



ALBUQUERQUE OFFICE

28 August 2002

Mr. Jeff Sanders
Ground Water Quality Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, NM 87502

RE: **Grants Reclamation Project – DP-200 Renewal – Response to September 12, 2000 NMED Letter Transmitting Comments / Questions on Renewal Application**

Dear Mr. Sanders:

Attached are Homestake's responses to the September 12, 2000 NMED letter from M.H. Noble regarding questions on the pending DP-200 renewal application. Some of the additional information requested was also directed toward evaluation of the project 1989 Corrective Action Plan (CAP) in terms of adequacy to support deletion of the site from the National Priorities List (NPL) under CERCLA Superfund.

While we view that the DP-200 renewal, revision of the 1989 CAP, and future site NPL deletion consideration are all integral aspects of the overall site reclamation and closure program, it is believed that the most appropriate approach to achieve the mutual objectives of NMED, NRC and the project is to work through the various permit revision / renewal and related review and approval processes in a stepwise fashion.

It should be mentioned that the Nuclear Regulatory Commission (NRC) has asked to see our attached responses to NMED comments and questions as part of their review of our proposed background water quality review document filed recently with NRC. It is our understanding that A. Phillips, formerly with the NMED-GWQB SOS staff, is presently reviewing that document as well for purposes of providing NMED comments to EPA. This process will hopefully result in establishment of the full range of background water quality objectives for water quality constituents of concern at the site that are mutually acceptable. After this is achieved, we then expect to file a revised CAP. A proposed project site alternative concentration limit (ACL) document will subsequently be filed based on additional information that is developed from the background and CAP development efforts for agency review.

Thank you for your time and attention on this matter; if you have any questions, please contact me in our Albuquerque office at (505) 828-1621 or at the Grants site at (505) 287-4456, ext. 10.

Sincerely yours,

George T. Hoffman

for

Alan D. Cox
Manager - Grants &
Southwest U.S.

Enclosure(s)

cc: Elaine Brummett, NRC ✓
Mark Purcell, EPA
Birgit Landin, GWQB, SOS

**HOMESTAKE MINING COMPANY
Grants Reclamation Project
DP-200 Renewal**

**RESPONSES TO
NEW MEXICO ENVIRONMENT DEPARTMENT
REGARDING QUESTIONS / COMMENTS ON DP-200
RENEWAL APPLICATION
PER
NMED LETTER DATED SEPTEMBER 12, 2000**

September 3, 2002

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**Responses to New Mexico Environment Department
9/12/00 Letter Regarding DP-200 Renewal**

The attached presents a summary of NMED questions and HMC responses, which are numbered to correspond with the questions / comment letter.

Comment: I. Exemption from Abatement Plan

Response: HMC should be exempted from the abatement plan requirements due to WQCC Regulation 4105.A.2 and A.4. The NRC CAP defines the abatement requirements even if the site is removed from the NPL.

Comment: I.1. Abatement of Ground-Water Pollution in Naturally Poor Water Quality and Abatement of Ground-Water Pollution Outside the Site Boundary

Response: HMC understands that the naturally poor quality alluvial aquifer has to be restored for ground-water pollution at this site. HMC understands that based on the WQCC Regulations 4101 the ground-water quality downgradient of the site has to be returned to within the full range of natural background concentrations. The CAP will be revised to include off site ground-water restoration.

Comment: I.2.A. Movement of Vadose Zone Contaminates into the Alluvial Aquifer

Response: The vadose zone under the Large Tailings Pile (LTP) does contain high concentrations down to the top of the alluvial aquifer. The LTP tailings flushing program will gradually move the vadose zone concentrations down to the alluvial aquifer. This movement will occur over a short period of time and will be collected in the alluvial collection wells completed below the LTP as part of the groundwater restoration program.

Comment: I.2.B. Restoration of Contaminated Ground Water Downgradient of the Site

Response: See response to I.1.

Comment: II. Proposed Background Concentrations Higher than the 1999 Ranges

Responses: The 95-percentile value is used to define the full range of background concentrations, which takes into account the natural changes over time and the natural areal variations in the aquifer. The 1999 Annual Report data presented the range in values for the latest 1999 results and does not account for the variability

due to time or full range in areal variations that are presented in the background water quality report documents presently under review by the State and NRC.

Comment: II.1. Appropriateness of the San Mateo Alluvial Background Concentrations for the Upper Chinle Aquifer

Response: The geologic setting of the Upper Chinle aquifer is presented using the typical geologic cross section and the limits of Upper Chinle aquifer and well locations figures in Section 2 of the "Ground-Water Hydrology for Support of Background Concentrations at the Grants Reclamation Site" report. The cross section shows how the Upper Chinle sandstone subcrops against the alluvium. Good connection exists in the subcrop areas. The limits figure shows where the Upper Chinle exits west of the East Fault and east of the East Fault. This figure also shows where the Upper Chinle sandstone subcrops against the alluvium (see red pattern). Water can easily move between these two units in the red pattern area. Therefore the alluvium recharges the Upper Chinle aquifer within the site and to the north. Under pre-restoration conditions the alluvial aquifer also recharged the Upper Chinle aquifer on the east side of the East Fault. The water-level elevation contours show the direction of ground-water flow within the Upper Chinle aquifer (see flow paths and water-level elevation for the Upper Chinle aquifer in the 2000 Ground-water Hydrology report). Additional water quality data for the Upper Chinle aquifer is available in the HMC monitoring reports for well CW3 and some of the eastern wells. The use of these wells in establishing background water quality concentrations would likely increase the 95th percentile concentration levels in several parameters over that indicated in the background document.

Comment: II.2. Use of Only the Near Upgradient Wells in Defining Background Concentrations

Response: The Far Up-Gradient well data were included in the DP-200 renewal and NRC background report; however, these data were not used in the selection of the 95th percentile levels. The results from the analysis of only the Near Up-Gradient wells were used in selecting the proposed background levels.

Comment: II.3. Biased Analysis of Near Upgradient Data Set

Response: The long period of observed results is important to be used to define the natural variations with time in water quality in the alluvial aquifer. The well distribution over the upgradient aquifer is important to define the natural variation in an areal extent as well. Reducing the observed data set for the near upgradient wells is more likely to bias the results due to not accounting for the full range of observed changes with time and changes in an areal extent. Therefore the full data set is better to define the historical variations in the alluvial background concentrations.

Comment: II.4. Water Quality Trends in Near Upgradient Wells

Response: Plots of historical water quality for TDS, chloride, uranium, selenium, molybdenum and nitrate were developed for wells P, Q, R, DD, ND, P1, P2, P3 and P4 at the same vertical and time scales. The 5 'P' wells are grouped together because they are in the same vicinity of the alluvial aquifer. The remaining four background wells, which are west, north and east of the 'P' wells, are shown on the second plots. The historical plots of water-quality concentrations for the 9 background wells are presented in the enclosed figures according to the following list:

Constituent	FIGURE NUMBER	
	P Wells	Non-P wells
SO4	1	2
TDS	3	4
Cl	5	6
U	7	8
Se	9	10
Mo	11	12
NO3	13	14

The present State site standard was determined from the mean concentrations for upgradient wells P, Q and R for data from 1976 through early 1983. These mean concentrations are presented in Table 2 of the NMED's Pre-hearing Ground-water Discharge Plan Analysis for the Homestake Uranium Mill near Milan, New Mexico, published in January 1984. The use of the mean concentrations does not define the upper portion of the natural background concentrations. Also, the much shorter record does not account for the historical changes that have been observed over the last 24 years. The additional near background wells also better define the natural areal variation in the alluvial aquifer. Therefore, the present statistical analysis of full background is a much more appropriate way to define the site standards at the Grants site.

Comment: II.5.A. Graphs for Near Upgradient Data

Response: See response to II.4.

Comment: II.5.B. Table 2-1 in the Discharge Plan Renewal Application

Response: Table 2-1 in the 2000 ground-water report which was included in the DP-200 renewal package was taken from the 1999 Annual Report and is the range for the latest 1999 values for wells P, Q, R, DD, ND, P1, P2, P3, P4, 920 and 921. The 1999 data from the Annual Report uses the near upgradient background wells and two far upgradient wells and also uses only the latest 1999 values (see

response II.). Therefore, the background reports submitted with the DP-200 renewal and to the NRC, which use only the near upgradient wells and the full data set, presents a full range of the background water quality.

Comment: III.1.A. Summary of Historical and Current Downgradient Water Quality Data

Response: The requested tables, which are presented in Appendix A in Tables A-1 through A-12, compare the downgradient concentrations with present State site standards. The following tabulation lists the table number and corresponding area and aquifer presented in the tabulations.

TABLE NUMBER	AREA/AQUIFER
A-1	Homestake/Alluvial
A-2	Broadview and Felice/Alluvial
A-3	Murray and Pleasant Valley/Alluvial
A-4	Regional/Alluvial
A-5	Homestake/Upper Chinle
A-6	Broadview and Felice/Upper Chinle
A-7	Murray and Pleasant Valley/Upper Chinle
A-8	Regional/Upper Chinle
A-9	Homestake/Middle Chinle
A-10	Broadview and Felice/Middle Chinle
A-11	Murray and Pleasant Valley/Middle Chinle
A-12	Regional/Middle Chinle

The yellow shaded values exceed the present State site standard. Water-quality data under "H" columns are the highest values observed for the particular constituents while the 'E' values are the latest value observed. The values with an asterisk were the latest values measured but were prior to 1994. The percentages of wells that exceed the standard are listed at the bottom of the tables.

Appendix B presents a similar set of tables comparing the highest and existing concentrations to the proposed background concentration. The table numbers for the above tabulation of table numbers versus area and aquifer can be used for finding the data in Appendix B except the 'A' in the table number needs to be replaced with a 'B'.

Comment: III.1.B. Graphs of Water-quality Data for the Table 2 Wells

Response: Plots for the routine monitoring wells from Table 2 of the NRC license are presented for sulfate, TDS, chloride, uranium, selenium, molybdenum and nitrate concentrations as Figures 15 through 49. The first group of wells for each of these constituents are presented for the three POC wells (Wells D1, X and S4) and

the initial figure also includes on site wells (Wells F, FB and GH). The following tabulation lists the figure numbers for each of the constituents:

CONSTITUENT	FIGURE NUMBER
SO4	15 – 19
TDS	20 – 24
Cl	25 – 29
U	30 – 34
Se	35 – 39
Mo	40 – 44
NO3	45 – 49

A few different vertical scales were required due to the large variations in parameter concentrations. The present State standard and the proposed background concentrations are presented on the plots.

Comment: III.1.C. Updated Geologic Cross-Sections with Water Quality Concentrations

Responses: The geologic cross-sections were originally presented in the 1983 report for DP-200. Cross-sections B-B' and D-D' are presented in these responses to convey the geologic setting. These two cross-sections were put into ACAD with color patterns to portray water quality concentrations. Figure 50 shows the location of cross-sections B-B' and D-D'. Cross-section B-B' runs generally west to east just south of the Large Tailings pile while cross-section D-D' runs generally from the south to the north through the Large Tailings pile. The following list presents the drawing numbers for the two cross-sections for corresponding water-quality constituents.

CONSTITUENT	DRAWING NUMBER	
	X-SECTION B-B'	X-SECTION D-D'
U	1	4
Se	2	5
Mo	3	6

Deep wells with geophysical logs are also shown on the cross-section. The screened section or interval in the wells are shown with short horizontal lines on the well location.

The uranium concentrations in the alluvial aquifer exceed 10 mg/l in the area of the Small Tailings (see Drawing 1) with concentrations declining quickly to the east due to the fresh water injection in this area and concentrations existing above 1 mg/l on the west side of the Small Tailings. Higher concentrations in the Upper Chinle exist

where it subcrops against the alluvial aquifer. All uranium concentrations in the Middle and Lower Chinle aquifers are less than 0.1 mg/l in the area of cross-section B-B'.

Drawing 2 presents the selenium concentrations for cross-section B-B' showing very similar areas of higher concentrations for selenium as that observed for uranium. Drawing 3 shows elevated molybdenum concentrations in the alluvial aquifer and a portion of the Upper Chinle aquifer near the Small Tailings.

Cross-section D-D' shows that the Upper Chinle subcrops southwest of well CW14 with the alluvial aquifer and is showing the convergence toward a subcrop to the north of the Large Tailings near the edge of the cross-section at D' location. The subcrop of the Middle Chinle to the alluvial aquifer is also shown near well CW29. The Lower Chinle also subcrops with the alluvial aquifer near well 853. Uranium concentrations exist in the alluvial aquifer in the area of the Large Tailings and south to well CW4R. The Middle Chinle aquifer shows some effects from recharge from the alluvial aquifer near its subcrop area, as does the Lower Chinle aquifer near well CW42.

Drawing 5 shows very similar selenium concentration patterns to those observed for uranium. Selenium concentrations underneath the tailings are less due to the decrease in selenium concentrations in the tailings water with time. Cross-section D-D', Drawing 6, shows that molybdenum concentrations are only elevated near the Large Tailings in the alluvial aquifer and Upper Chinle aquifer.

Comment: III.1.D. Comparison of Current Concentrations to Predicted Concentrations

Response: The 1981 DP-200 modeling study only predicted the water quality restoration progress up through 1992. Therefore a comparison of the current concentrations to predicted concentrations from that modeling effort is not particularly instructive. We periodically complete a progress review for our restoration program to assure that we are meeting internal goals and project completion time frames.

Comment: III.2. Use of Irrigation Program to Restore Off Site Concentrations

Response: The details of the irrigation program will be added to the updated and revised CAP document. The most recent water quality data shows some improvement in the areas where irrigation water is being pumped and selenium concentrations in some areas are showing a significant reduction.

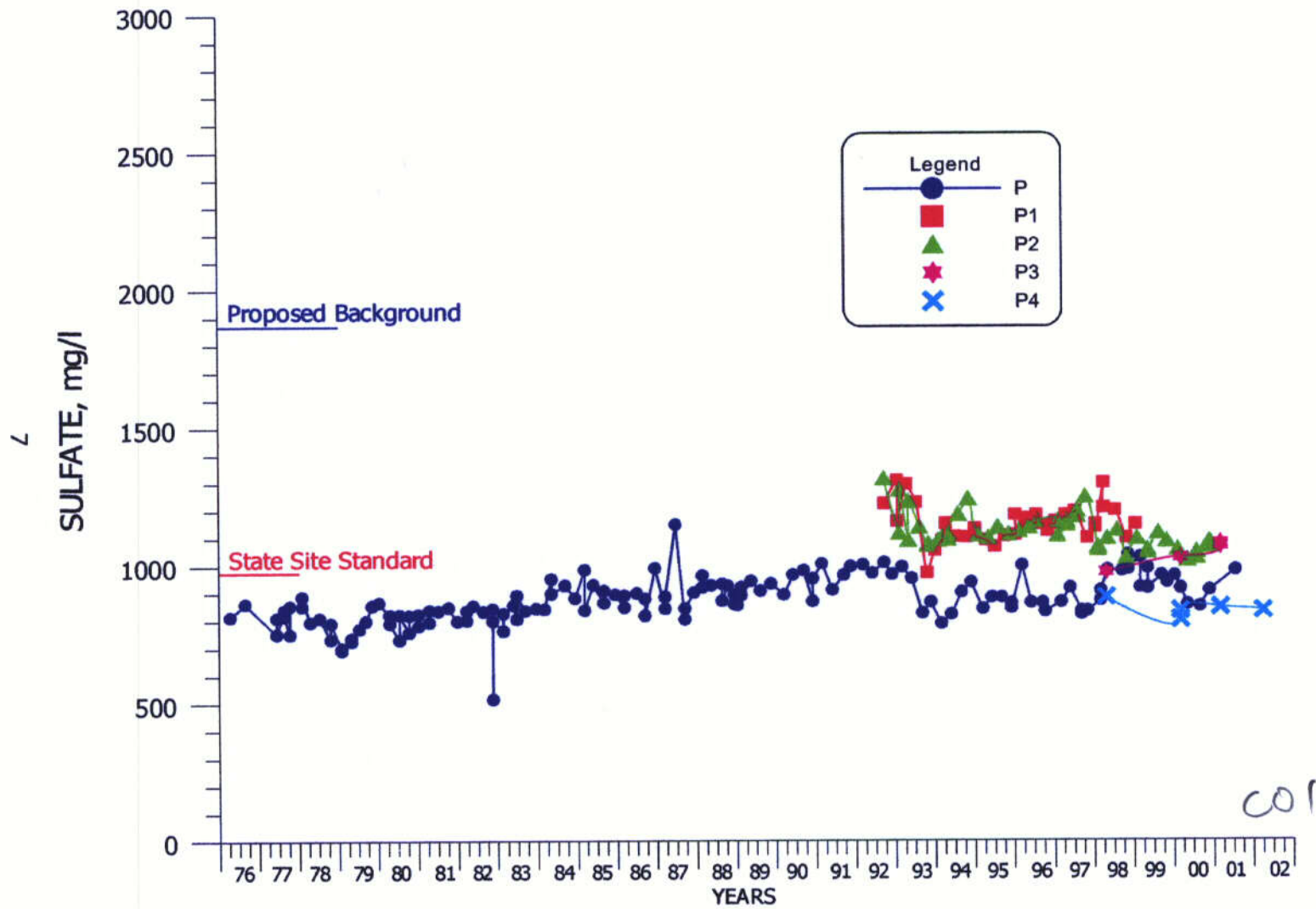


FIGURE 1. SULFATE CONCENTRATIONS FOR BACKGROUND WELLS P, P1, P2, P3 AND P4.

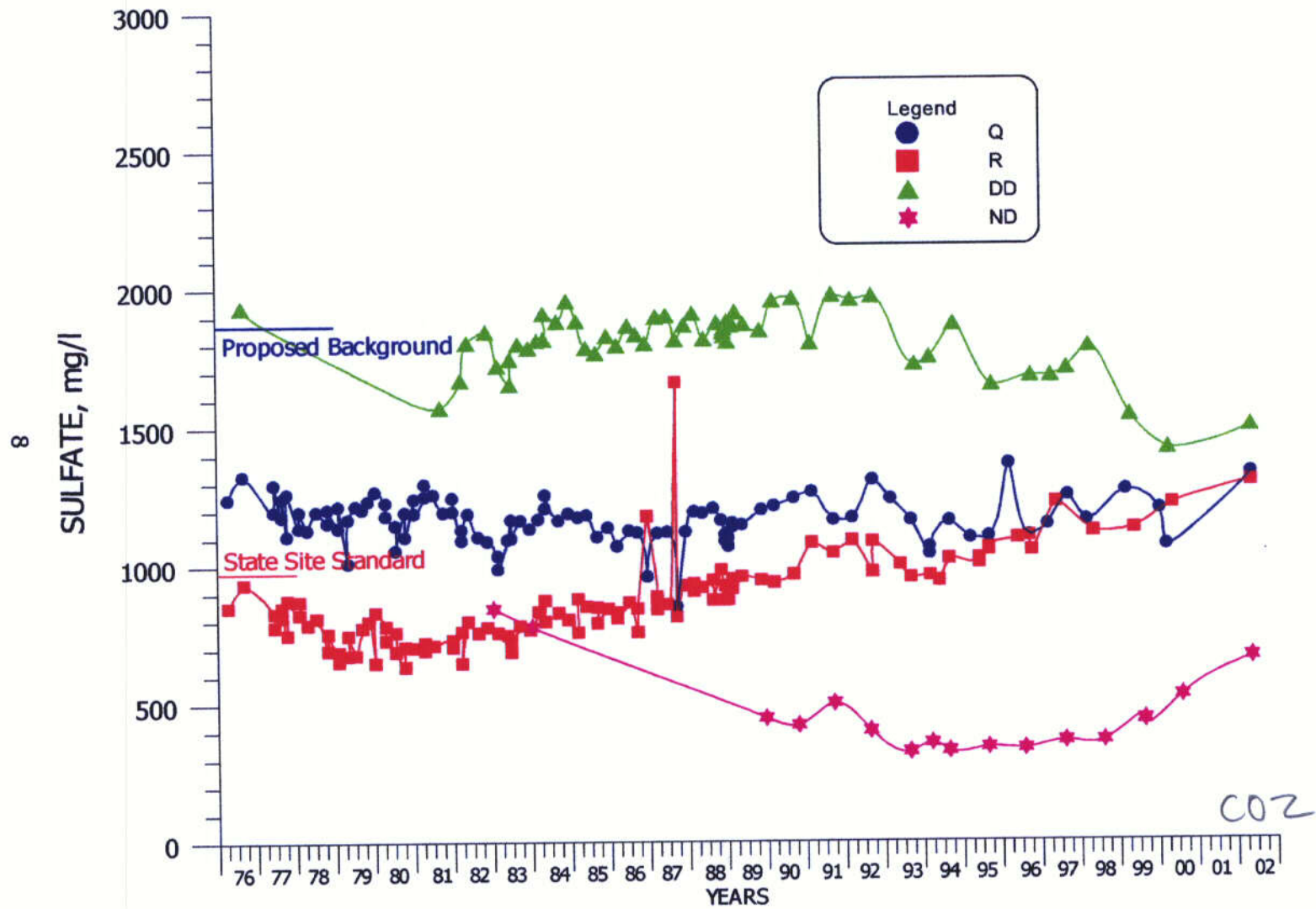


FIGURE 2. SULFATE CONCENTRATIONS FOR BACKGROUND WELLS Q, R, DD AND ND.

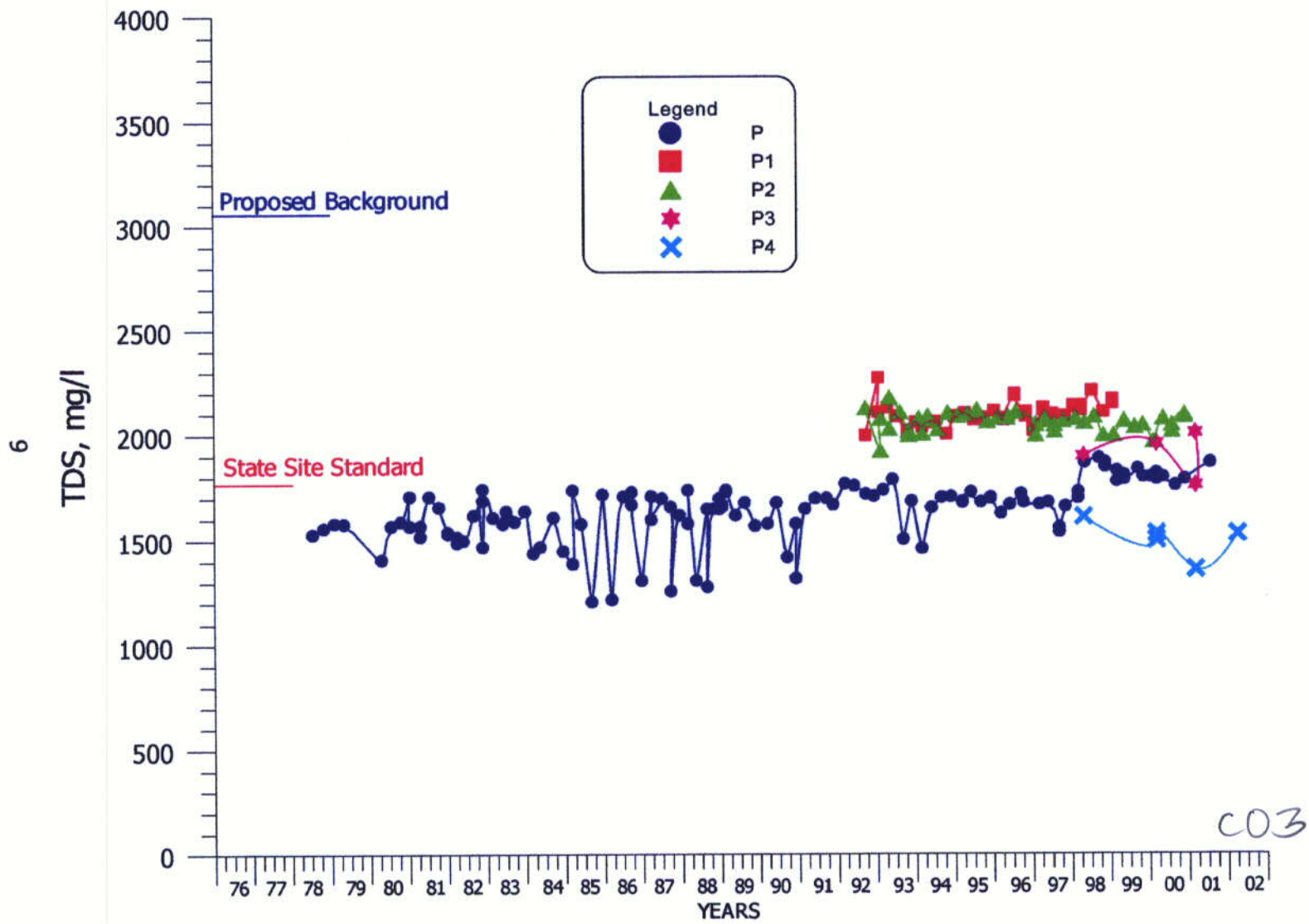


FIGURE 3. TDS CONCENTRATIONS FOR BACKGROUND WELLS P, P1, P2, P3 AND P4.

