)	S	17.00	Nil	-
16	1	S	17.05	675	10.5
17		1		260	27
18		2		20	355
19		3		< 5	> 1,420
20	3 (offshore NNE)	S	17.15	347	20.7
21		1		10	710
22		2		10	710
23		3		< 5	> 1,420
24		4		5	1,420
25		5		0	-

Nke/TD7300/446/70

VISIT TO EFFLUENT CAVE ON 11 MAY 1970

Times of high tide: 9.15, 21.19 Size of tide: medium neap

The party consisted of Lt , Officer i/c, and his crew of three from HMS DRAKE, P/O Yockney, HMS SEAHAWK Photography Section, and of CDE Nancekuke.

The expedition left Porthtowan beach at 15.10 and arrived at the cave's most Easterly entrance at 15.30.

This entrance measured 30 ft by 30 ft and its floor was strewn with large boulders. The depth of water between boulders was 4 ft. On the left hand face of the entrance there were numerous limpets, mostly Patella intermedia, and a few necklace shells, Natica alderi. Looking into the cave from here the effluent outfall could not be seen and the cave appeared to terminate after about 80 ft.

On entering the cave several green stains were noticeable on the roof, probably caused by natural drainage. The floor was still boulder strewn and the water depth was about 4 ft. There were no ledges particularly suitable for breeding seals. The effluent outfall was marked by a 2 ft wide brown stain on the cavern's left wall some 60 ft from the entrance. On either side of the brown stain there were limpets and necklace shells within 3 ft. Here the cave floor was 10 ft wide and covered in water apart from where boulders protruded to a depth of 2 ft. The effluent outlet was about 30 ft above the water level.

The rock face was climbed and the outlet pipe and access tunnel were examined. Everything appeared to be in good order. A sketch of the effluent outfall as it appeared is included.

Proceeding further into the cave it narrowed to 6 ft and the water became much deeper, probably 15-20 ft and two other entrances to the cave were noticed. The size of these could not be seen as they were almost totally submerged. Although the sea was that day exceptionally calm, water was pulsating through the openings with considerable force.

We now left the cave and re-embarking proceeded around the cliff face to investigate the other entrances from outside. The furthest West of these was an opening 15 ft high by 10 ft wide containing water to a considerable depth. 20 ft inside the ceiling dropped sharply, leaving the passage to the effluent cave

almost totally submerged and of an undetermined size. Numerous mussels were living in this area. What appeared to be the other entrance was also located, this too was nearly totally submerged.

We then concluded our observations and returned to Porthtowan, landing at 16.40.