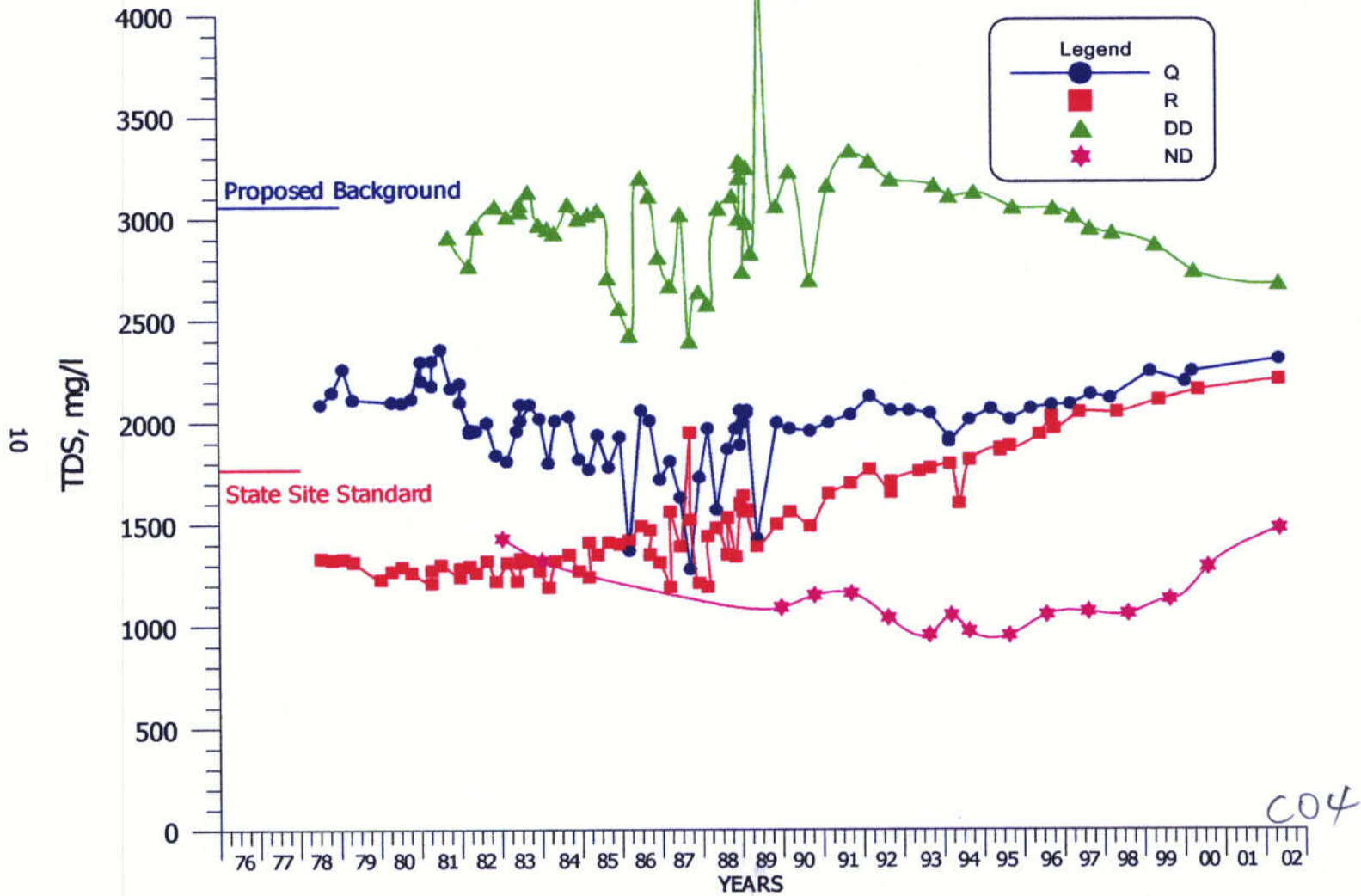


FIGURE 4. TDS CONCENTRATIONS FOR BACKGROUND WELLS Q, R, DD AND ND.

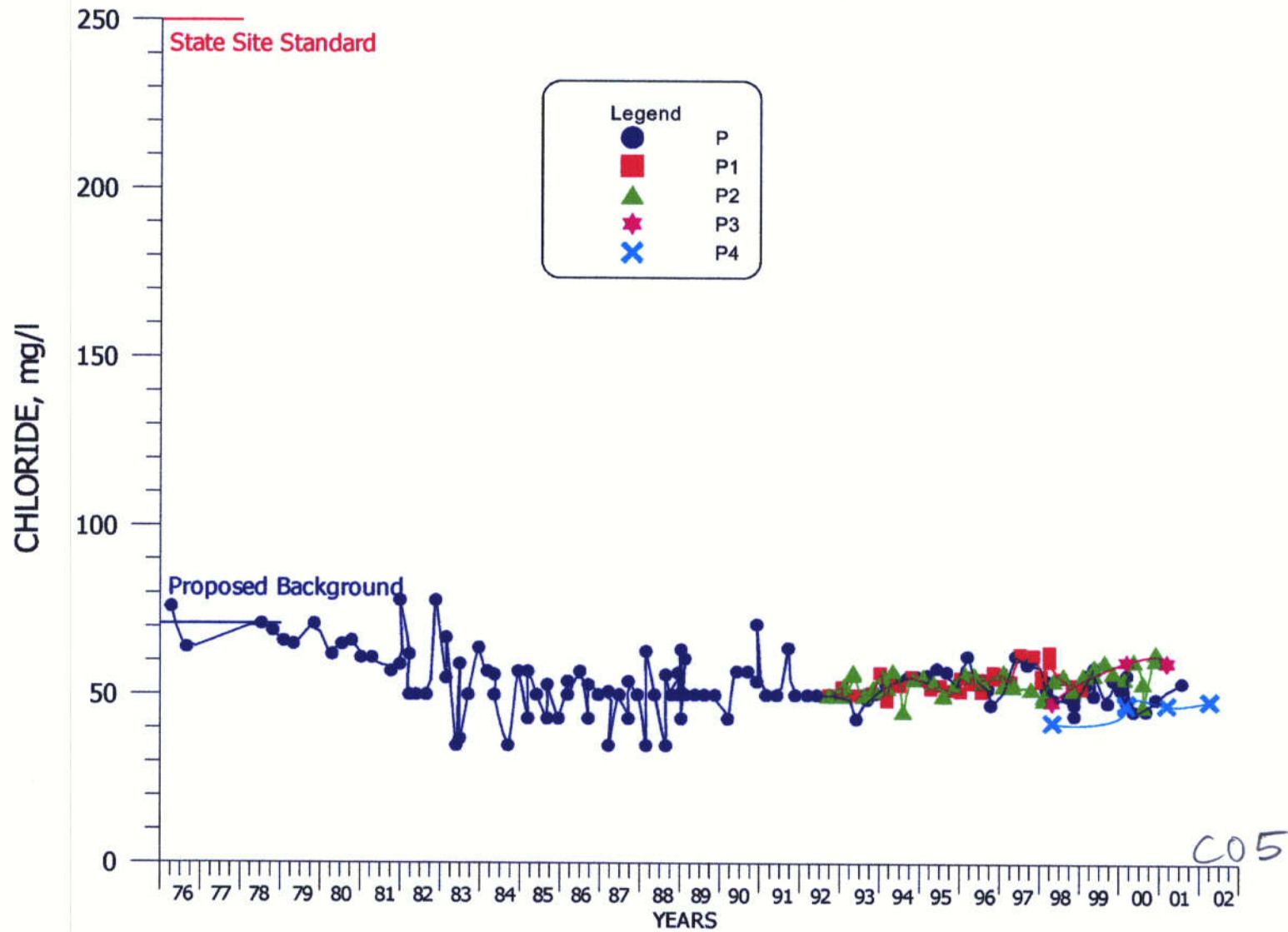


FIGURE 5. CHLORIDE CONCENTRATIONS FOR BACKGROUND WELLS P, P1, P2, P3 AND P4.

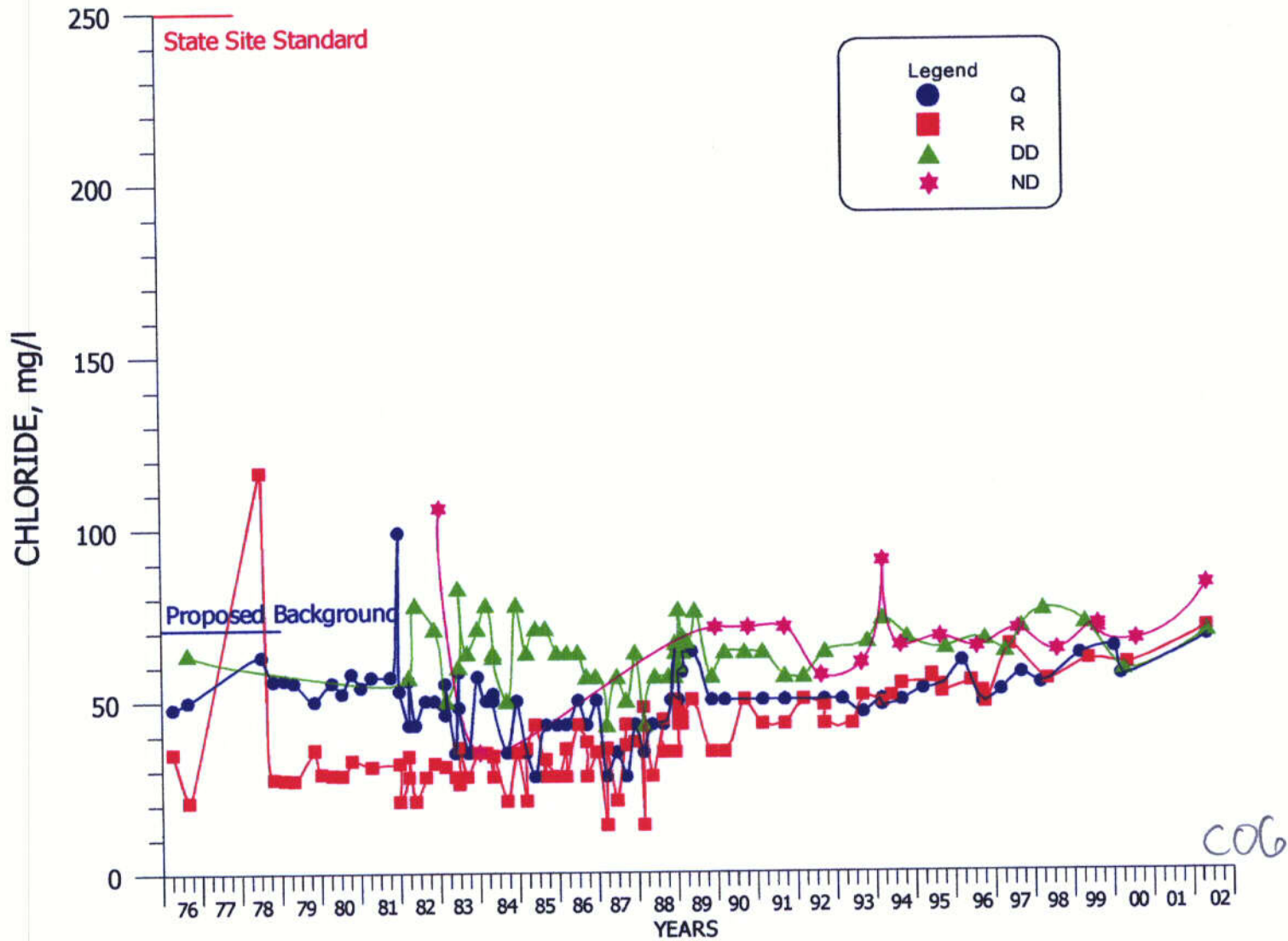


FIGURE 6. CHLORIDE CONCENTRATIONS FOR BACKGROUND WELLS Q, R, DD AND ND.

COG

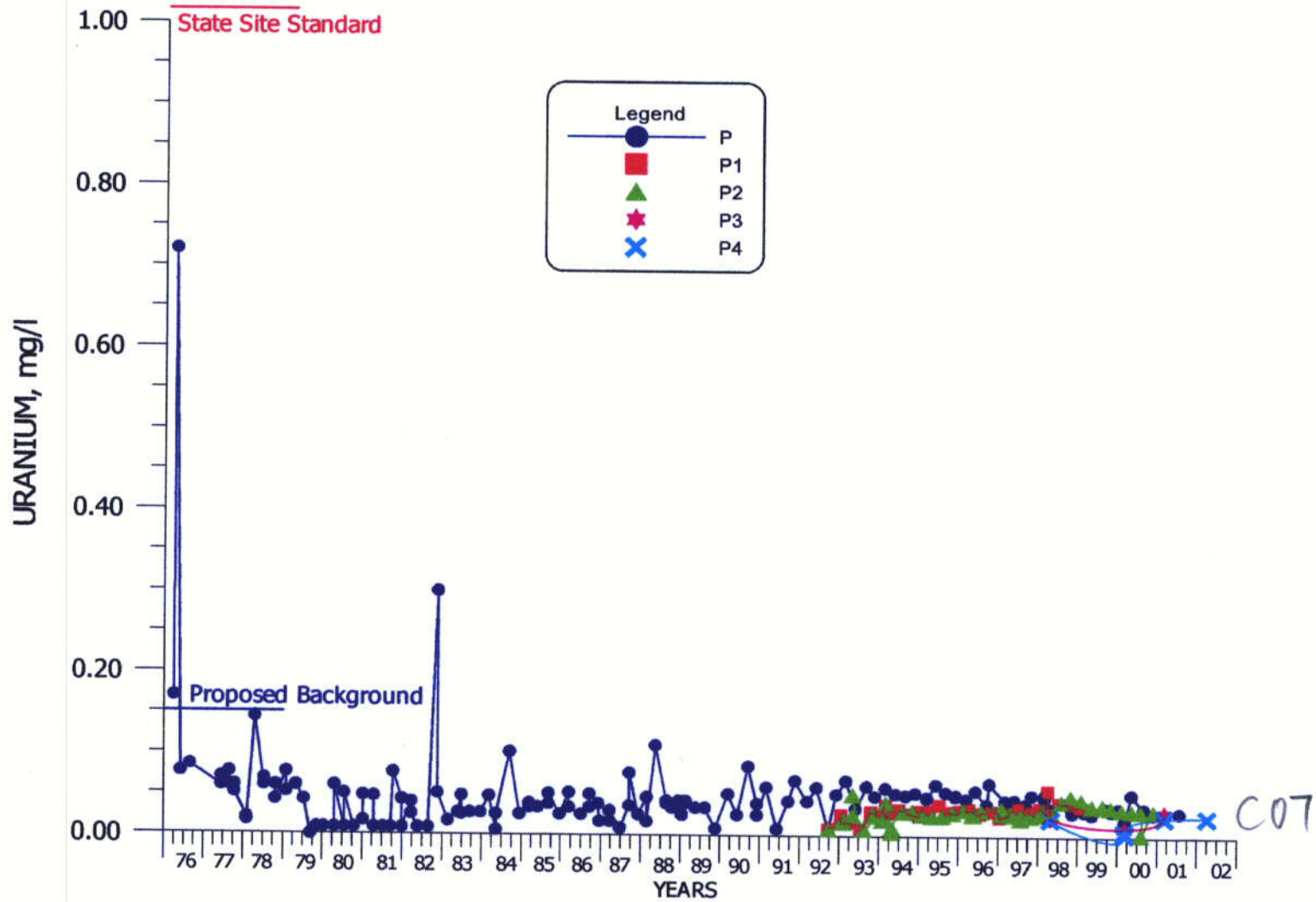


FIGURE 7. URANIUM CONCENTRATIONS FOR BACKGROUND WELLS P, P1, P2, P3 AND P4.

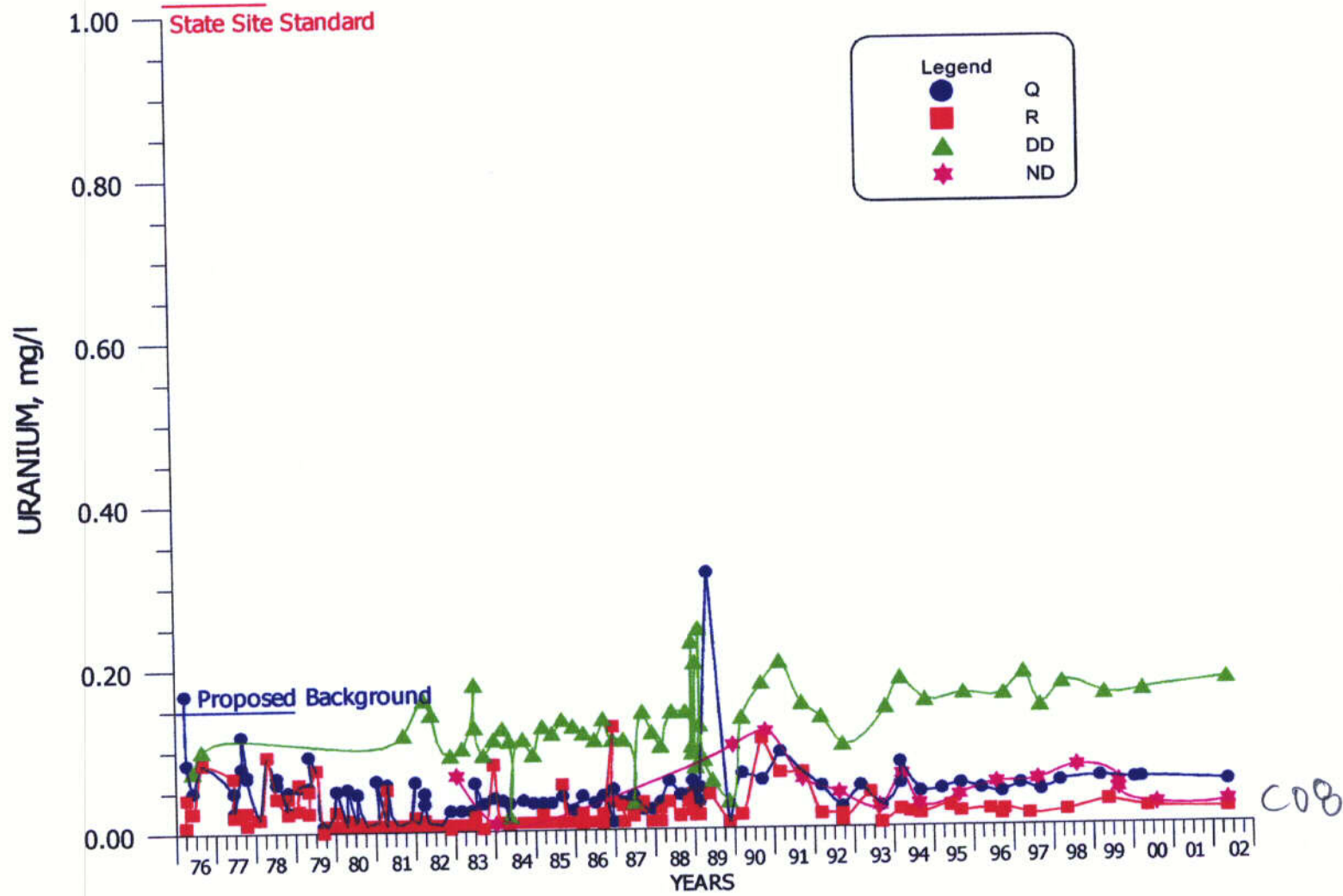


FIGURE 8. URANIUM CONCENTRATIONS FOR BACKGROUND WELLS Q, R, DD AND ND.

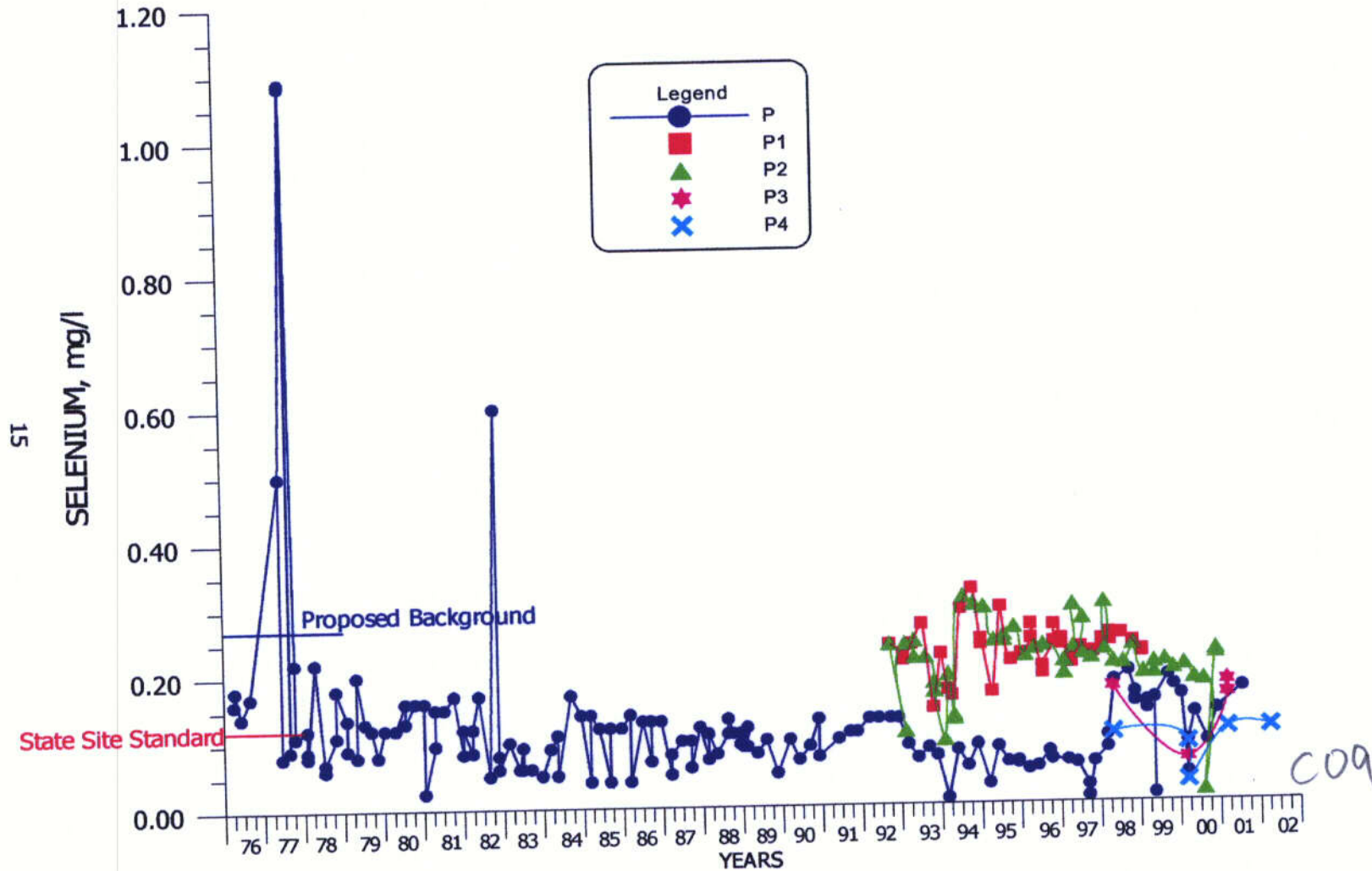


FIGURE 9. SELENIUM CONCENTRATIONS FOR BACKGROUND WELLS P, P1, P2, P3 AND P4.

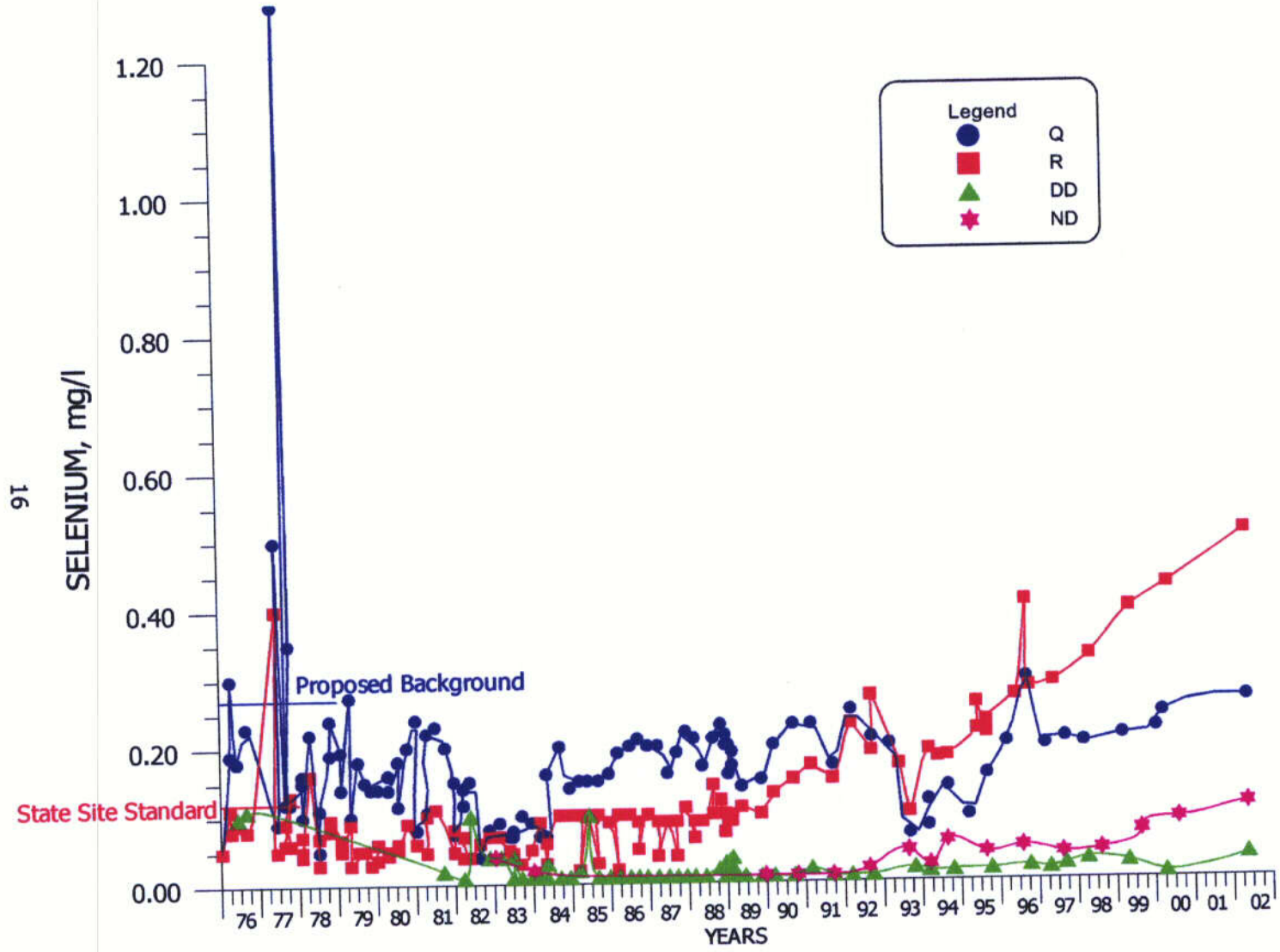


FIGURE 10. SELENIUM CONCENTRATIONS FOR BACKGROUND WELLS Q, R, DD AND ND.