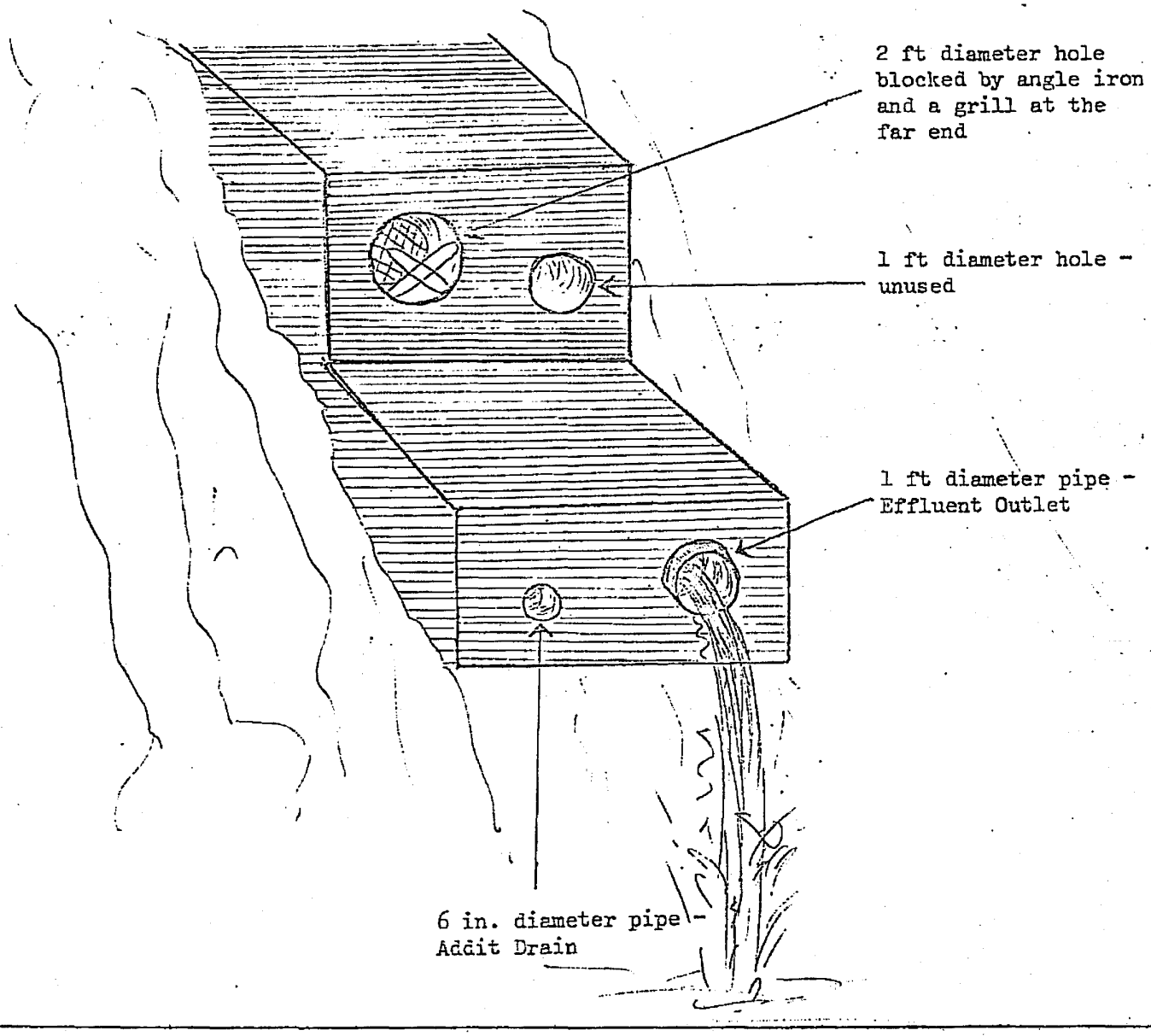
Conclusions

There appears to be a good number of marine animals living without ill effect in the vicinity of the effluent outfall. The effluent outfall outlet itself is in good condition. A sketch plan of the cave is included. It would be expected that when the sea level is higher and with the normal wave action on this coast that the sea will pulse in through the two submerged entrances, leaving the cave through the large East-facing exit. This is particularly likely as the submerged caves face North-West to North, the direction in which the swell generally runs on this coast. The numerous boulders deposited in the East end of the cave are also an indication that this happens. This sort of pulsing action should give a very good dilution of any effluent released.

CDE Nancekuke
Redruth Cornwall
13 May 1970

SKETCH OF THE EFFLUENT OUTFALL

(The shaded area is concrete)