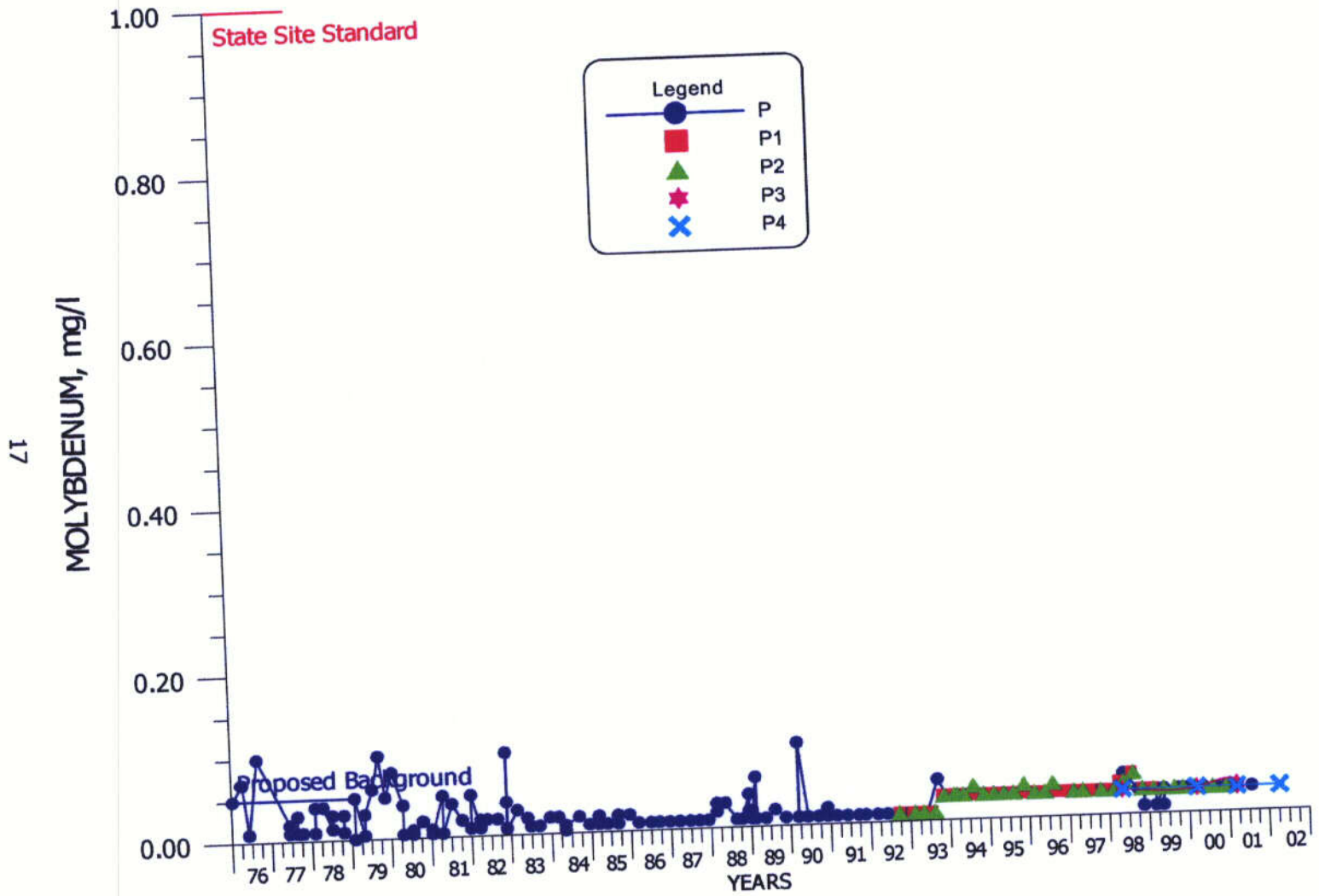
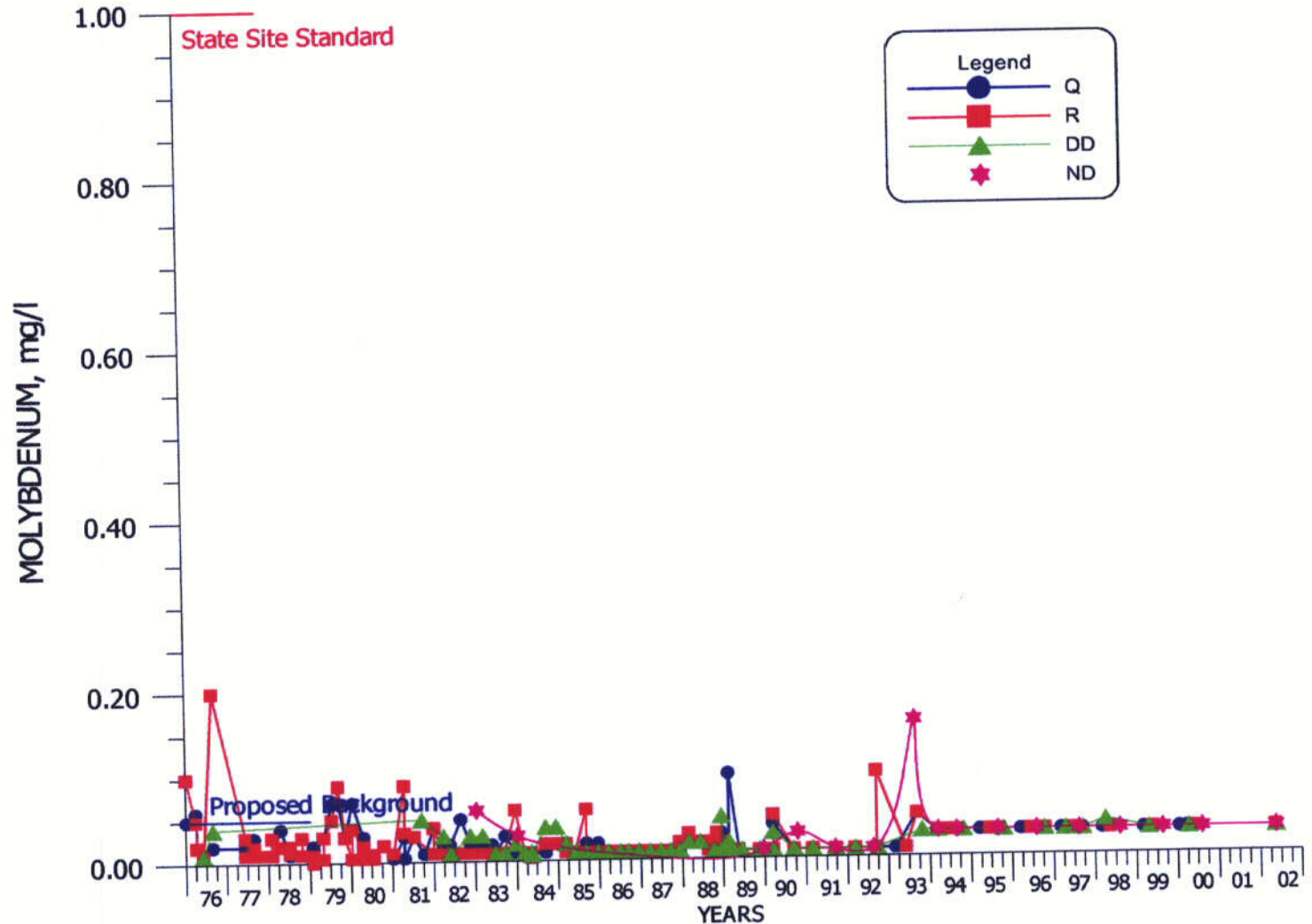


FIGURE 11. MOLYBDENUM CONCENTRATIONS FOR BACKGROUND WELLS P, P1, P2, P3 AND P4.

C11



C12

FIGURE 12. MOLYBDENUM CONCENTRATIONS FOR BACKGROUND WELLS Q, R, DD AND ND.

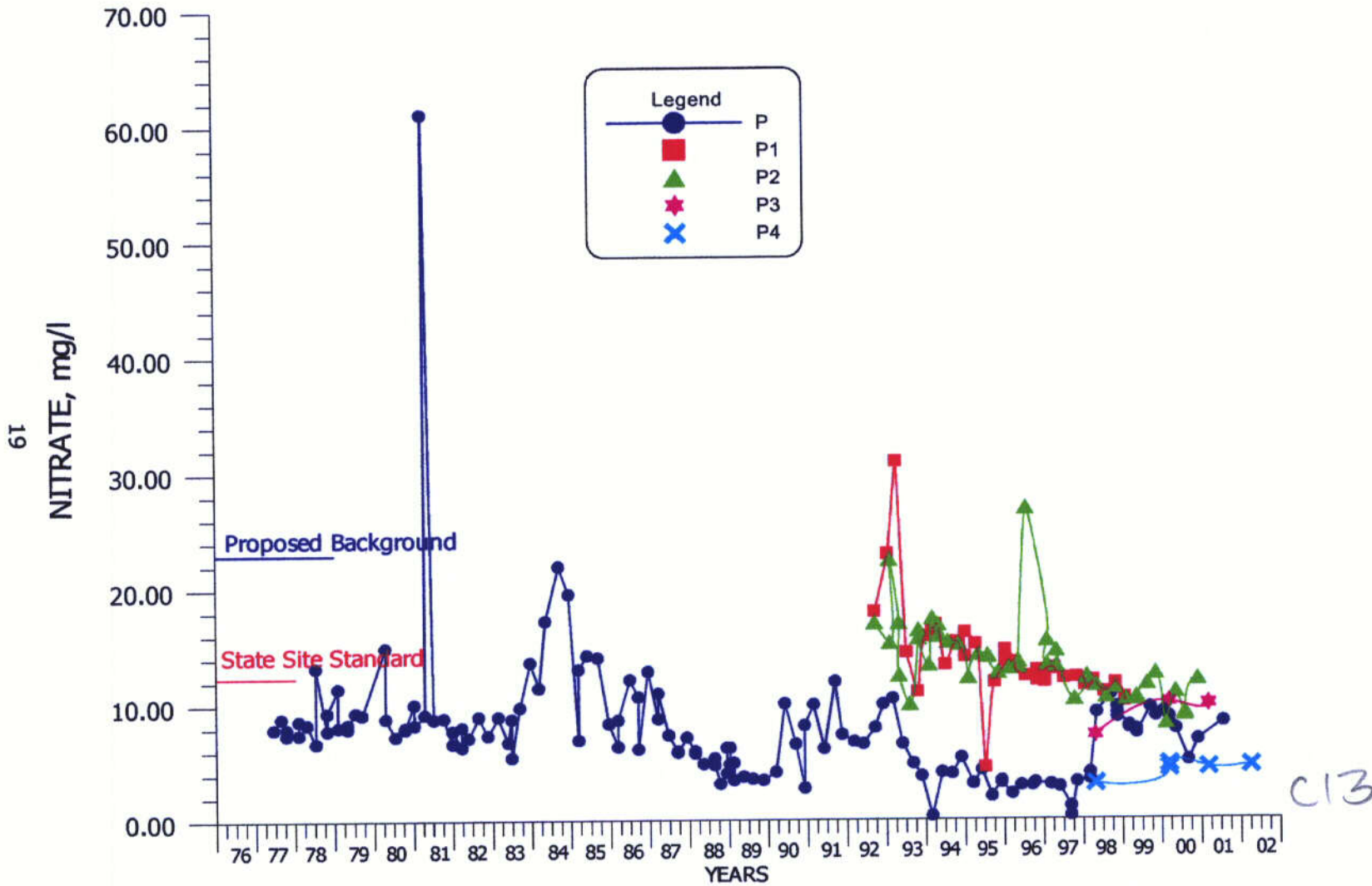


FIGURE 13. NITRATE CONCENTRATIONS FOR BACKGROUND WELLS P, P1, P2, P3 AND P4.

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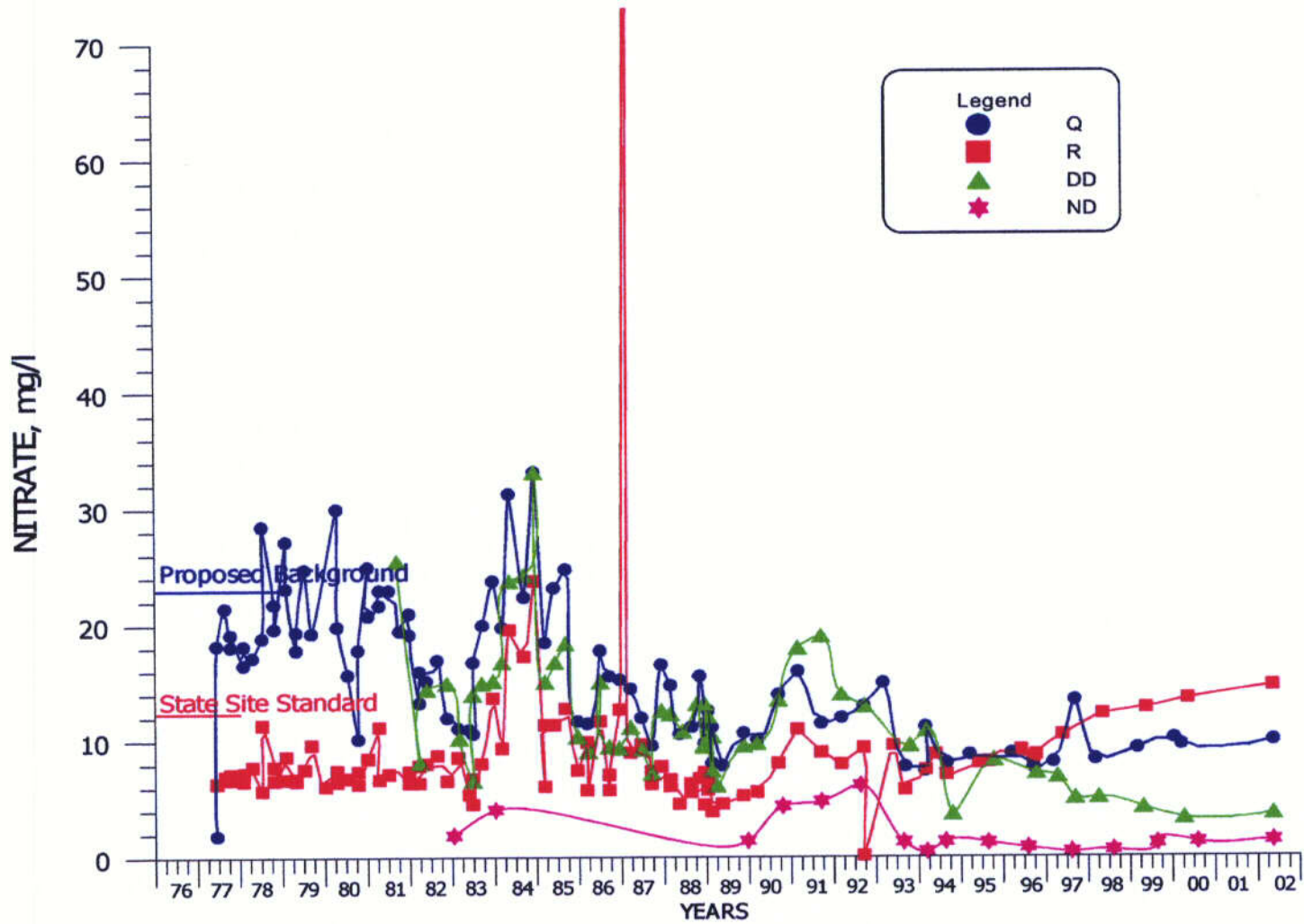


FIGURE 14. NITRATE CONCENTRATIONS FOR BACKGROUND WELLS Q, R, DD AND ND.

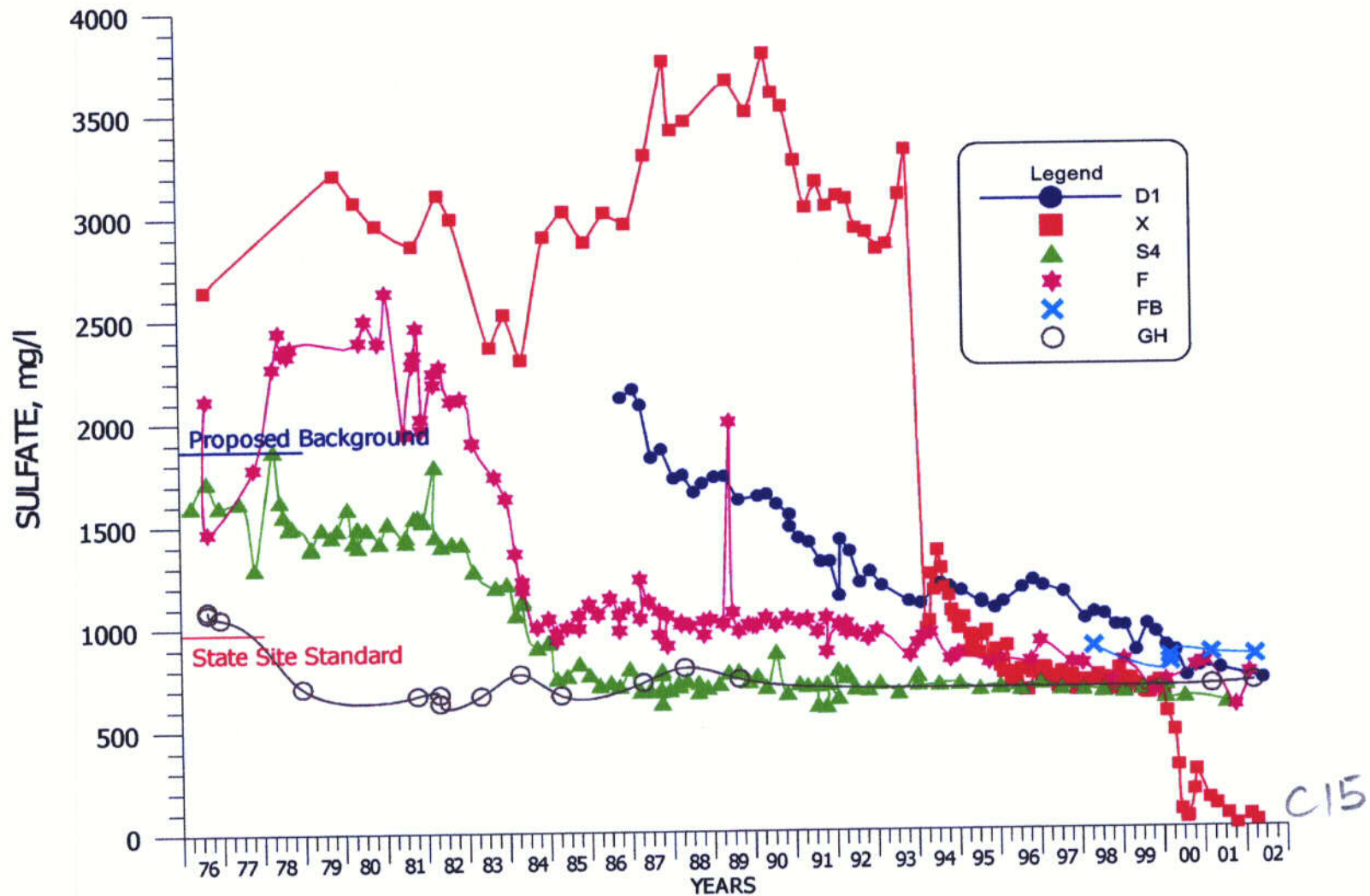
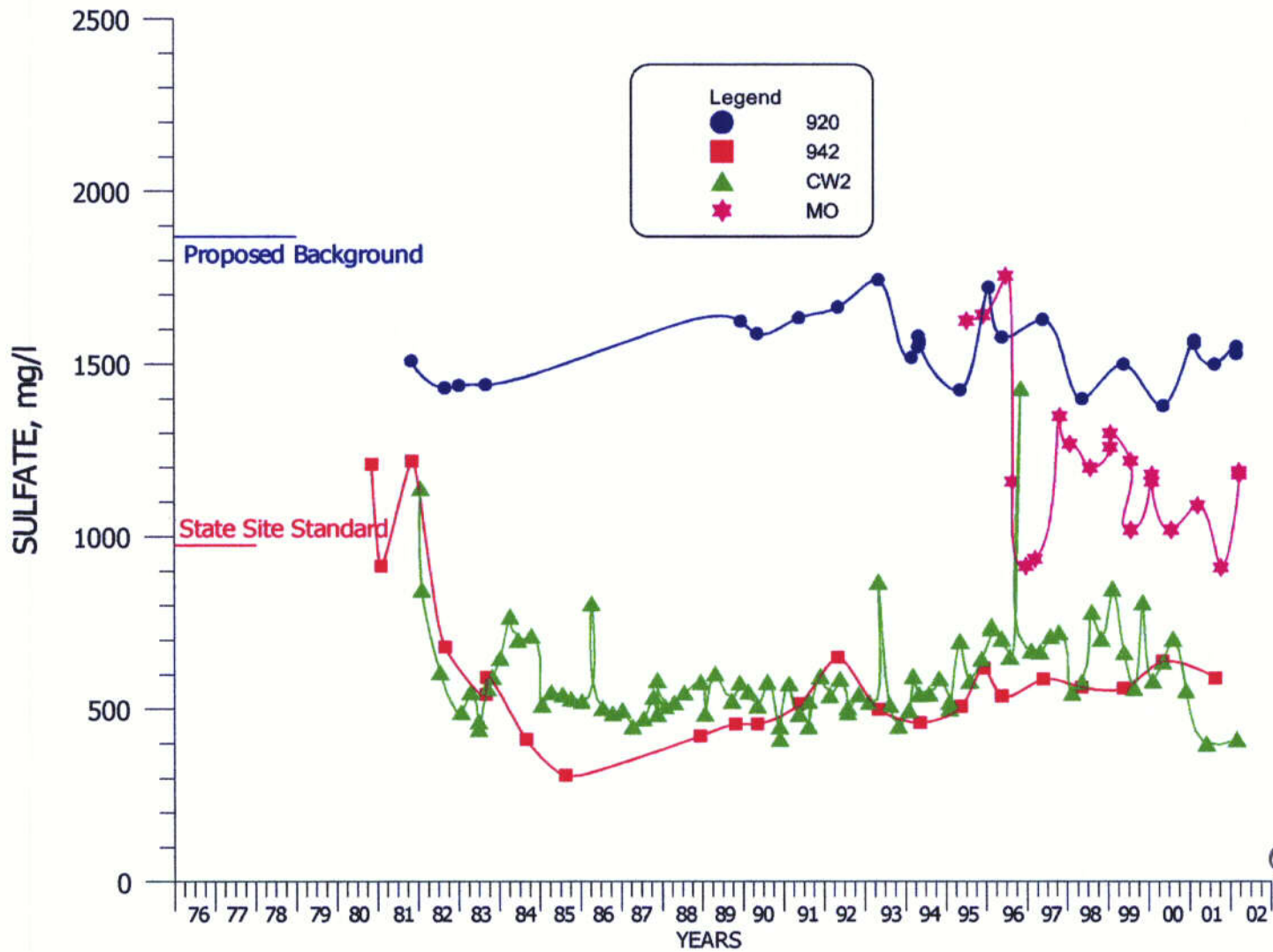


FIGURE 15. SULFATE CONCENTRATIONS FOR WELLS D1, X, S4, F, FB AND GH.



C16

FIGURE 16. SULFATE CONCENTRATIONS FOR WELLS 920, 942, CW2 AND MO.

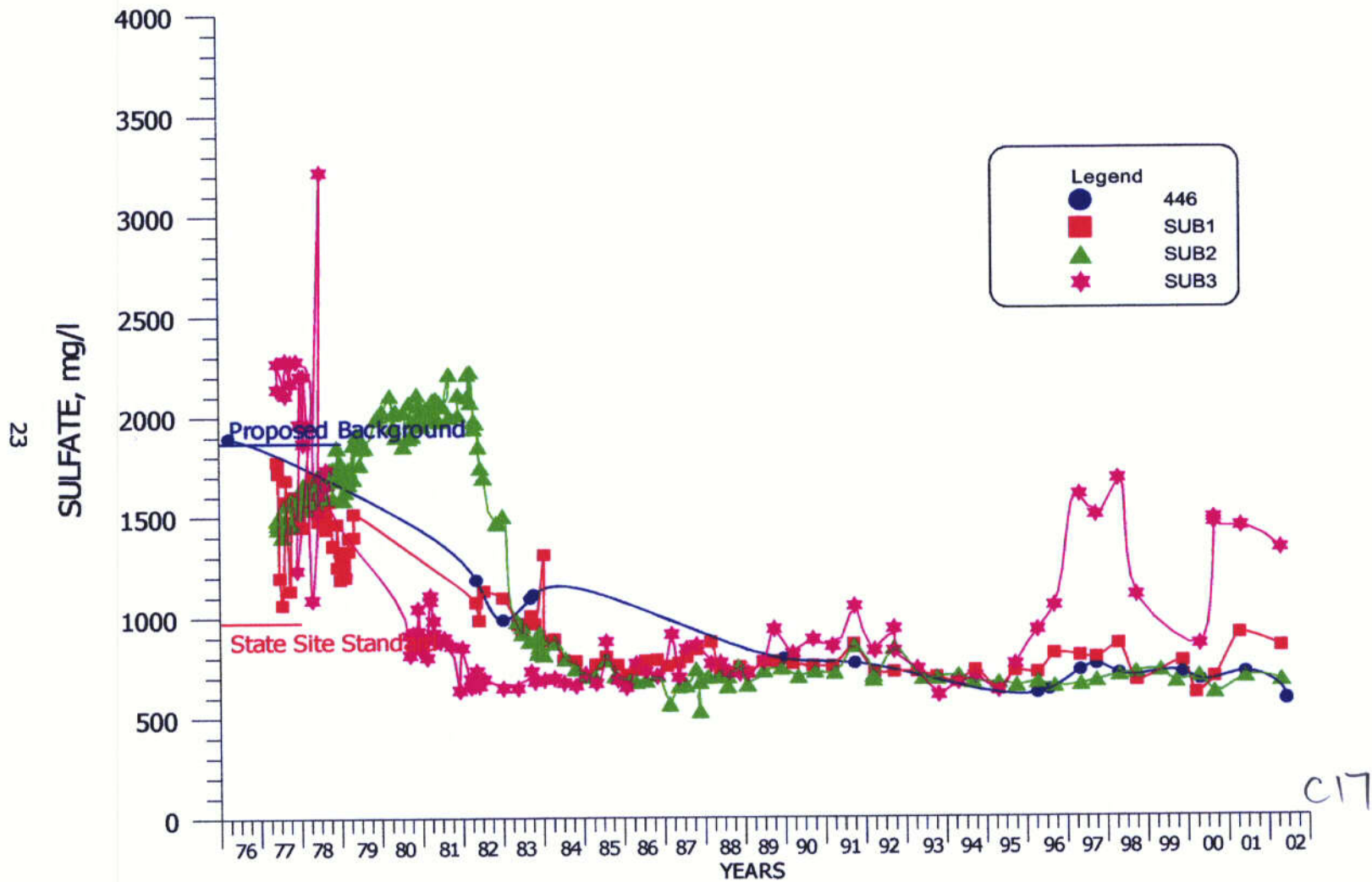


FIGURE 17. SULFATE CONCENTRATIONS FOR WELLS 446, SUB1, SUB2 AND SUB3.

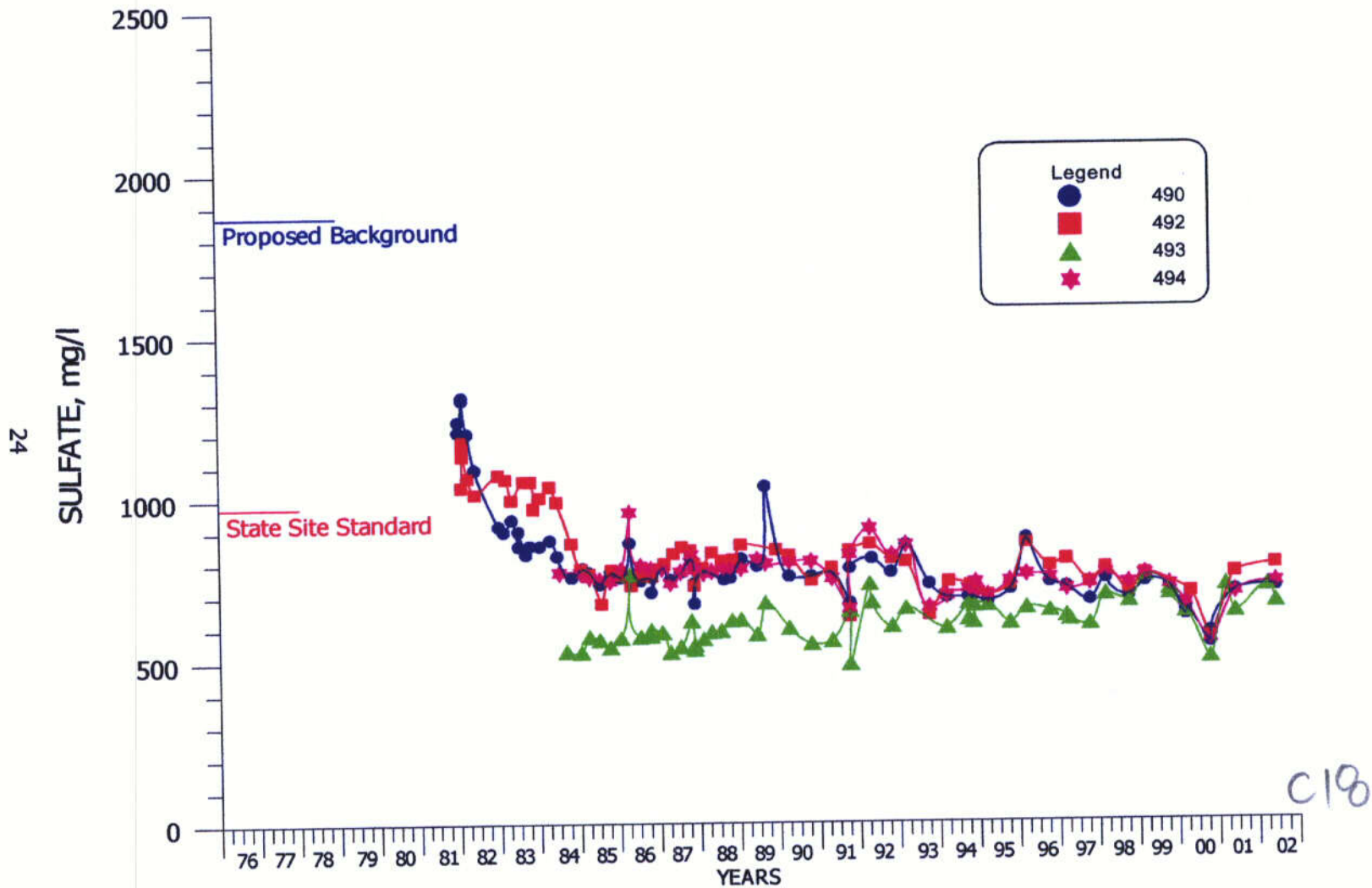


FIGURE 18. SULFATE CONCENTRATIONS FOR WELLS 490, 492, 493 AND 494.

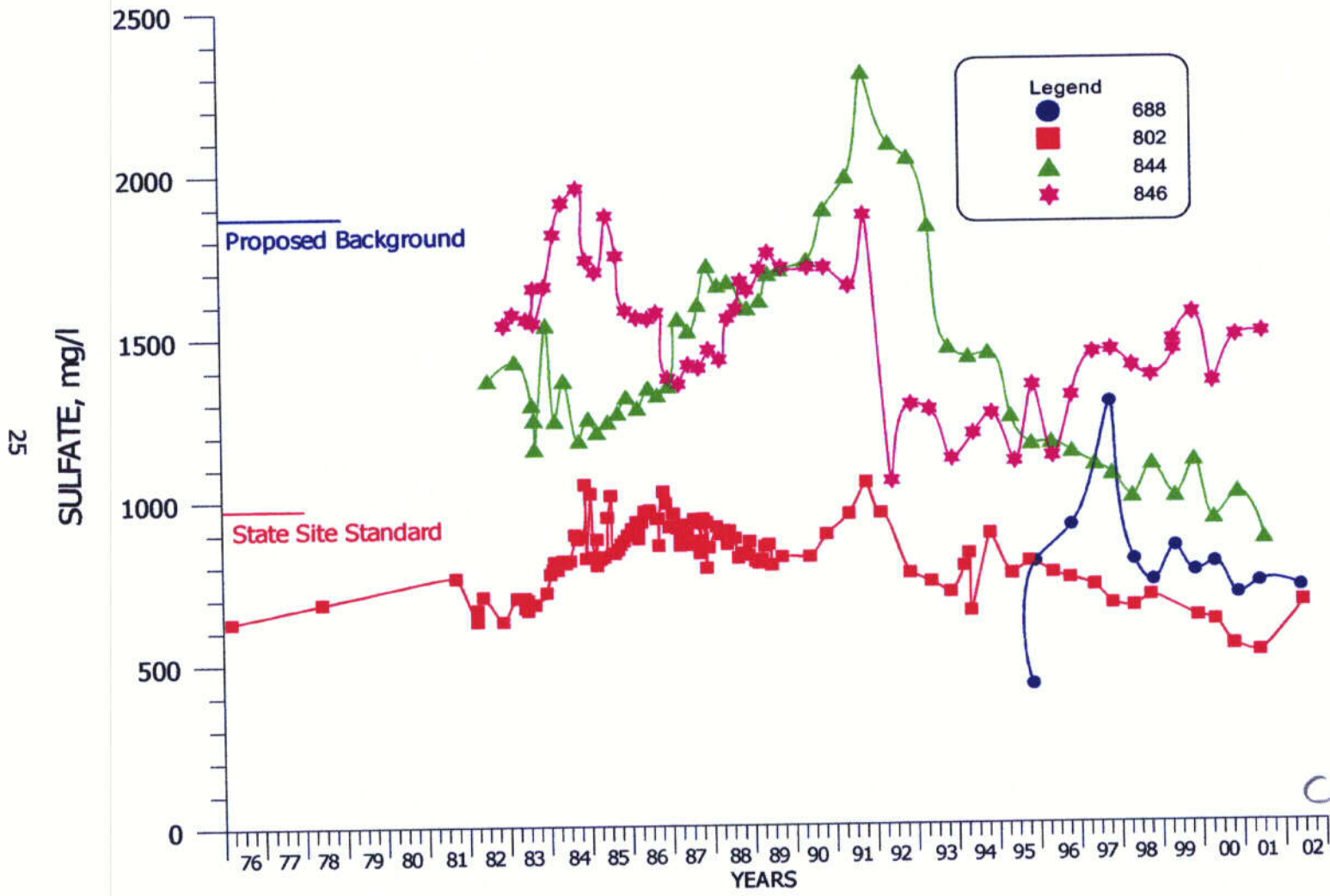


FIGURE 19. SULFATE CONCENTRATIONS FOR WELLS 688, 802, 844 AND 846.

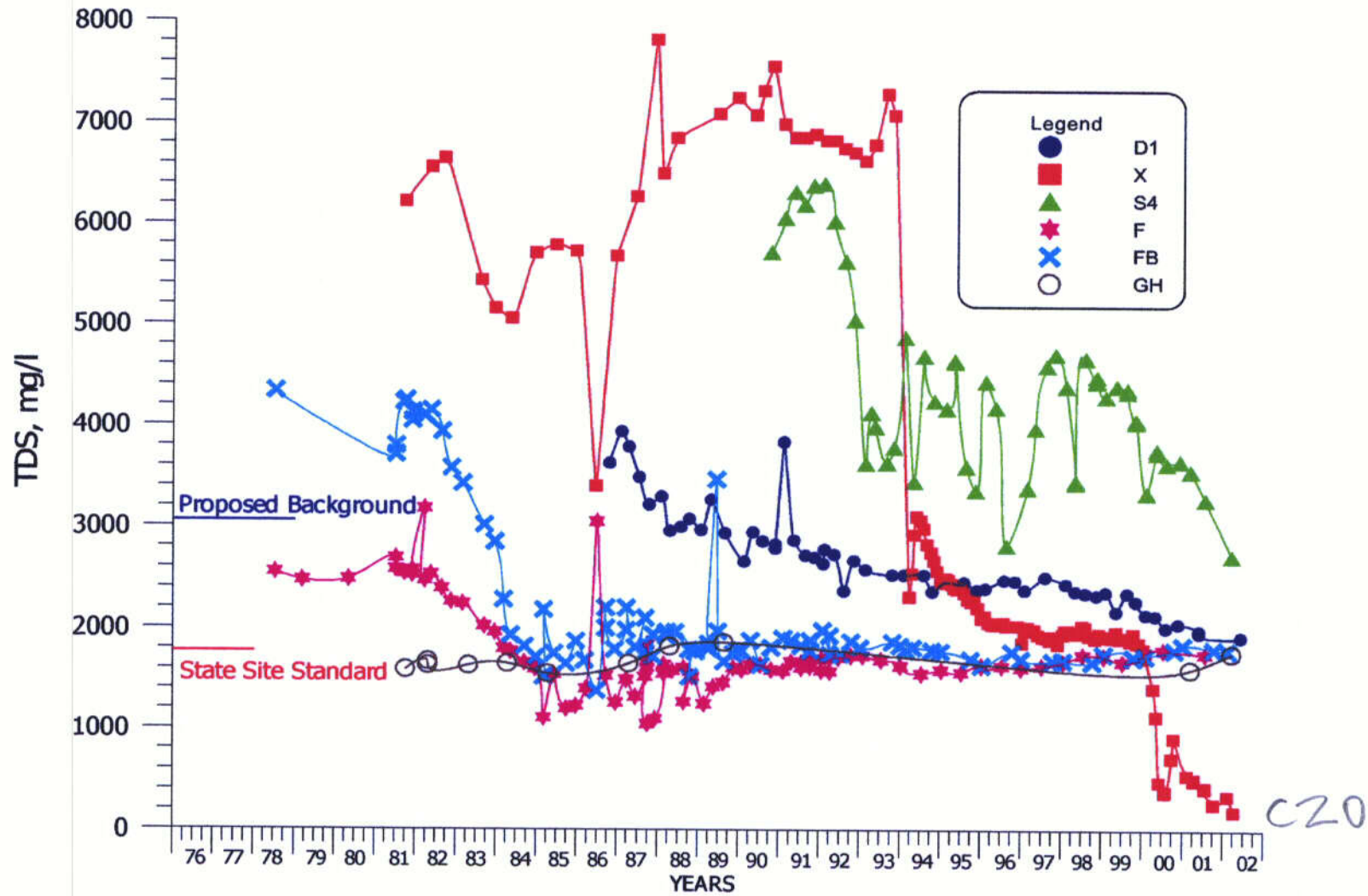


FIGURE 20. TDS CONCENTRATIONS FOR WELLS D1, X, S4, F, FB AND GH.

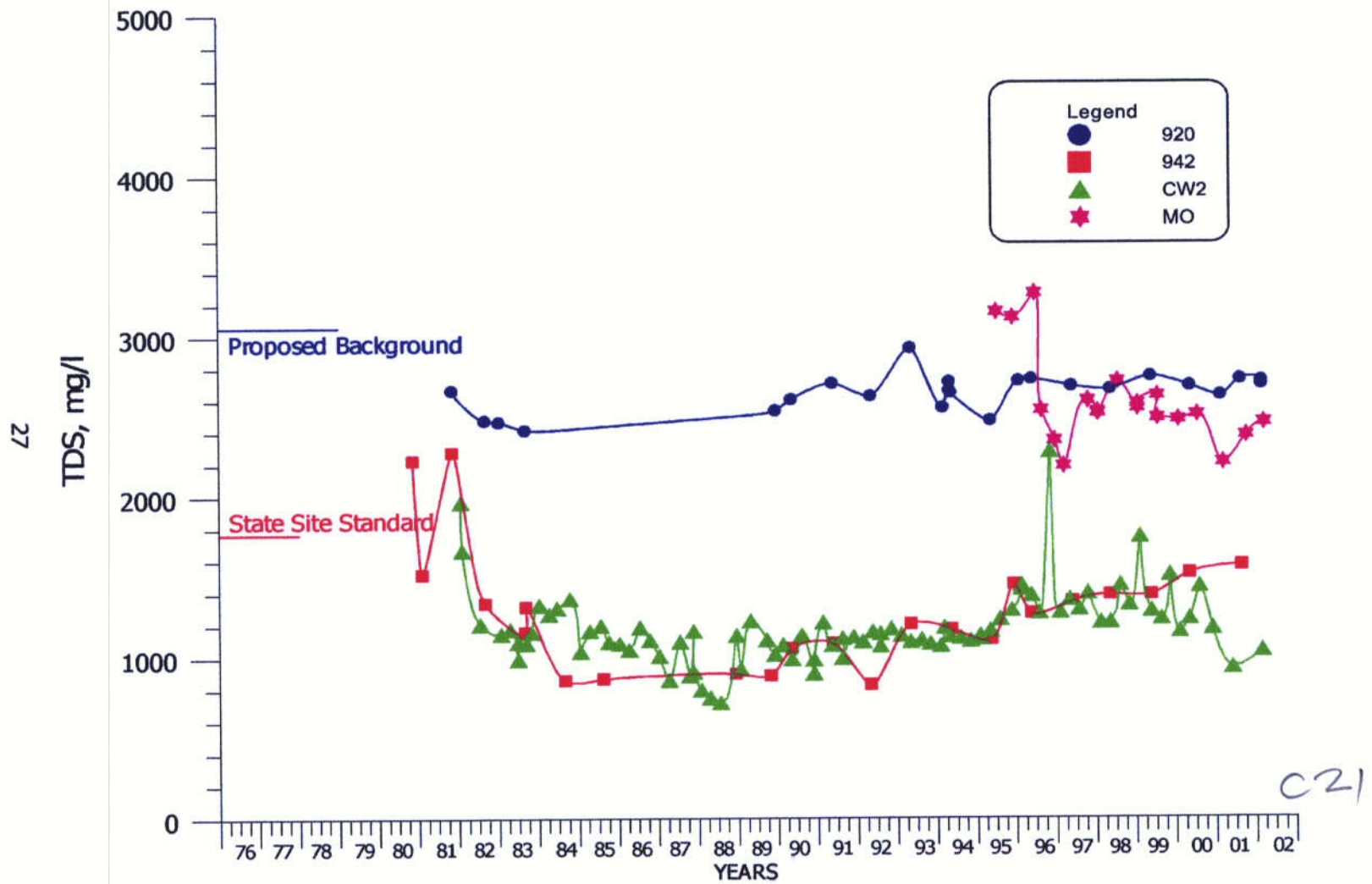


FIGURE 21. TDS CONCENTRATIONS FOR WELLS 920, 942, CW2 AND MO.

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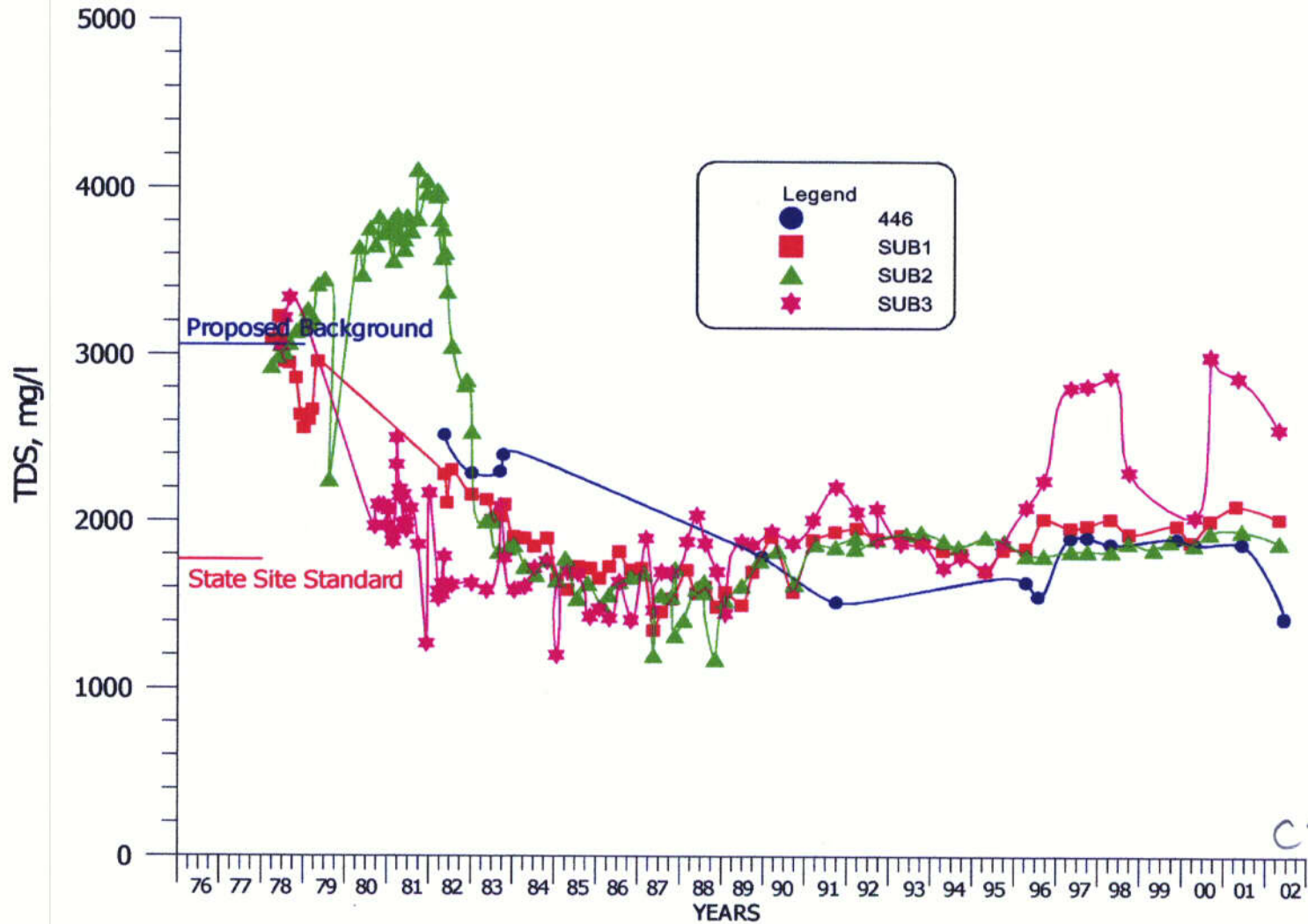


FIGURE 22. TDS CONCENTRATIONS FOR WELLS 446, SUB1, SUB2 AND SUB3.

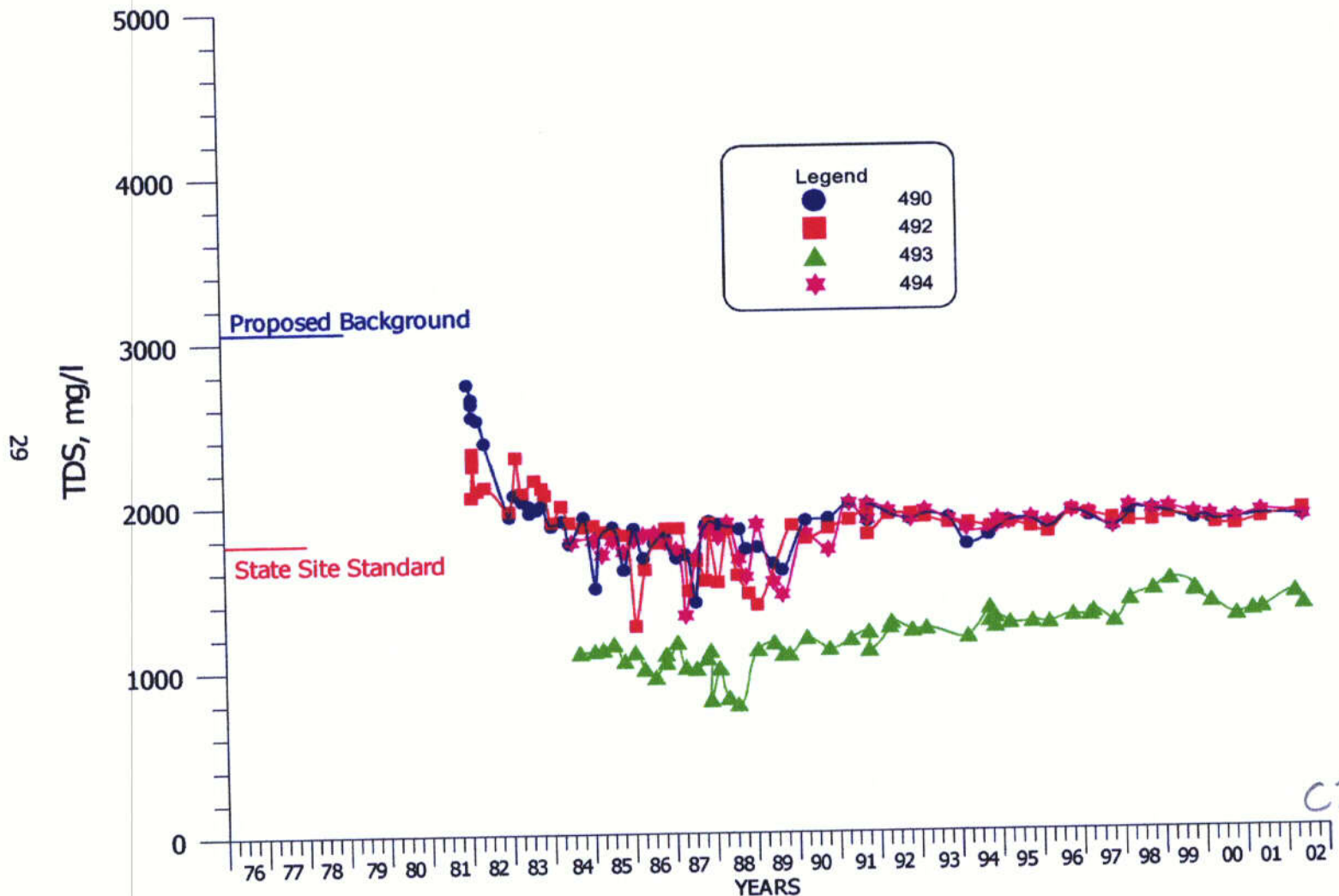


FIGURE 23. TDS CONCENTRATIONS FOR WELLS 490, 492, 493 AND 494.