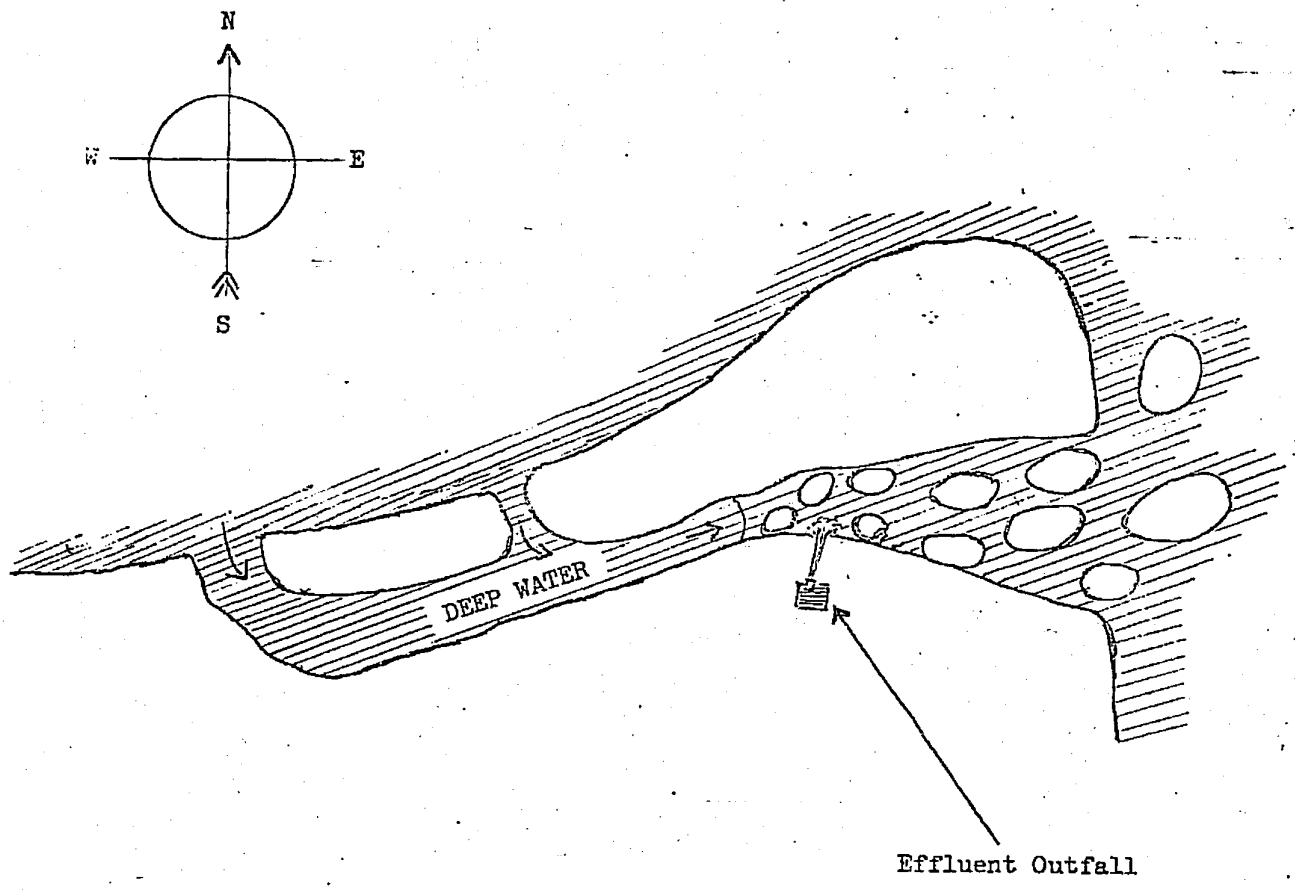


13 May 1970
KCM/MN

CDE Nancekuke
REDRUTH Cornwall

ProcRD/TD7300/448/70

SKETCH PLAN OF THE EFFLUENT CAVE



13 May 1970
KCM/MN

CDE Nancekuke
REDRUTH Cornwall

APPENDIX 11

LEACHING FROM THE QUARRY DUMPS

In order to check the possibility of toxic chemicals being leached from the chemical dump and the main quarry dump, samples were taken periodically from surface water on the run-off side of these areas and examined. The sample sites chosen were a ditch at the head of a small stream about 250 metres to the north-west of the chemical dump and a stream about 500 metres down the valley from the main quarry. Both these water sources discharged into the sea at Sally Bottom. Occasional samples were also taken from the Toltiggen stream about 500 metres from the dam.

The water samples were filtered and acidified to M/10 approximately with HCl. These were examined by ultra-violet spectrophotometry. As controls water samples were taken from sites several miles from CDE Nancekuke - William's Shaft, Pool, Carne Marth Quarry and Lanner.

All water samples showed similar overall background absorption - a slight general increase in absorption below 300 mu and a more intense one below about 240 mu.

The UV spectra were examined for signs of specific absorption bands particularly at 260 mu pyridine bases and at 313 mu for CR. It was estimated that 1 ppm of either of these compounds could be detected. The water was also examined for any red coloration that would indicate the presence of pyridine-2-aldoxime.

Samples were taken on the following dates:-

11 1 74	Both sites
22 3 74	Large quarry only
25 6 74	Both sites
16 8 74	Both sites
27 9 74	Both sites and Toltiggen
2 12 74	Large quarry only
4 3 75	Both sites
7 5 75	Both sites
7 8 75	Both sites
21 11 75	Both sites and Toltiggen
10 3 76	Large quarry only
16 3 76	Both sites
11 6 76	Both sites
14 9 76	Both sites
4 3 77	Both sites
30 6 77	Both sites and Toltiggen
14 2 78	Both sites
23 6 78	Both sites
4 12 78	Both sites

In no case was contamination by pyridine bases, CR or P2X detected. In no case was significant contamination by any other material detected.

CDE Nancekuke
20 February 1980

APPENDIX 12

RECORD OF WORK TO BE CARRIED OUT BY DOE AFTER CLOSURE

The work required to be done by DOE for CDE after closure on 30 September 1980 is as follows. The request for the work is included in a letter from O i/c Nancekuke to DWO RNAD Culdrose NSR2/014/138/80.

a) Demolition of Buildings

North Site Buildings: P1, P2, P3, P4, P5, P6, P10, P11, D11, 104 and 108. Any fencing and plinths remaining to be removed.