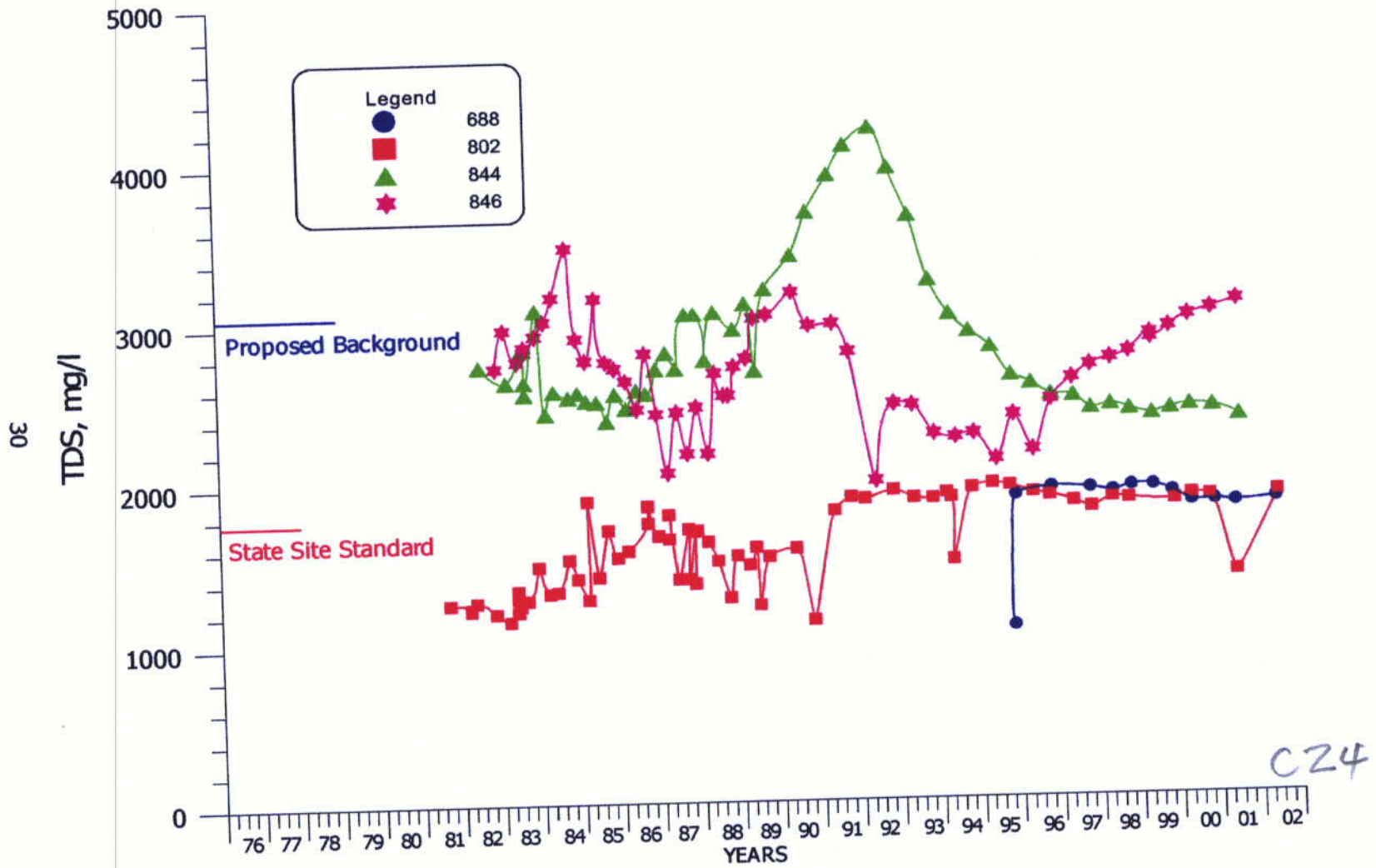


FIGURE 24. TDS CONCENTRATIONS FOR WELLS 688, 802, 844 AND 846.

C24

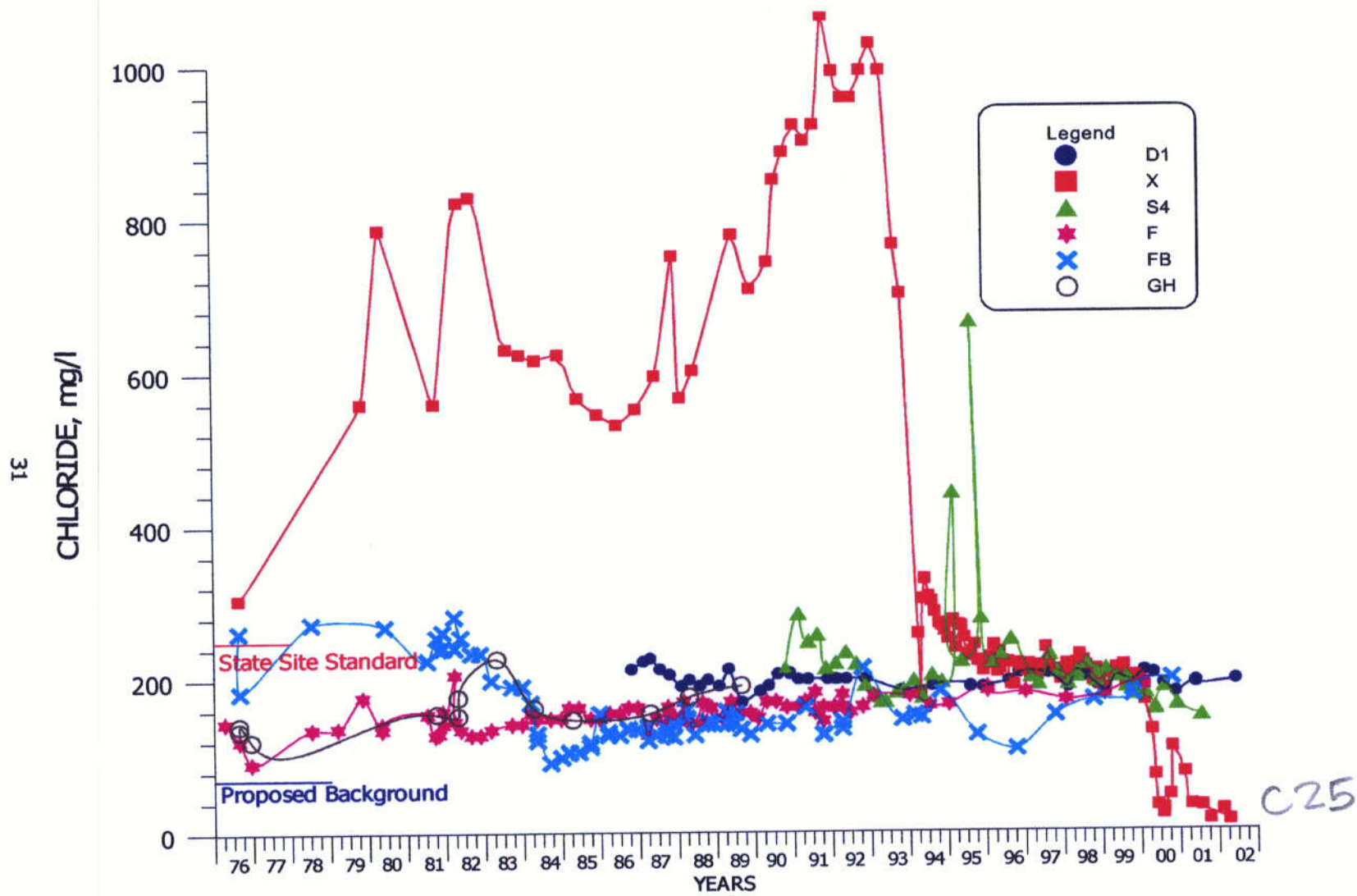


FIGURE 25. CHLORIDE CONCENTRATIONS FOR WELLS D1, X, S4, F, FB AND GH.

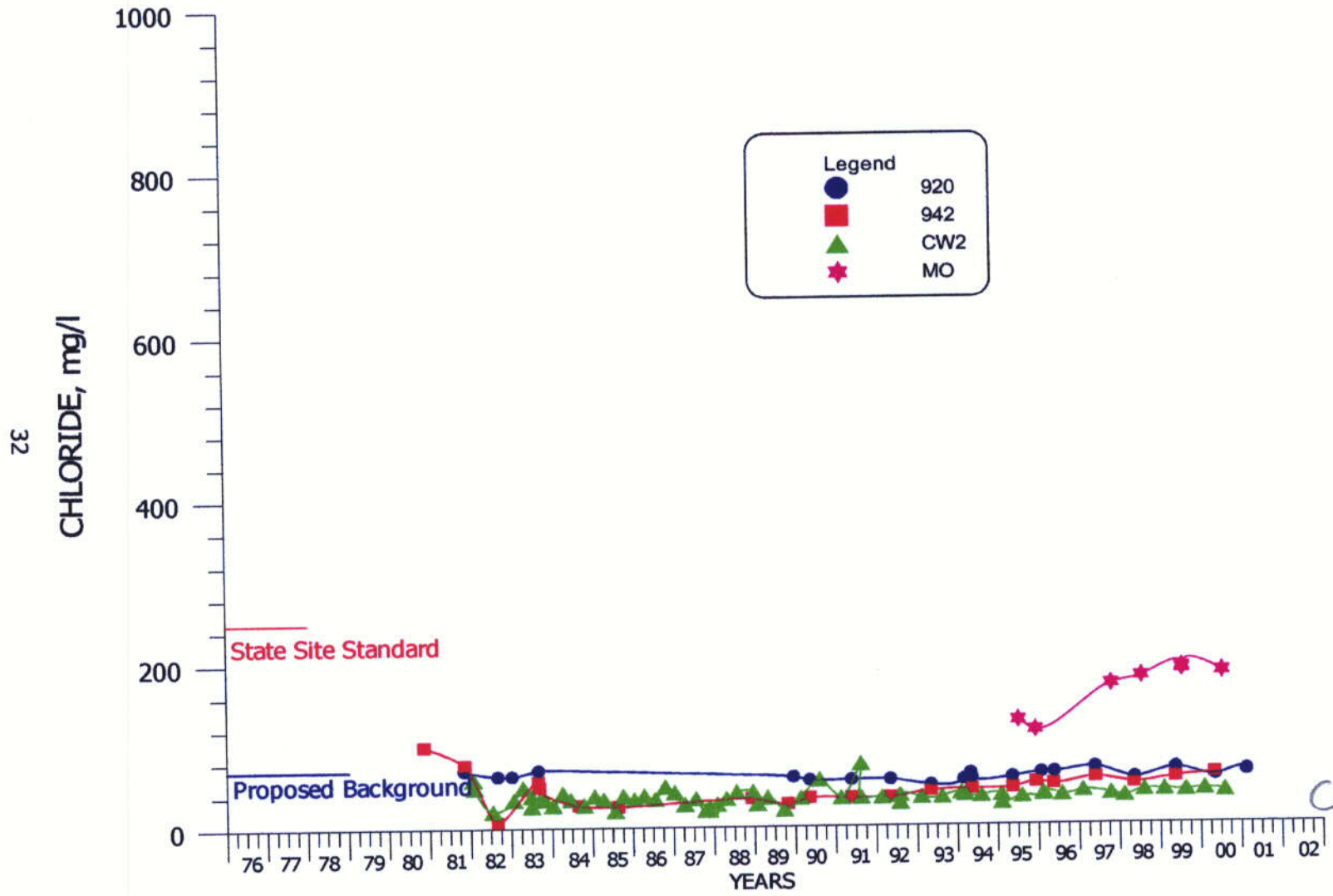


FIGURE 26. CHLORIDE CONCENTRATIONS FOR WELLS 920, 942, CW2 AND MO.

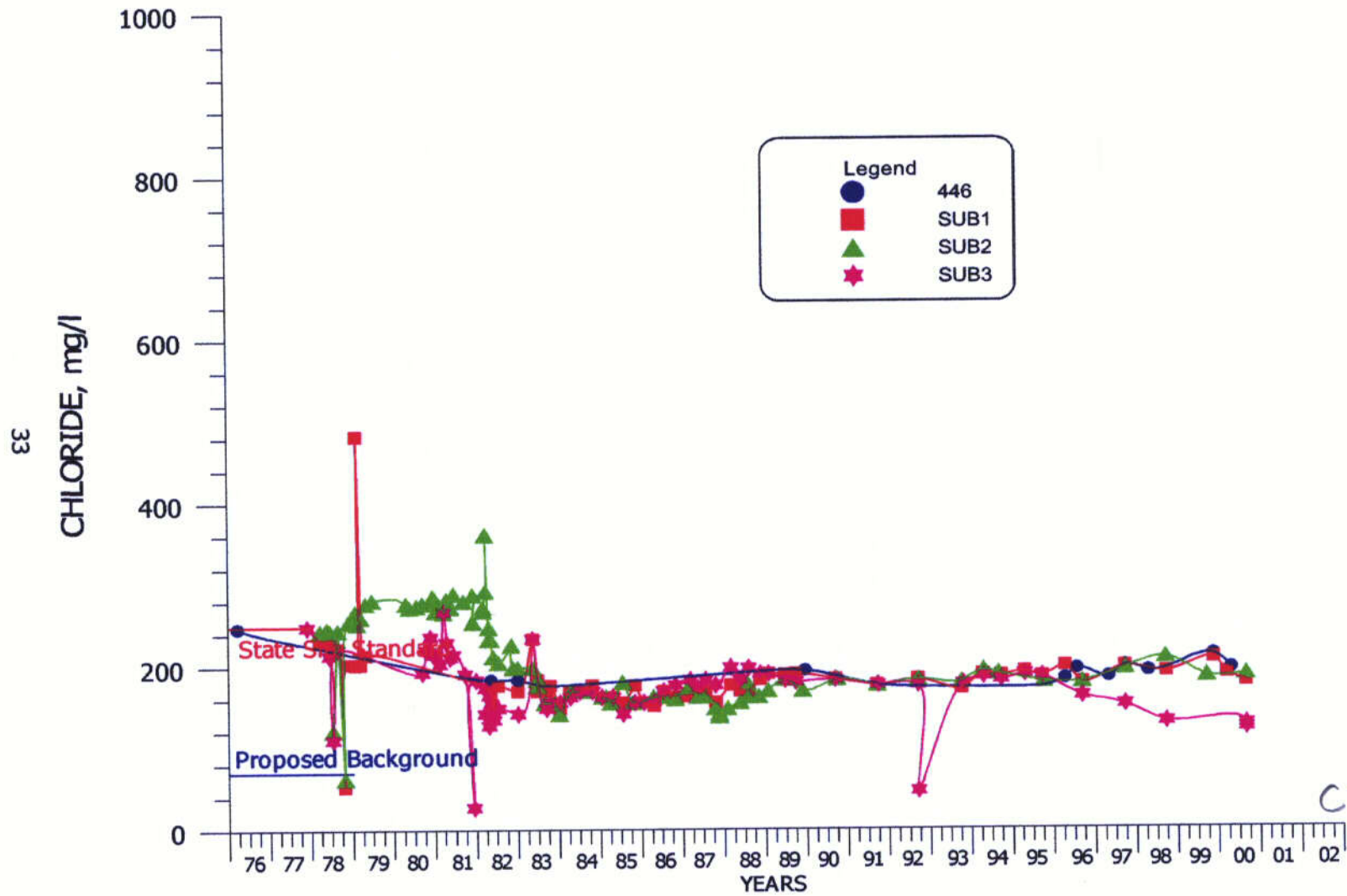


FIGURE 27. CHLORIDE CONCENTRATIONS FOR WELLS 446, SUB1, SUB2 AND SUB3.

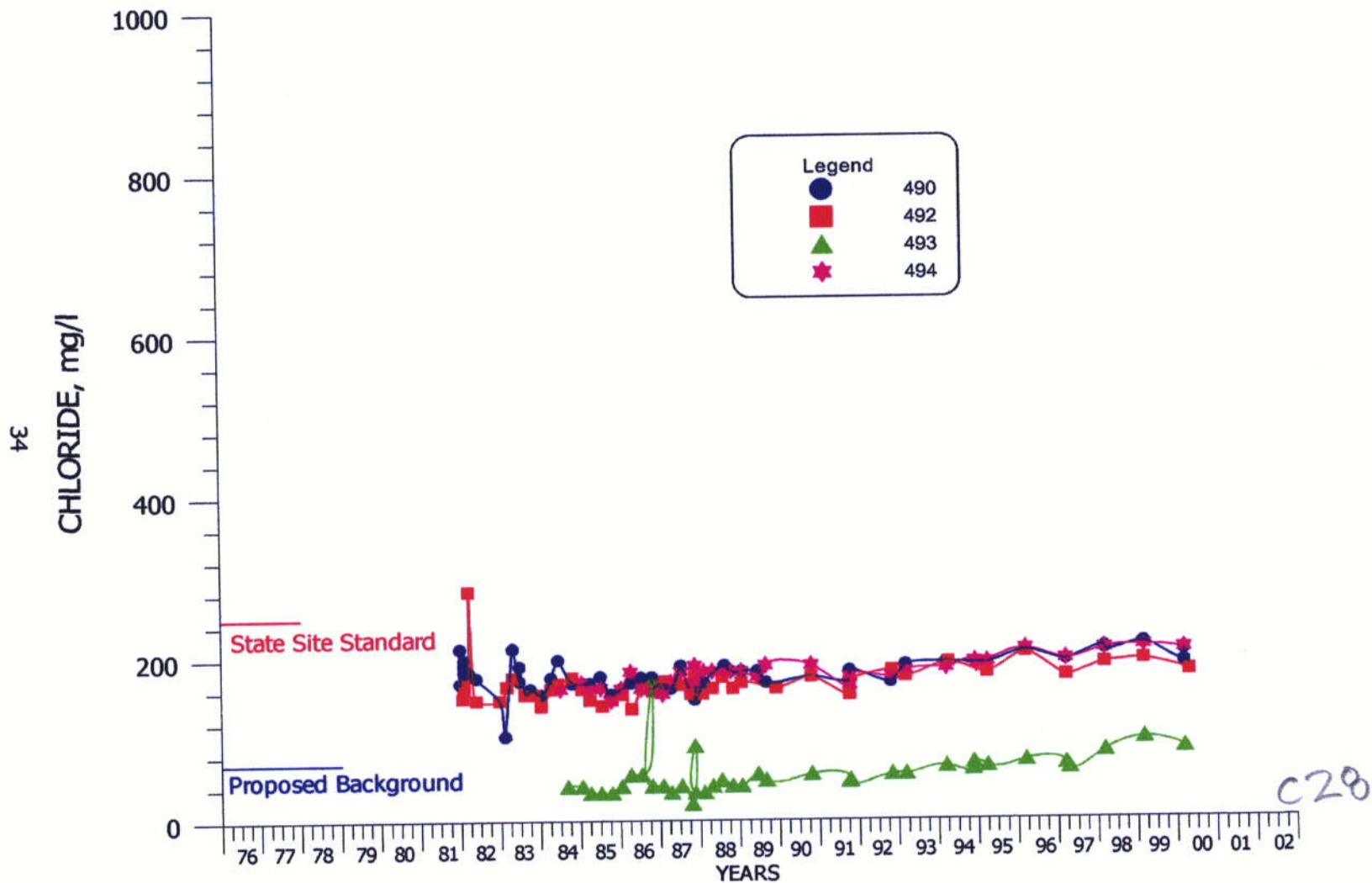


FIGURE 28. CHLORIDE CONCENTRATIONS FOR WELLS 490, 492, 493 AND 494.

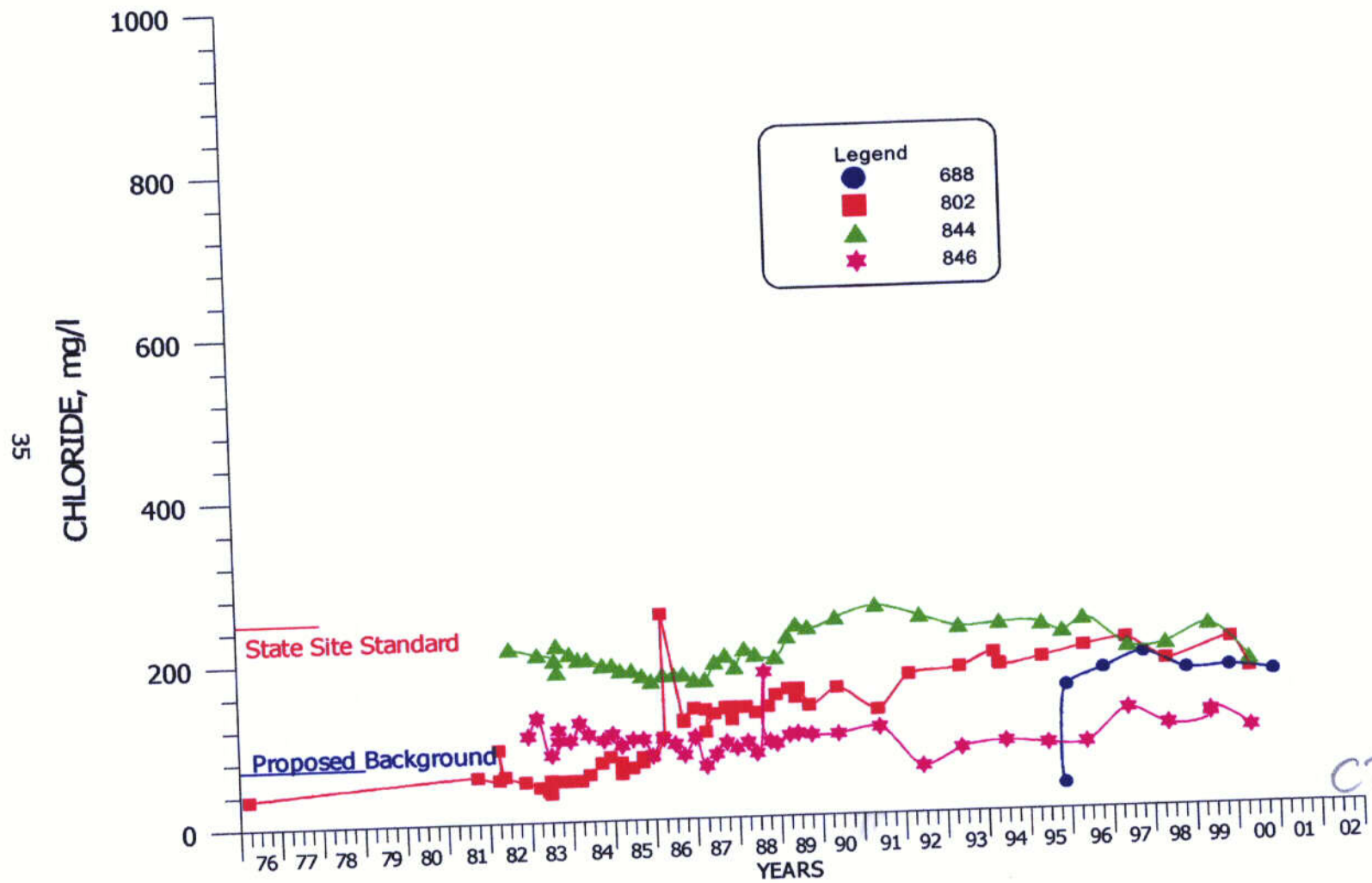


FIGURE 29. CHLORIDE CONCENTRATIONS FOR WELLS 688, 802, 844 AND 846.

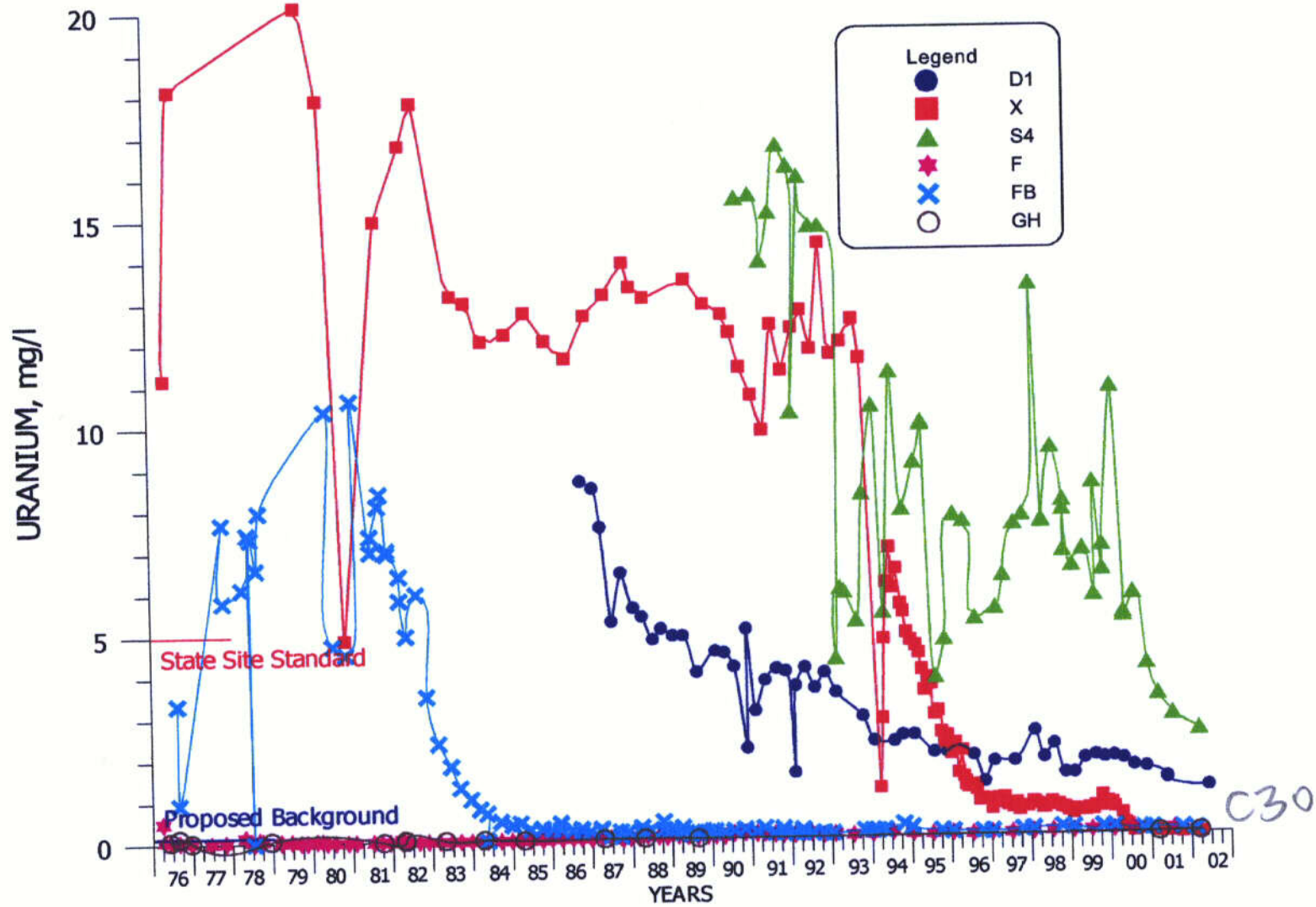


FIGURE 30. URANIUM CONCENTRATIONS FOR WELLS D1, X, S4, F, FB AND GH.