Central Site Buildings: 1, 2, 3, 5, 6, 8, 9, 17, 24, 1000, 1006, D1, D2, D3, D6, *D12, *D15, *D16, D17. Plinths to be removed.

*Asbestos hazard

South Site Buildings: 67, 91, R6, R7 and 448. Plinths to be removed.

b) Additional Work

1. Effluent shaft and adit at North Site to be blocked with a concrete plug at the seaward end and capped at the surface. Manholes to be plugged. (The RAF have no requirement for this facility, see reference STC/1062/10/Plans of 12 6 80.)

2. Effluent pits at North Site to be levelled with earth.

3. Circular concrete tank at North Site to be demolished unless required.

4. The equipment dump and chemical dump marked "A" and "B" on the site map to be covered with extra earth and landscaped. The equipment dump "A" to be used for rubble from the demolition of North Site buildings and elsewhere if necessary before covering and landscaping. The remainder of site rubble to be deposited in Utta Hollow marked "F" on site map.

5. All buildings spoil which has been deposited in Utta Hollow to be covered with soil and landscaped.

6. Well situated in dog compound to be made safe (spectic tank to be left for possible future use).

7. Mineshaft in Landry's field Porthtowan Gate area, to be fenced.

8. Mineshafts not searched during EOD survey and indicated on the site map to be fenced.

9. Areas marked A, B, C, D, E on site map designated as areas not to be disturbed to be marked and fenced.

(DOE must liaise with RAF to ensure fencing material is compatible with radar operations.)

10. Large Braithwaite tank between Central Site and North Site to be dismantled, unless required, and disposed as clean scrap.

11. Large oil-fired boiler and large asbestos-lagged coal fired boiler to be removed from North Site boiler house for disposal by DOE. The asbestos-lagged boiler in the boiler house adjacent to the laundry at South Site to be removed for disposal as scrap.

APPENDIX 13

VISIT OF UN COMMITTEE ON DISARMAMENT CHEMICAL WEAPONS EXPERTS

1. At the invitation of the UK, Chemical Weapons Experts from the Member States of the Committee on Disarmament and other interested states visited CDE Nancekuke on 15 March 1979.

2. As a result of the closure of CDE Nancekuke it was necessary to demolish the GB plant. This fact suggested that an inspection of this activity could be used as a confidence building measure to contribute to the progress on a convention to prohibit the development, manufacture and stockpiling of chemical weapons and their destruction. It was hoped that the visit would demonstrate the complexity of the task of demolition or conversion to peaceful purposes of CW agent facilities together with the overriding importance of verification.

3. The following countries accepted the invitation and the representatives attending were:-

Australia	Netherlands
Belgium	Norway
Canada	Pakistan
Egypt	Romania
France	Sweden
Germany	Turkey
Greece	United Nations
Indonesia	USA
Ireland	Venezuela
Italy	Yugoslavia
Japan	

They were accompanied by

, ACDD, Foreign Office

CW Sub Gp of Minister of States Advisory Panel on Disarmament

, DS 11

4. The visit commenced at 0930 hours and after a welcome by D/CDE a presentation on the "Provision of Small Scale Chemical Production Facilities (1951-1976)" was given. This briefly described the installation and operation of the GB Pilot Plant, nominally designed to produce 1 tonne/wk, actually achieved a rate of 70 tonne/yr -

20 tonnes GB being made during the period 1951-1955. Reference was also made to the limited production of other materials eg irritant chemicals, enzymes, charcoal cloth and P2S during the period 1955-1977. A second presentation entitled "Disposal of Toxic Facilities (1976-1980)" was given which outlined the problems of safe demolition and disposal of the GB Pilot Plant facility.

5. Following the presentation, the visitors toured the site in 2 parties. They were shown the GB compound, the destructor facility, development laboratories, workshops, research laboratories and the medical station.

6. The visit concluded with a presentation on "UK Chemical Defence Equipment" including protective clothing, prophylaxis and detection equipment followed by a general discussion on the overall subject of chemical warfare and defence which terminated at 1530 hours when the party left for a visit to Albright and Wilson Ltd, at Oldbury.

7. Following the visit the Armaments Control Disarmament Dept of the Foreign Office reported that the visit was a resounding success. Participants had expressed appreciation for the British initiative and saw the action as advancing a further step towards a CW convention. The visitors were most complimentary about the professionalism of CDE's presentations and their unrestricted ability to examine the Nancekuke site.

CDE TM 8

DISTRIBUTION

CDE	(2)
DCE	(1)
SSO (PE)	(1)
RAF PORTREATH	(1)
PSA CULDROSE	(1)