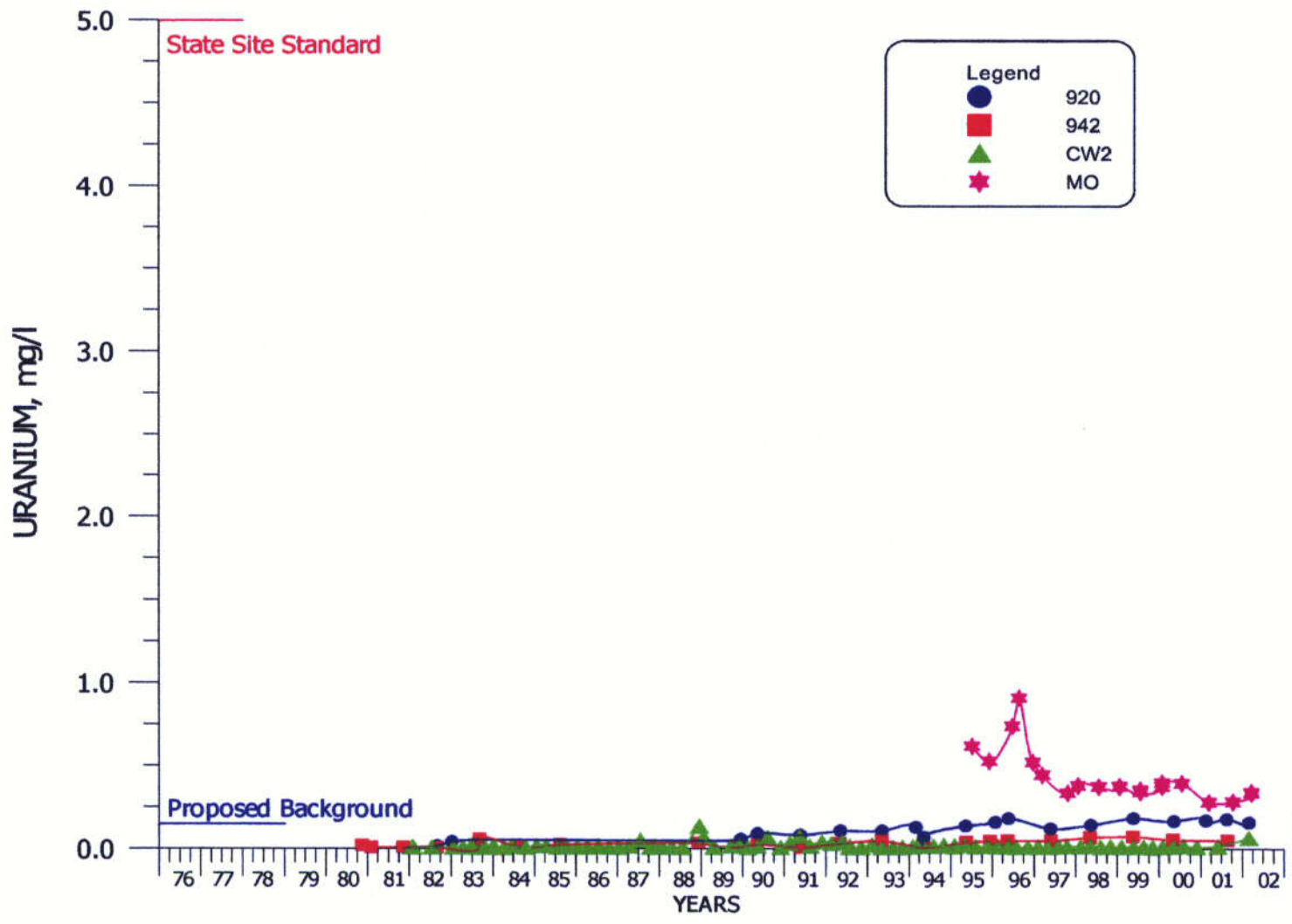


FIGURE 31. URANIUM CONCENTRATIONS FOR WELLS 920, 942, CW2 AND MO.

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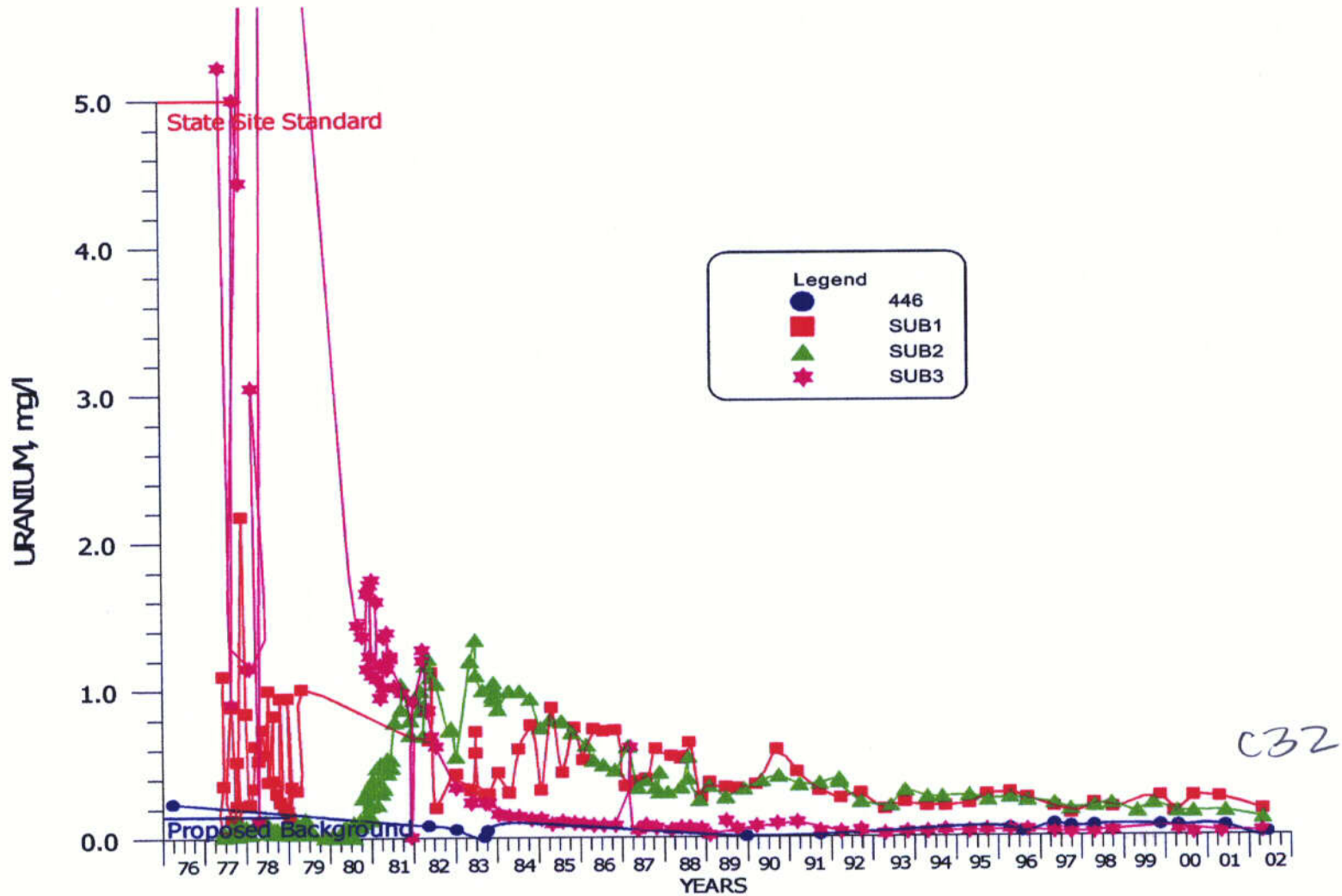


FIGURE 32. URANIUM CONCENTRATIONS FOR WELLS 446, SUB1, SUB2 AND SUB3.

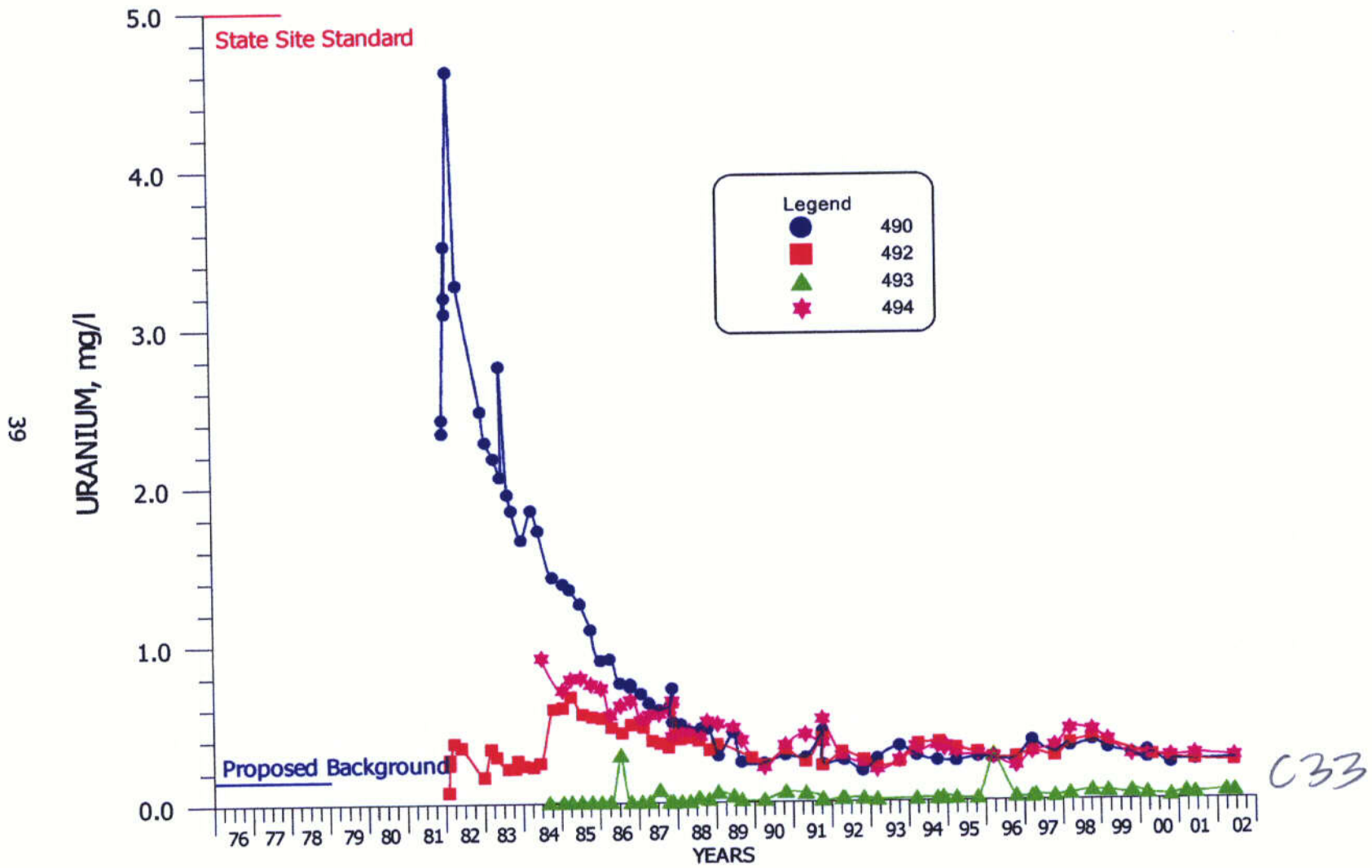


FIGURE 33. URANIUM CONCENTRATIONS FOR WELLS 490, 492, 493 AND 494.

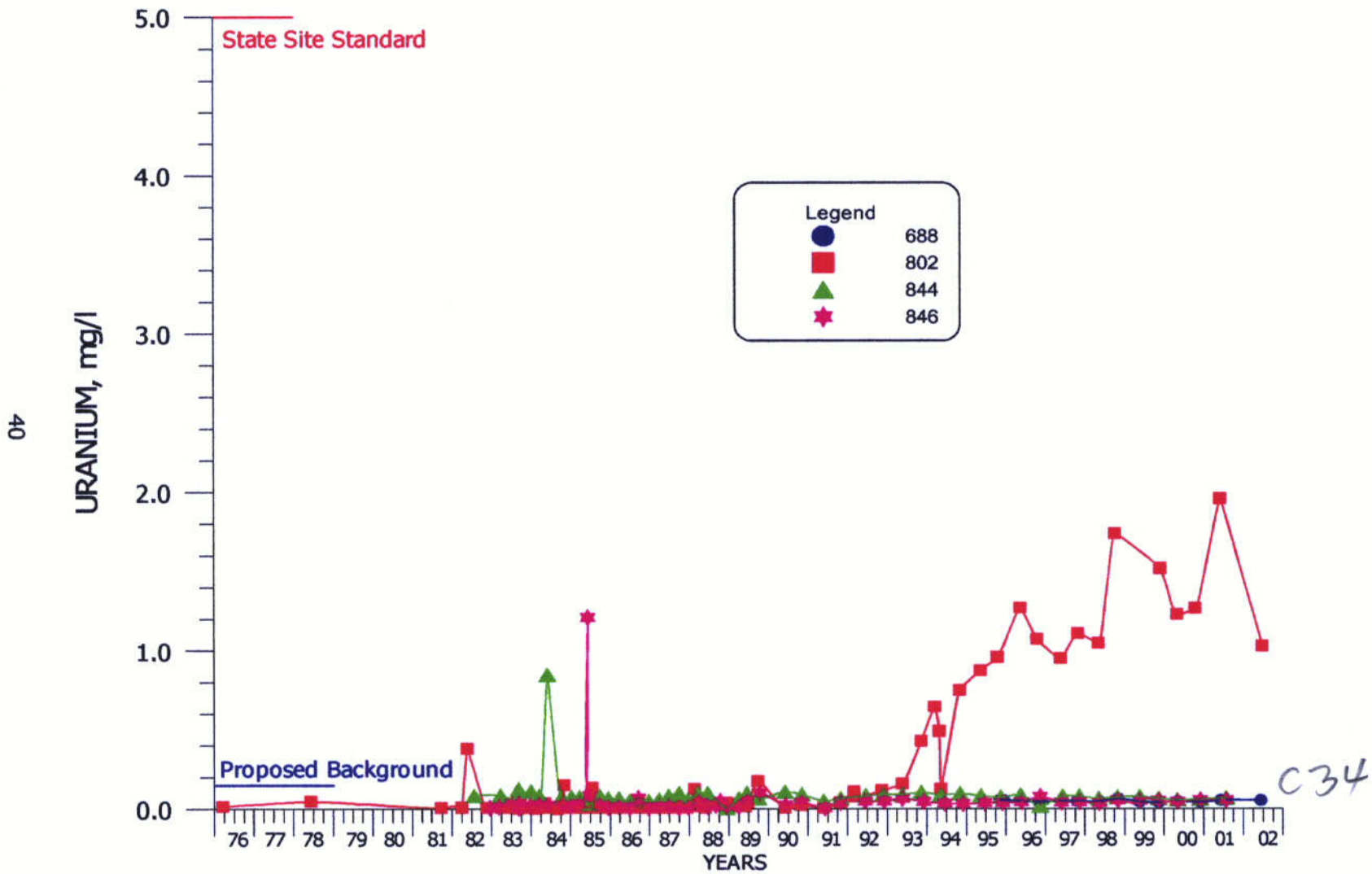


FIGURE 34. URANIUM CONCENTRATIONS FOR WELLS 688, 802, 844 AND 846.

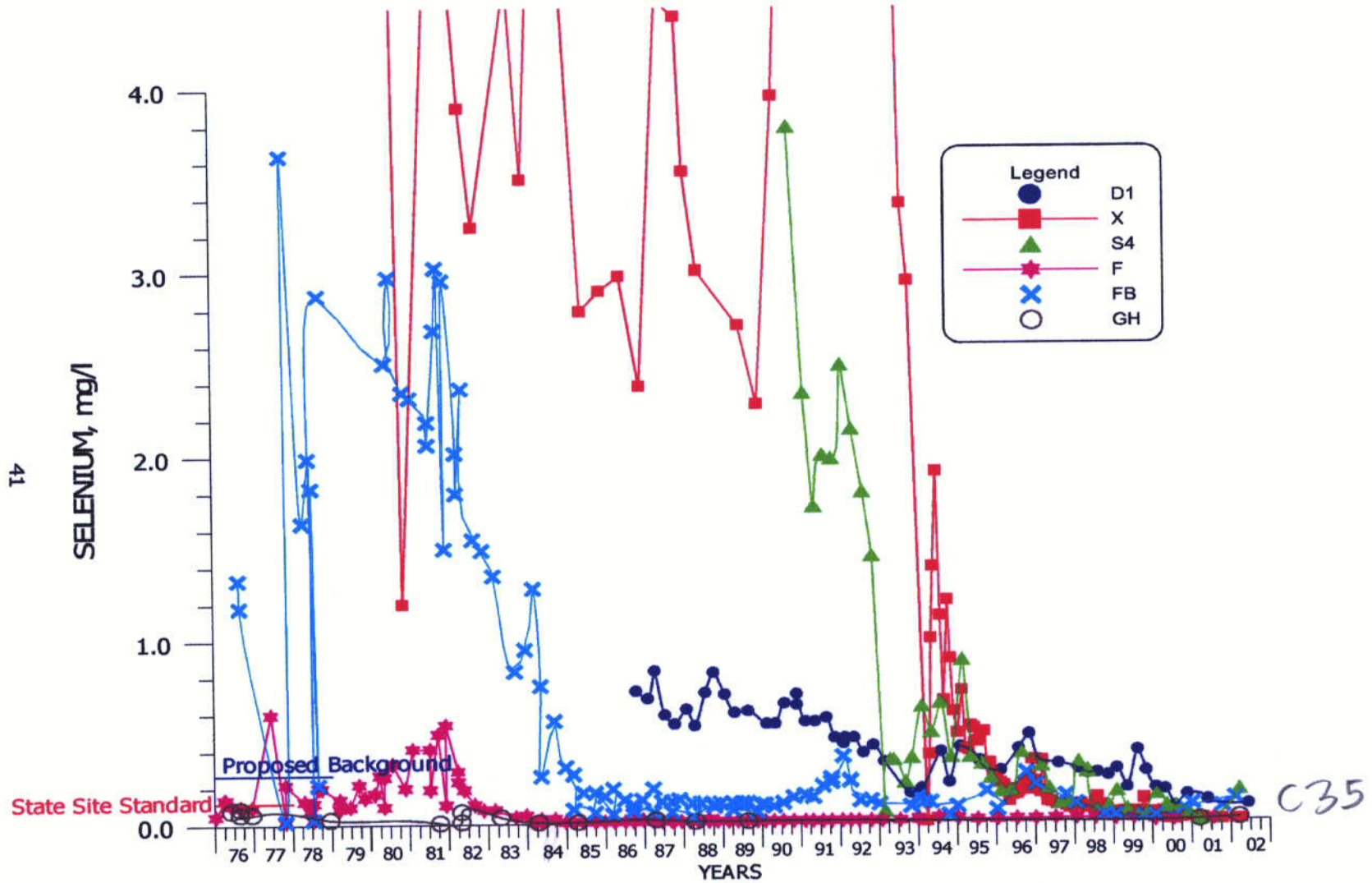


FIGURE 35. SELENIUM CONCENTRATIONS FOR WELLS D1, X, S4, F, FB AND GH.

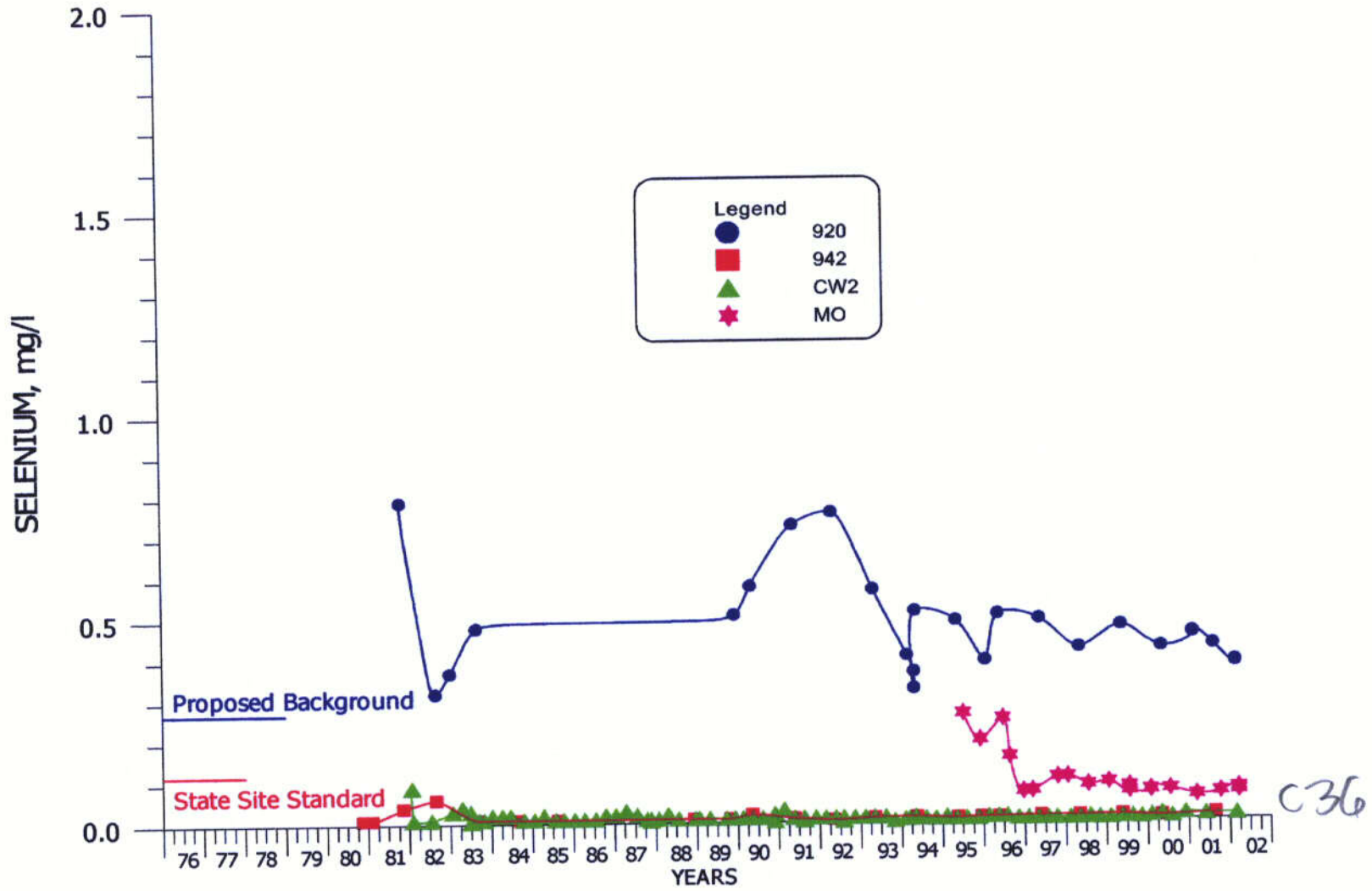


FIGURE 36. SELENIUM CONCENTRATIONS FOR WELLS 920, 942, CW2 AND MO.

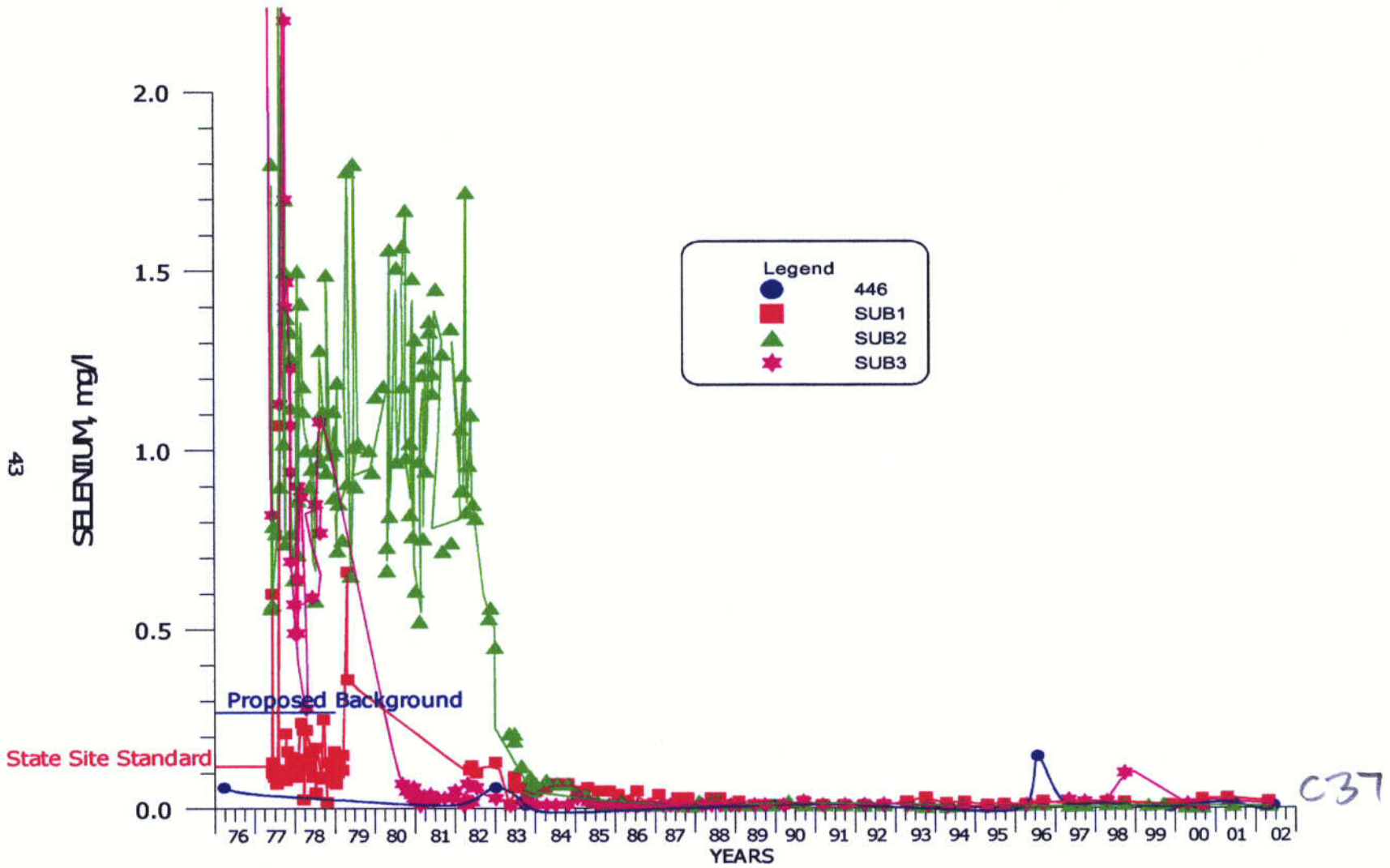
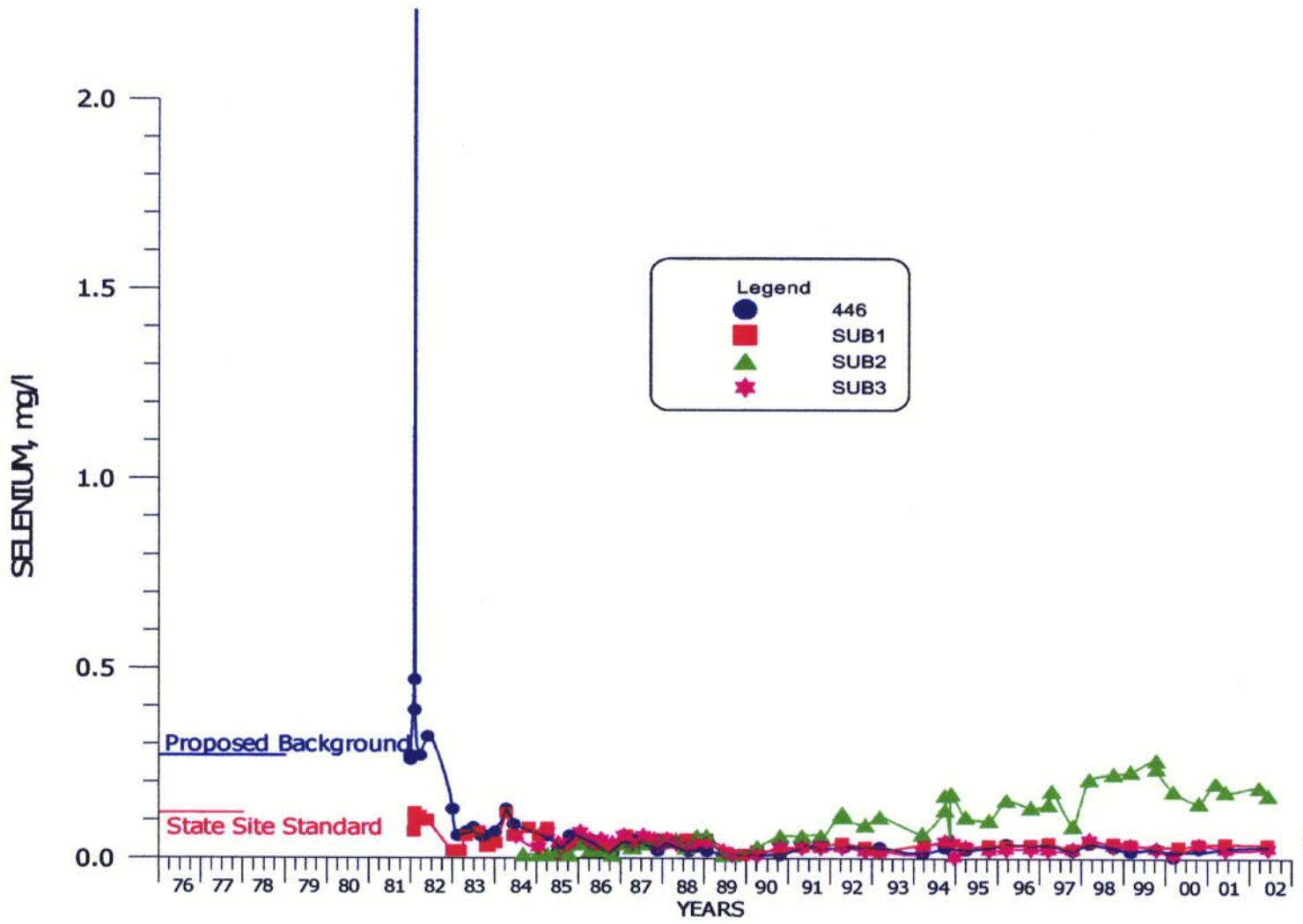


FIGURE 37. SELENIUM CONCENTRATIONS FOR WELLS 446, SUB1, SUB2 AND SUB3.

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C38

FIGURE 38. SELENIUM CONCENTRATIONS FOR WELLS 490, 492, 493 AND 494.

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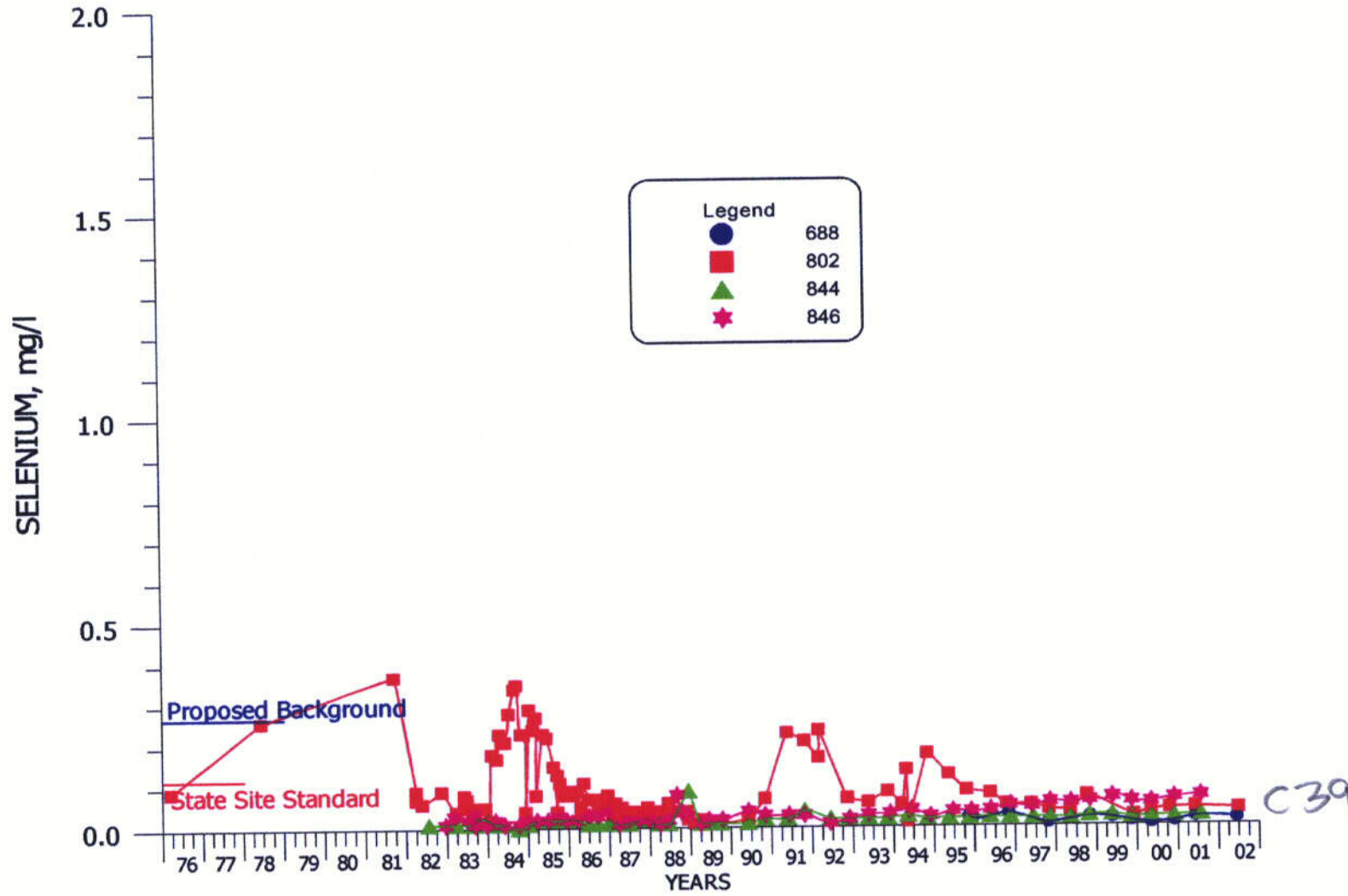


FIGURE 39. SELENIUM CONCENTRATIONS FOR WELLS 688, 802, 844 AND 846.

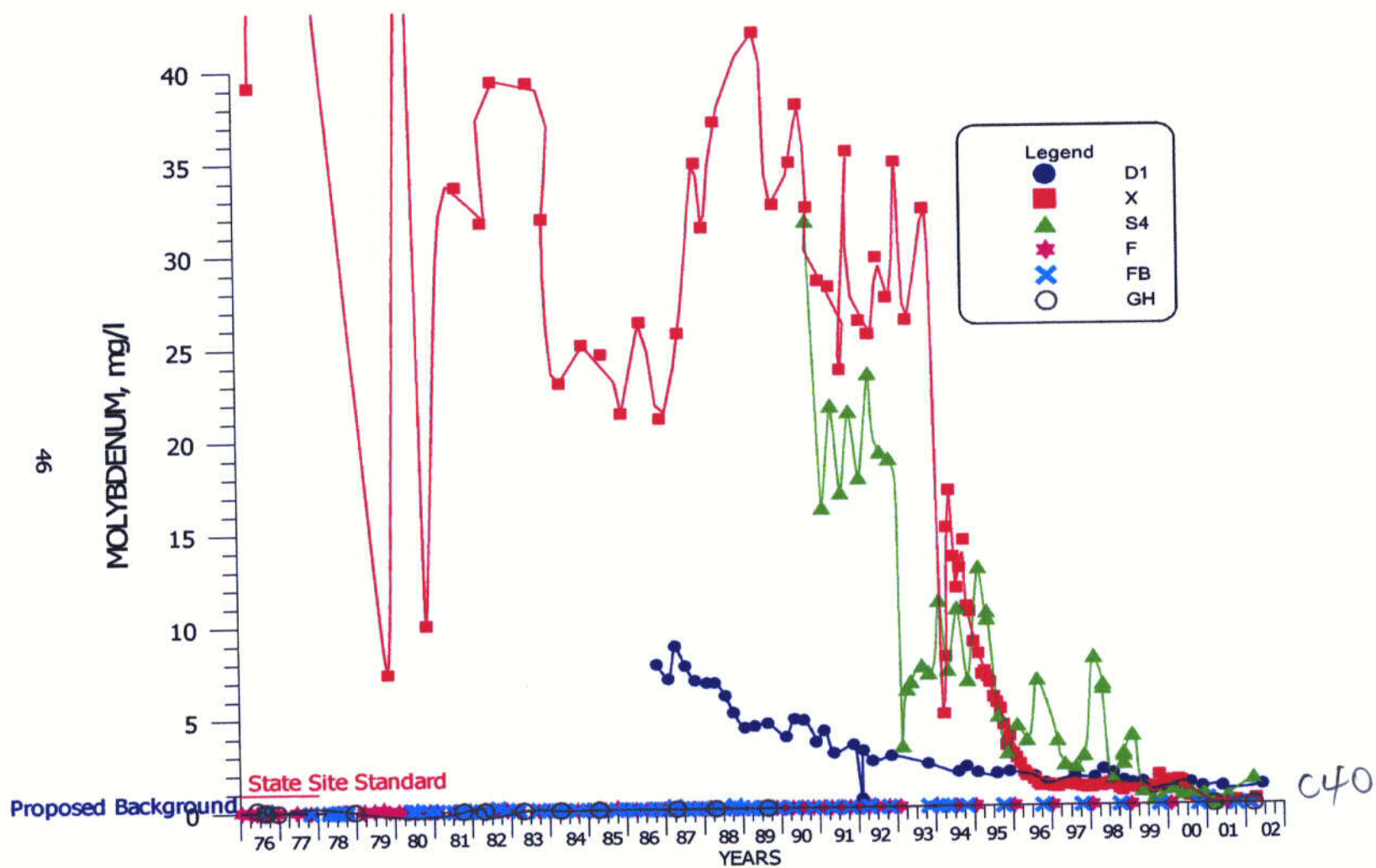


FIGURE 40. MOLYBDENUM CONCENTRATIONS FOR WELLS D1, X, S4, F, FB AND GH.

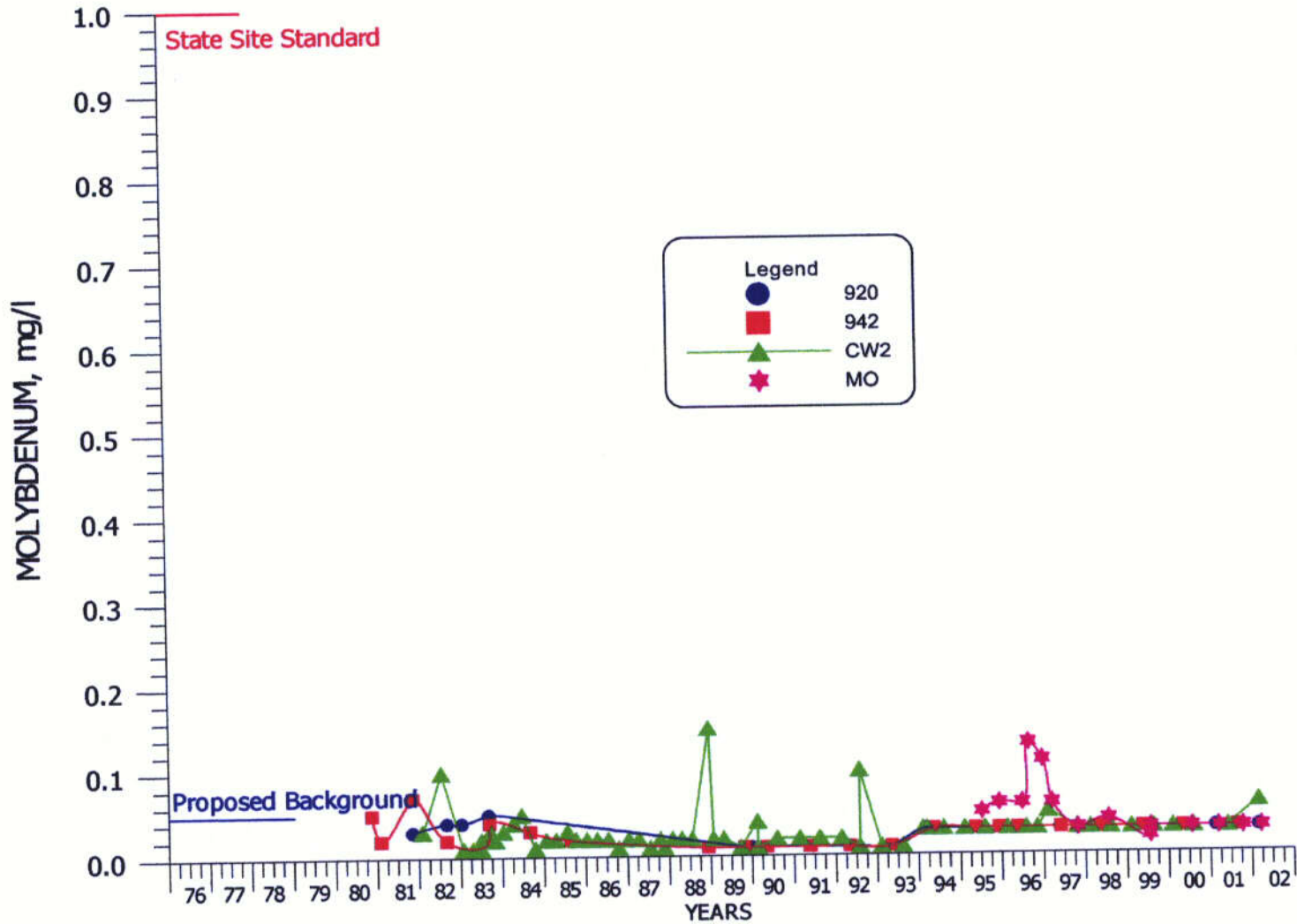


FIGURE 41. MOLYBDENUM CONCENTRATIONS FOR WELLS 920, 942, CW2 AND MO.

C41

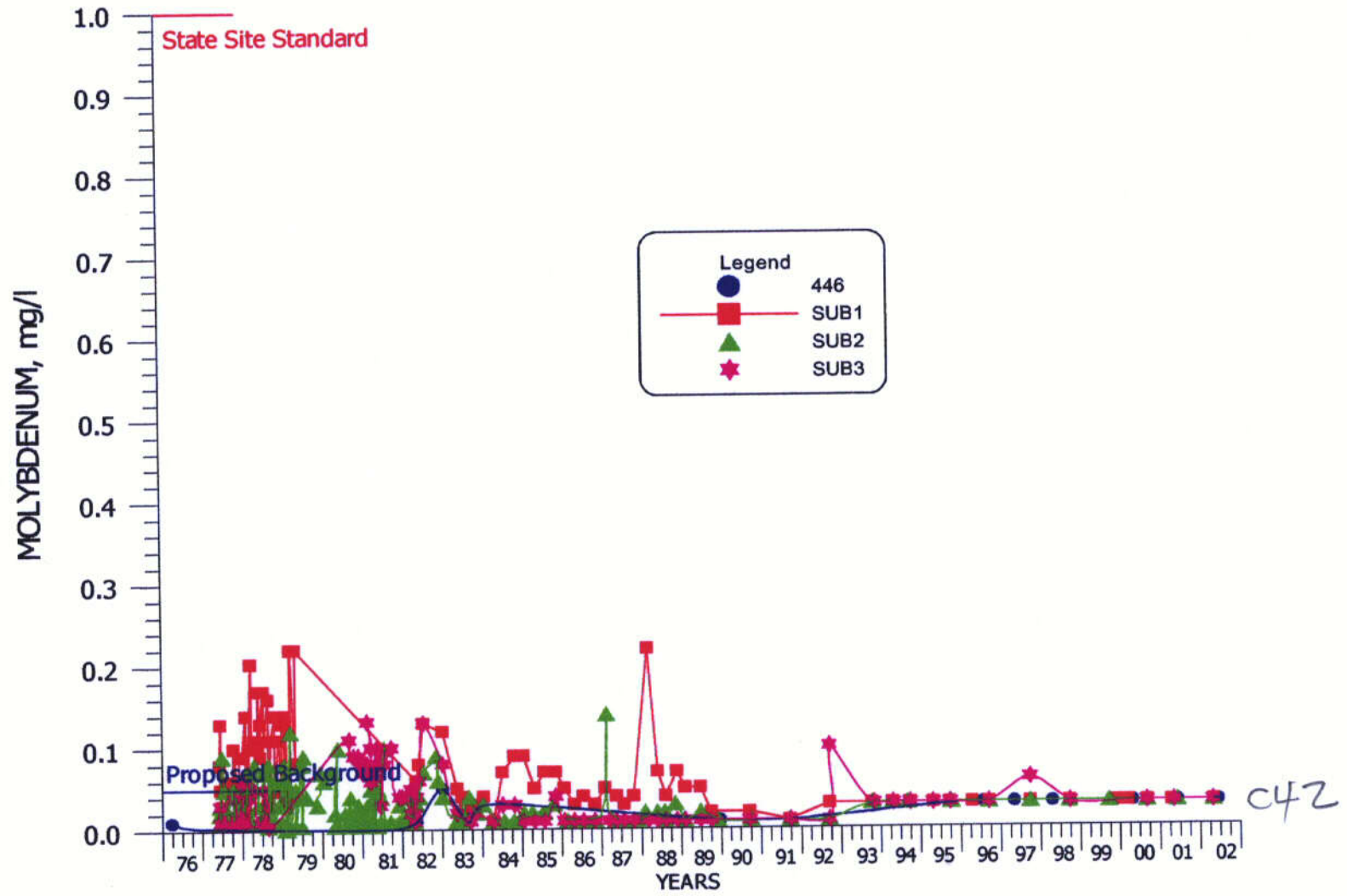
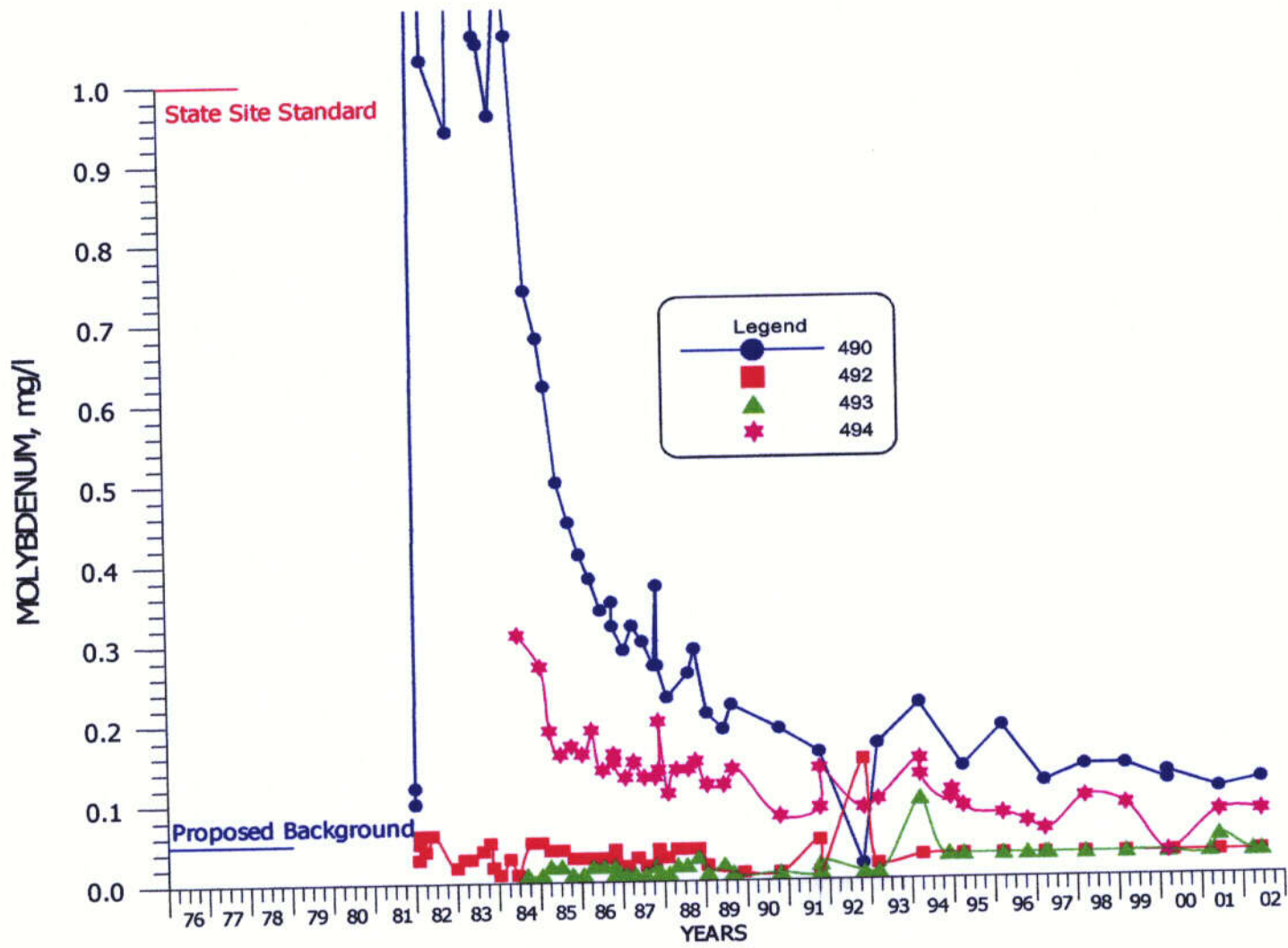


FIGURE 42. MOLYBDENUM CONCENTRATIONS FOR WELLS 446, SUB1, SUB2 AND SUB3.



C43

FIGURE 43. MOLYBDENUM CONCENTRATIONS FOR WELLS 490, 492, 493 AND 494.

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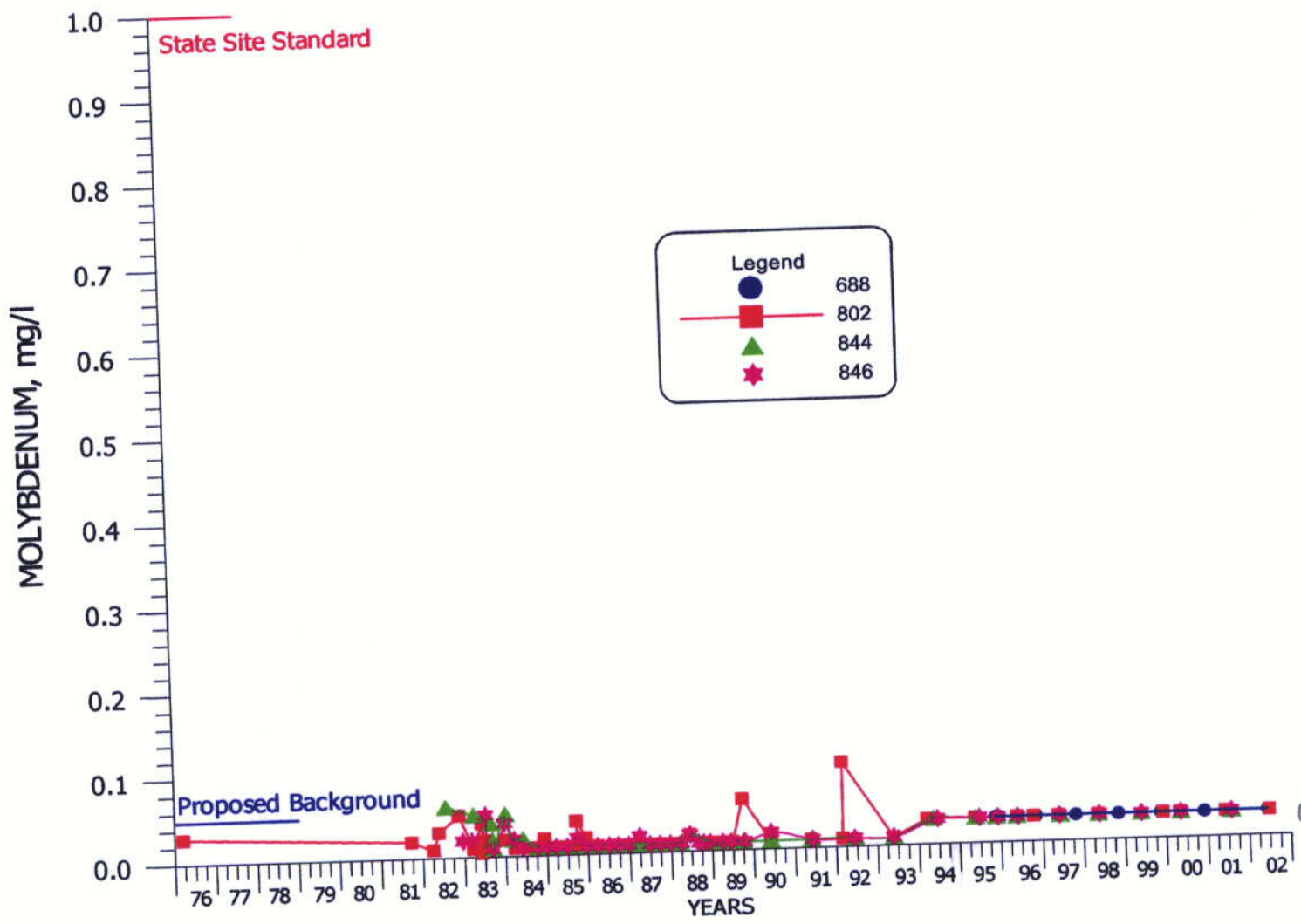
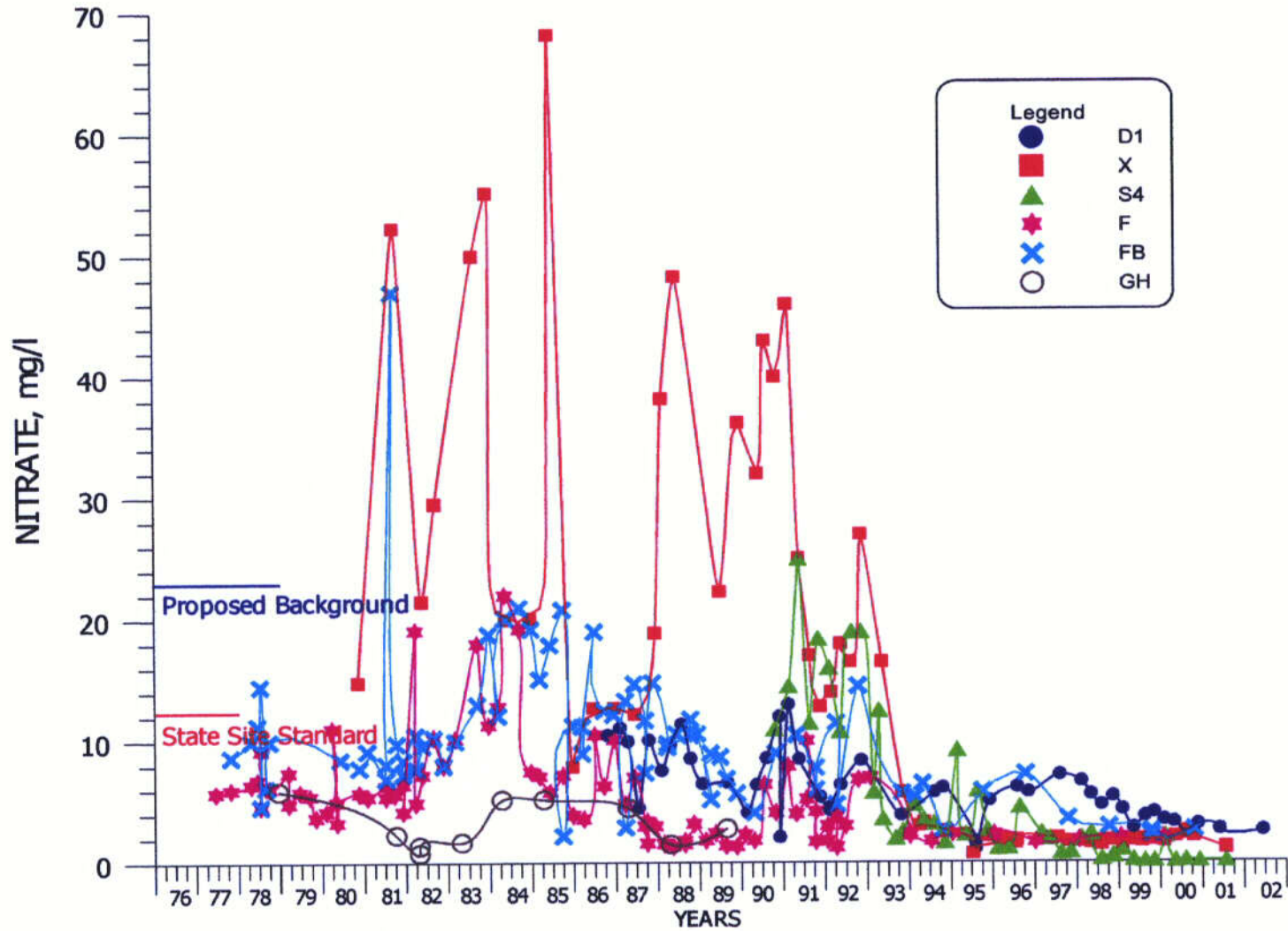


FIGURE 44. MOLYBDENUM CONCENTRATIONS FOR WELLS 688, 802, 844 AND 846.



C45

FIGURE 45. NITRATE CONCENTRATIONS FOR WELLS D1, X, S4, F, FB AND GH.

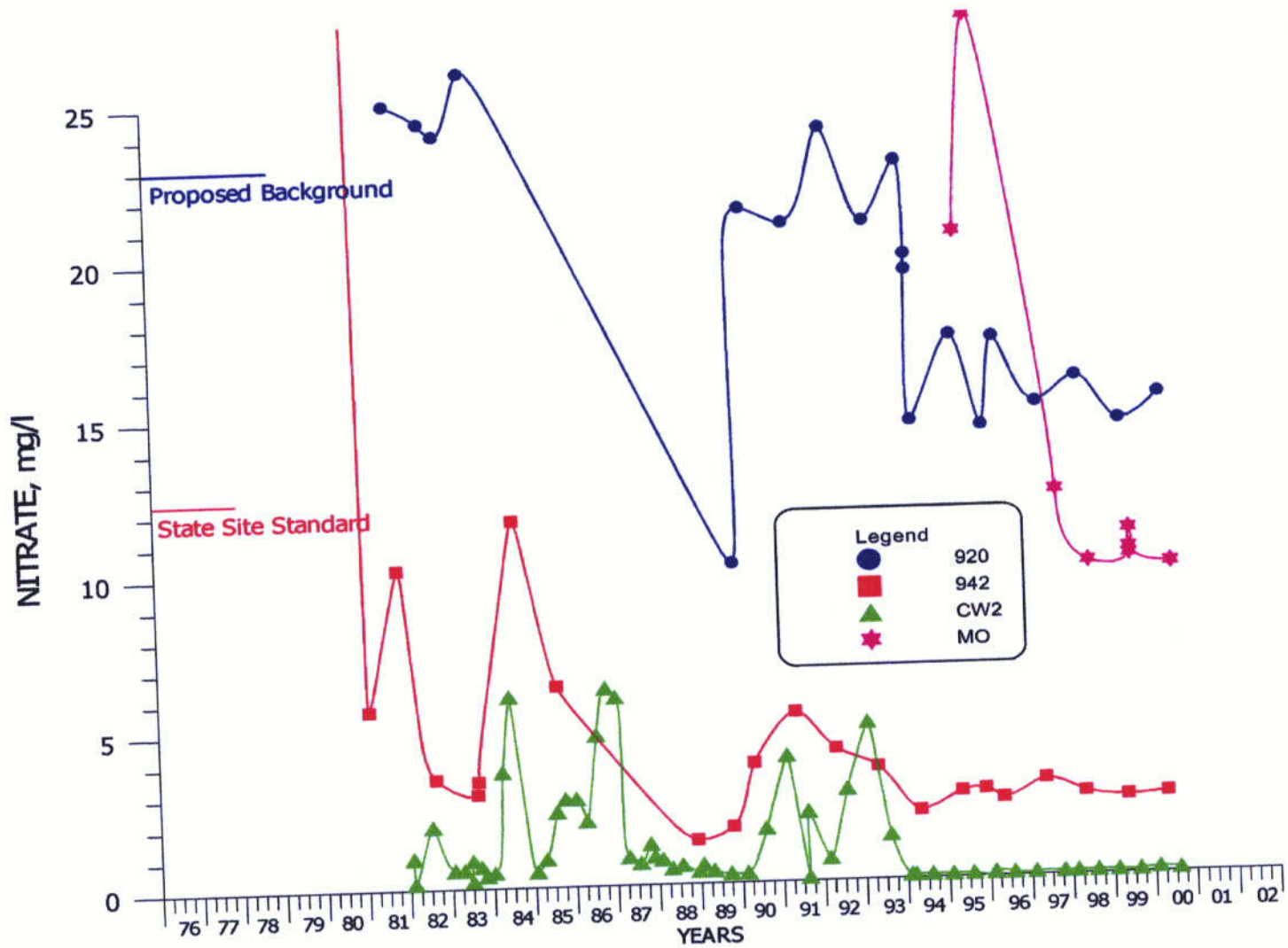
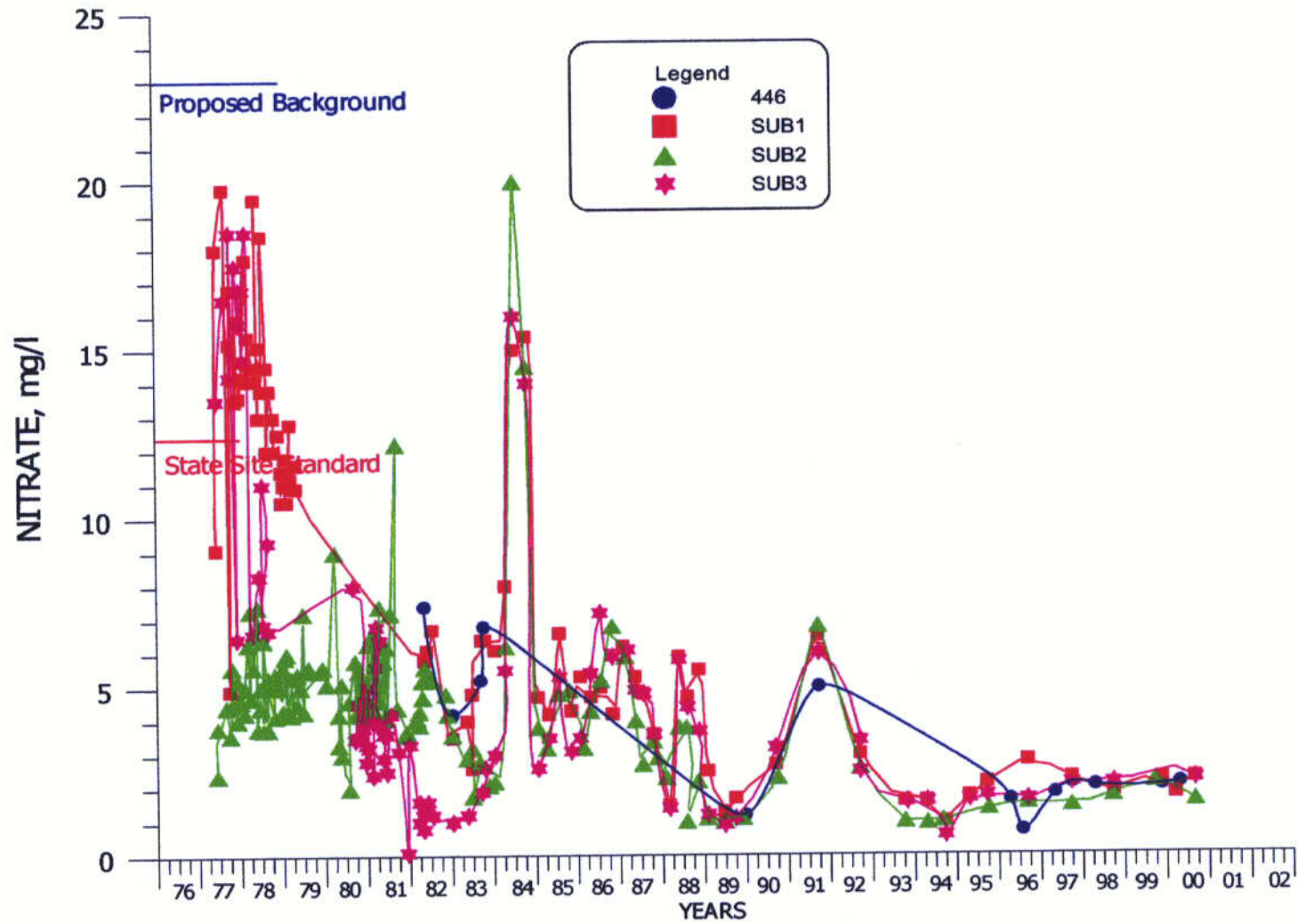


FIGURE 46. NITRATE CONCENTRATIONS FOR WELLS 920, 942, CW2 AND MO.

C46

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C47

FIGURE 47. NITRATE CONCENTRATIONS FOR WELLS 446, SUB1, SUB2 AND SUB3.

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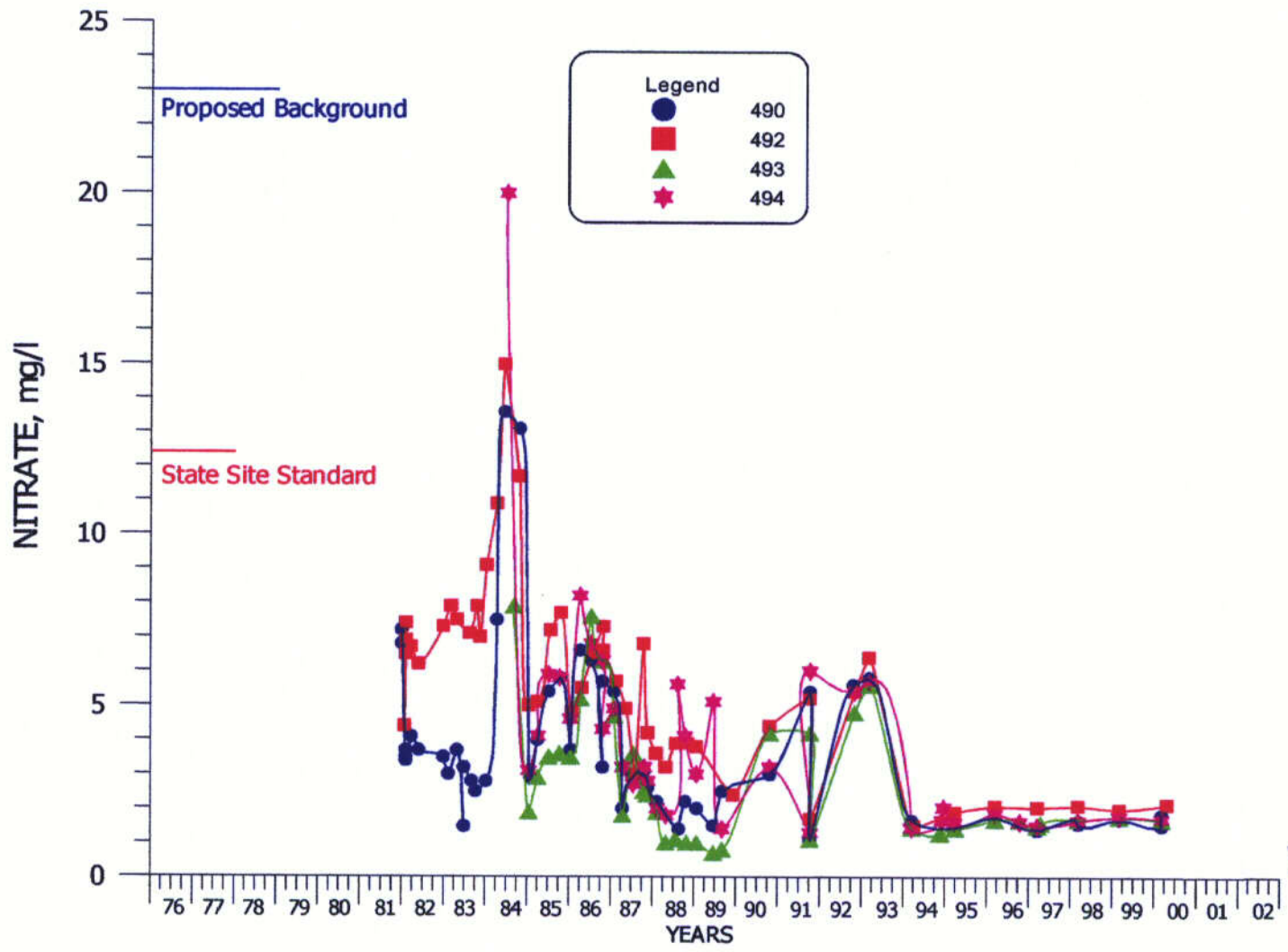
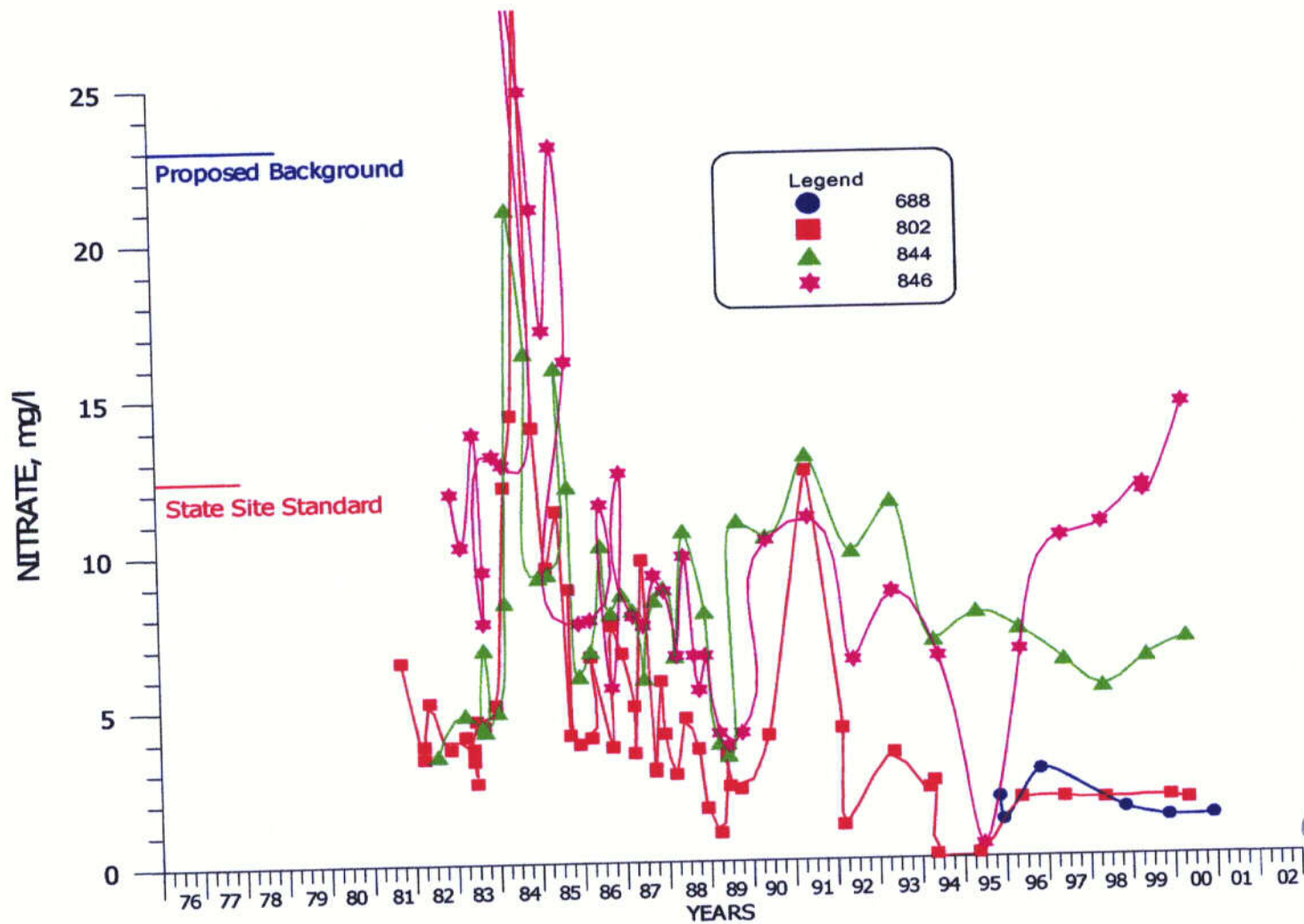


FIGURE 48. NITRATE CONCENTRATIONS FOR WELLS 490, 492, 493 AND 494.

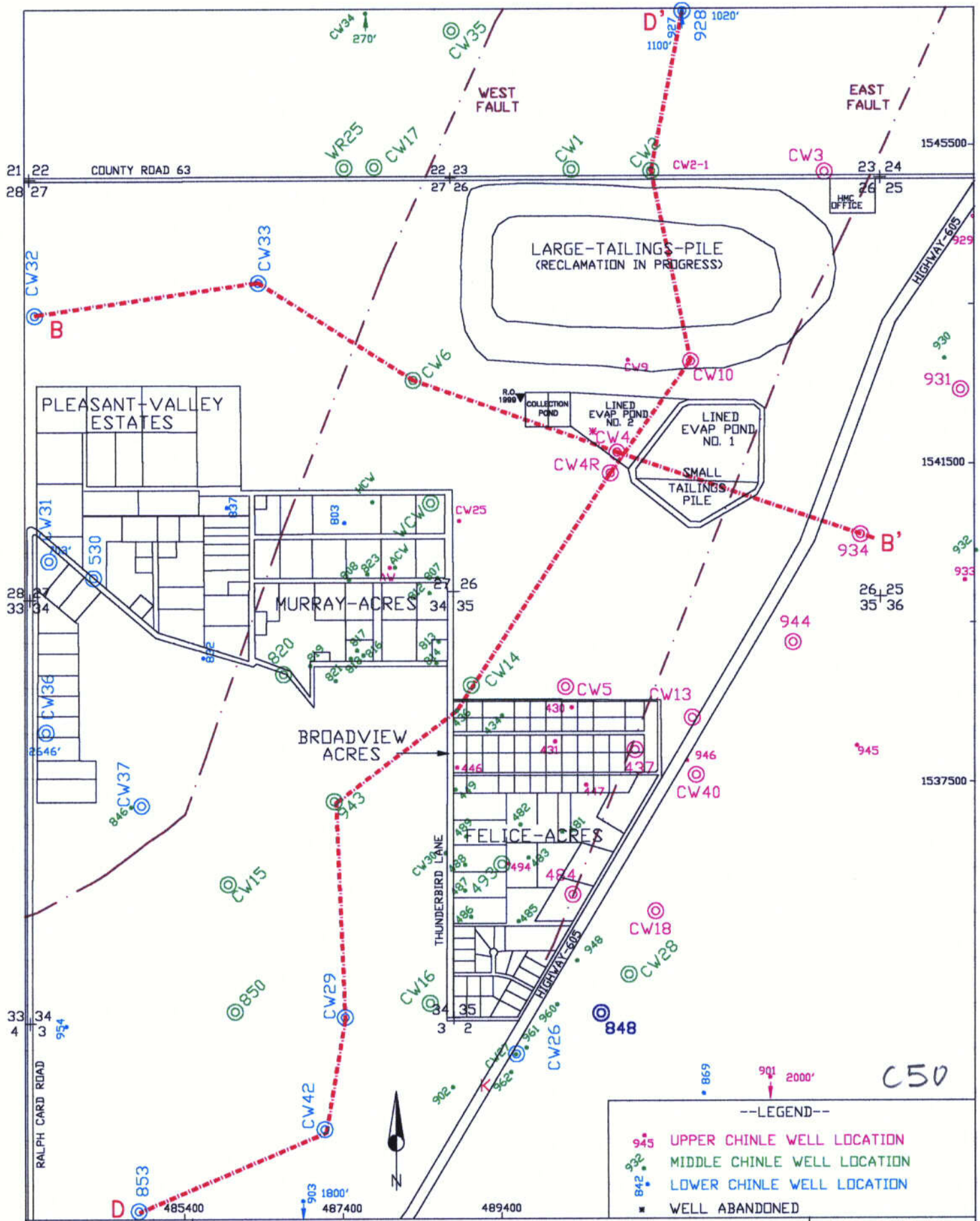
48

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C49

FIGURE 49. NITRATE CONCENTRATIONS FOR WELLS 688, 802, 844 AND 846.



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FIGURE 50. LOCATIONS OF GEOLOGIC CROSS SECTIONS

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D-01

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CONCENTRATIONS ON GEOLOGIC
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D-05

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D-06